U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NUREG-2237

Environmental Impact Statement for the Holtec International's License Application for a Consolidated Interim Storage Facility for Spent Nuclear Fuel in Lea County, New Mexico

Final Report

Office of Nuclear Material Safety and Safeguards

AVAILABILITY OF REFERENCE MATERIALS IN NRC PUBLICATIONS

NRC Reference Material

As of November 1999, you may electronically access NUREG-series publications and other NRC records at the NRC's Library at www.nrc.gov/reading-rm.html. Publicly released records include, to name a few, NUREG-series publications; *Federal Register* notices; applicant, licensee, and vendor documents and correspondence; NRC correspondence and internal memoranda; bulletins and information notices; inspection and investigative reports; licensee event reports; and Commission papers and their attachments.

NRC publications in the NUREG series, NRC regulations, and Title 10, "Energy," in the *Code of Federal Regulations* may also be purchased from one of these two sources:

1. **The Superintendent of Documents**
   U.S. Government Publishing Office
   Washington, DC 20402-0001
   Internet: www.bookstore.gpo.gov
   Telephone: (202) 512-1800
   Fax: (202) 512-2104

2. **The National Technical Information Service**
   5301 Shawnee Road
   Alexandria, VA 22312-0002
   Internet: www.ntis.gov
   1-800-553-6847 or, locally, (703) 605-6000

A single copy of each NRC draft report for comment is available free, to the extent of supply, upon written request as follows:

Address: **U.S. Nuclear Regulatory Commission**
Office of Administration
Digital Communications and Administrative Services Branch
Washington, DC 20555-0001
E-mail: Reproduction.Resource@nrc.gov
Facsimile: (301) 415-2289

Some publications in the NUREG series that are posted at the NRC's Web site address www.nrc.gov/reading-rm/doc-collections/nuregs are updated periodically and may differ from the last printed version. Although references to material found on a Web site bear the date the material was accessed, the material available on the date cited may subsequently be removed from the site.

Non-NRC Reference Material

Documents available from public and special technical libraries include all open literature items, such as books, journal articles, transactions, *Federal Register* notices, Federal and State legislation, and congressional reports. Such documents as theses, dissertations, foreign reports and translations, and non-NRC conference proceedings may be purchased from their sponsoring organization.

Copies of industry codes and standards used in a substantive manner in the NRC regulatory process are maintained at—

The NRC Technical Library
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852-2738

These standards are available in the library for reference use by the public. Codes and standards are usually copyrighted and may be purchased from the originating organization or, if they are American National Standards, from—

American National Standards Institute
11 West 42nd Street
New York, NY 10036-8002
Internet: www.ansi.org
(212) 642-4900

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NUREG-2237

Environmental Impact Statement for the Holtec International's License Application for a Consolidated Interim Storage Facility for Spent Nuclear Fuel in Lea County, New Mexico

Final Report

Manuscript Completed: July 2022
Date Published: July 2022

Prepared by
U.S Nuclear Regulatory Commission

U.S. Bureau of Land Management
Carlsbad Field Office
Carlsbad, New Mexico

Office of Nuclear Material Safety and Safeguards

ABSTRACT

The U.S. Nuclear Regulatory Commission (NRC) prepared this environmental impact statement (EIS) as part of its environmental review of the Holtec International (Holtec) license application to construct and operate a consolidated interim storage facility (CISF) for spent nuclear fuel (SNF) and Greater-Than-Class C waste, along with a small quantity of mixed oxide fuel. The proposed CISF would be located in southeast New Mexico at a site located approximately halfway between the cities of Carlsbad and Hobbs, New Mexico. This EIS includes the NRC staff's evaluation of the environmental impacts of the proposed action and the No-Action alternative. The proposed action is the issuance of an NRC license authorizing the initial phase (Phase 1) of the project to store up to 8,680 metric tons of uranium (MTUs) [9,568 short tons] in 500 canisters for a license period of 40 years. Holtec plans to subsequently request amendments to the license to store an additional 500 canisters for each of 19 expansion phases of the proposed CISF (a total of 20 phases), to be completed over the course of 20 years, and to expand the proposed facility to eventually store up to 10,000 canisters of SNF.

Holtec's expansion of the proposed project (i.e., Phases 2-20) is not part of the proposed action currently pending before the agency. However, as a matter of discretion, the NRC staff considered these expansion phases in its description of the affected environment and impact determinations in this EIS, where appropriate, when the environmental impacts of the potential future expansion can be determined so as to conduct a bounded analysis for the proposed CISF project. For the bounding analysis, the NRC staff assumes the storage of up to 10,000 canisters of SNF.

Based on its environmental review, the NRC staff recommendation is issuance of a license to Holtec authorizing the initial phase of the project, subject to the determinations in the staff's safety review of the application. The NRC staff based its recommendation on the following:

- the environmental report submitted by Holtec
- the NRC staff's consultation with Federal, State, Tribal, and local government agencies
- the NRC staff's independent environmental review
- the NRC staff's consideration of public comments received during the scoping process
- the NRC staff's consideration of public comments on the draft EIS

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

BACKGROUND

By letter dated March 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) received an application from Holtec International (Holtec) requesting a license that would authorize Holtec to construct and operate a consolidated interim storage facility (CISF) for spent nuclear fuel (SNF) and Greater-Than-Class C (GTCC) waste, along with a small quantity of mixed-oxide fuel, which are collectively referred to in this document as SNF, and composed primarily of spent uranium-based fuel. The license application includes an Environmental Report (ER), a Safety Analysis Report (SAR), and other relevant documents. Holtec prepared the license application in accordance with requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 72, *Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste*. This environmental impact statement (EIS) was prepared consistent with NRC's National Environmental Policy Act (NEPA)-implementing regulations contained in 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions" and the NRC staff guidance in NUREG–1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs" (NRC, 2003).

The proposed action is the issuance, under the provisions of 10 CFR Part 72, of an NRC license authorizing the construction and operation of the proposed Holtec CISF in southeastern New Mexico at a site located approximately halfway between the cities of Carlsbad and Hobbs, New Mexico. Holtec requests authorization for the initial phase (Phase 1) of the proposed project to store 5,000 metric tons of uranium (MTUs) [5,512 short tons] in 500 canisters for a 40-year license period. However, because the capacity of individual canisters can vary, the 500 canisters proposed in the Holtec license application have the potential to hold up to 8,680 MTUs [9,568 short tons]. Therefore, the analysis in this EIS and in the corresponding NRC safety review will analyze the storage of up to 8,680 MTUs [9,568 short tons] for Phase 1.

Holtec anticipates subsequently requesting amendments to the license to store an additional 5,000 MTUs [5,512 short tons] for each of 19 expansion phases of the proposed CISF to be completed over the course of 20 years to expand the facility to eventually store up to 10,000 canisters of SNF). Holtec's expansion of the proposed project (i.e., Phases 2-20) is not part of the proposed action currently pending before the agency. However, the NRC staff considered these expansion phases in its description of the affected environment and impact determination, where appropriate, when the environmental impacts of the potential future expansion were able to be determined so as to conduct a bounding analysis for the proposed CISF project. The NRC staff conducted this analysis as a matter of discretion because Holtec provided the analysis of the environmental impacts of the future anticipated expansion of the proposed facility as part of its license application. For the bounding analysis, the NRC staff assumes the storage of up to 10,000 canisters of SNF.

The NRC identified the U.S. Bureau of Land Management (BLM) as a cooperating agency for the Holtec CISF environmental review. The transfer of SNF to and from the main rail line to the proposed CISF would occur using a rail spur. The proposed rail spur would be constructed on BLM land and require BLM permitting. The Memorandum of Understanding (MOU) between the NRC and BLM can be found using the Agencywide Documents Access and Management System (ADAMS) (Accession No. ML18248A133). BLM will be the agency responsible for issuing the appropriate right-of-way for the rail spur and permitting any other project-related actions on BLM land. This EIS will serve to fulfill the NEPA responsibilities of both the NRC and BLM, with both agencies issuing a separate Record of Decision.

At the request of the State of New Mexico, the New Mexico Environment Department (NMED) was identified as a cooperating agency having special expertise in surface water and groundwater resources for the proposed CISF project. The NRC staff coordinated with NMED staff on water resources for this EIS to describe the affected environment, potential impacts from the proposed project, cumulative impacts, and any additional mitigation measures. The NMED does not have any obligations under NEPA related to the proposed project; however, NMED provided special expertise for water resources in and around the proposed site.

The scope of the EIS includes an evaluation of the radiological and non-radiological environmental impacts of consolidated interim storage of SNF at the proposed CISF location and the No-Action alternative, as well as mitigation measures to either reduce or avoid adverse effects. It also includes the NRC staff's recommendation regarding the proposed action.

PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed Holtec CISF is to provide an option for storing SNF from nuclear power reactors before a permanent repository is available. SNF would be received from operating, decommissioning, and decommissioned reactor facilities.

The proposed CISF is needed to provide away-from-reactor SNF storage capacity that would allow SNF to be transferred from existing reactor sites and stored for the 40-year license term before a permanent repository is available. Additional away-from-reactor storage capacity is needed, in particular, to provide the option for away-from-reactor storage so that stored SNF at decommissioned reactor sites may be removed so the land at these sites is available for other uses. This definition of purpose and need reflects the Commission's recognition that, unless there are findings in the safety review or findings in the NEPA environmental analysis that would lead the NRC to reject a license application, the NRC has no role in a company's business decision to submit a license application to operate a CISF at a particular location.

The BLM purpose and need is to provide direction for managing public lands the BLM administers in accordance with its mandate under the Federal Land Policy and Management Act of 1976. The proposed rail spur is needed to efficiently transfer SNF from existing rail lines to the proposed CISF.

THE PROJECT AREA

The proposed CISF project would be built and operated on approximately 421 hectares (ha) [1,040 (acres) ac] of land in Lea County, New Mexico (EIS Figure 2.2-1). The storage and operations area, which is a smaller land area within the full property boundary, would include 134 ha [330 ac] of disturbed land. The proposed project area is approximately 51 kilometers (km) [32 miles (mi)] east of Carlsbad, New Mexico, and 54 km [34 mi] west of Hobbs, New Mexico. Currently, the proposed project area is privately owned by the Eddy-Lea Energy Alliance LLC (ELEA); however, Holtec has committed to purchasing the property from ELEA if the NRC licenses the proposed facility. The proposed project area is located 0.84 km [0.52 mi] north of U.S. Highway 62/180 and consists of mostly undeveloped land used for cattle grazing.

Facility Construction, Operations, and Decommissioning and Reclamation

During the construction of the proposed action (Phase 1) of the CISF, Holtec would excavate multiple areas to accommodate and install the underground portions of the facilities. For the proposed action (Phase 1), the proposed CISF would be prepared by excavating a pit that would house the SNF canisters in the vertical ventilated modules (VVMs). Soil would be excavated for each subsequent phase; however, for the proposed action (Phase 1) the largest amount of soil would be excavated for construction of the facility buildings (e.g., security and administration buildings) and associated infrastructure, the access road, relocating the existing road that currently runs through the proposed project area, construction of the rail spur, and construction of the parking lot.

During CISF operations, transportation casks containing canisters of SNF would arrive via rail car. Upon arrival, casks would be surveyed and inspected, moved to a cask transfer building, transported in a transfer cask to the storage pad area, and installed in the appropriate storage module at the independent spent fuel storage installation (ISFSI) pad. When a geologic repository becomes available, the SNF stored at the proposed CISF would be removed and sent to the repository for disposal. Removal of the SNF from the proposed CISF, or defueling, would involve similar activities to those associated with shipping SNF from nuclear power plants and ISFSIs and emplacement of SNF at the proposed CISF project and is considered part of the operations stage of the proposed project.

Decommissioning and reclamation of the proposed facility would include the dismantling of the proposed facility and rail spur. The decommissioning evaluation in this EIS is based on currently available information and plans. At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area. Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; controlling erosion; and restoring and reclaiming disturbed areas. Because decommissioning and reclamation are likely to take place well into the future, technological changes that could improve the decommissioning and reclamation processes cannot be predicted. As a result, the NRC requires that licensees applying to decommission an ISFSI (such as the proposed CISF) submit a Decommissioning Plan. The requirements for the Final Decommissioning Plan are delineated in 10 CFR 72.54(d), 72.54(g), and 72.54(i). The NRC staff would undertake a separate evaluation and NEPA review and prepare an environmental assessment or EIS, as appropriate, at the time the Decommissioning Plan is submitted to the NRC.

ALTERNATIVES

The NRC environmental review regulations that implement NEPA in 10 CFR Part 51 require the NRC to consider reasonable alternatives, including the No-Action alternative, to a proposed action (Phase 1). The alternatives have been established based on the purpose and need for the proposed project. Under the No-Action alternative, the NRC would not approve the Holtec license application for the proposed CISF. The No-Action alternative would result in Holtec not constructing or operating the proposed CISF. As further detailed in EIS Section 2.3, other alternatives considered at the proposed CISF Project but eliminated from detailed analysis include storage at a government-owned CISF, alternative design and storage technologies, an alternative location, and an alternative facility layout. These alternatives were eliminated from detailed study because they either would not meet the purpose and need of the proposed project or would cause greater environmental impacts than the proposed action.

SUMMARY OF ENVIRONMENTAL IMPACTS

This EIS includes the NRC staff analysis that considers and weighs the environmental impacts from the construction, operations, and decommissioning and reclamation of the proposed CISF Project and for the No-Action alternative. This EIS also describes mitigation measures for the reduction or avoidance of potential adverse impacts that (i) the applicant has committed to in its license application, (ii) would be required under other Federal and State permits or processes, or (iii) are additional measures the NRC staff identified as having the potential to reduce environmental impacts, but that the applicant did not commit to in its application.

NUREG–1748 categorizes the significance of potential environmental impacts as follows:

SMALL: The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE: The environmental effects are sufficient to alter noticeably, but not destabilize, important attributes of the resource.

LARGE: The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

Chapter 4 of the EIS presents a detailed evaluation of the environmental impacts from the proposed action and the No-Action alternative on resource areas at the proposed CISF. For each resource area, the NRC staff identifies the significance level during each stage of the proposed project: construction, operations, and decommissioning and reclamation.

Impacts by Resource Area and CISF Stage

Land Use

Construction: Impacts would be SMALL. Approximately 48.3 ha [119.4 ac] of land disturbance would occur under the proposed action (Phase 1). The approximately 133.5 ha [330 ac] of land disturbance for full build-out (Phases 1-20) from the construction stage would be relatively minor compared to the 421-ha [1,040-ac] proposed project area. For all phases, Holtec has committed to mitigation measures, such as stabilizing disturbed areas with natural landscaping and protecting undisturbed areas with silt fencing and straw bales to reduce the impacts of surface disturbance during construction. Prohibiting grazing within the fenced 114.5-ha [283-ac] protected area would have a minor impact on local livestock production because there would be abundant open land available for grazing around the storage and operations area and surrounding the proposed project area. Likewise, because there would be abundant open land available around the proposed project area, impacts to recreational activities would be minor. Potash would remain available for extraction by leaseholders from the Permian Salado Formation beneath the proposed CISF project area. However, given the current market prices for potash, the international surplus, the requirements for obtaining additional permits for any new mines or to expand existing extraction activities, engineering challenges, and the constraints on the existing local potash mill for processing potash ores, it is highly unlikely that additional potash activities or extraction will occur beneath the proposed CISF site. Existing oil and gas leases within and adjacent to the proposed project area would remain in effect. Oil and gas reserves will remain available for extraction either by horizontal or vertical drilling. Therefore, the NRC staff concludes that the land use impacts during the construction stage for the proposed action (Phase 1) would be SMALL, and potential impacts for Phases 2-20 would also be SMALL.

The rail spur would be constructed to connect the proposed CISF project to an industrial railroad that lies 6.1 km [3.8 mi] to the west. The disturbed land area for the rail spur would be 15.9 ha [39.4 ac] of BLM-managed land. A site access road would also be constructed across BLM-managed land from the proposed CISF project southward to U.S. Highway 62/180. Construction of the rail spur and site access road would require right-of-way approval on Federal lands from BLM. Due to the small amount of disturbed land, relatively flat terrain, lack of highway crossing, and joint location of the access road along the rail spur right-of-way, the NRC and BLM staffs conclude that impacts from construction of the rail spur on land use would be SMALL.

Operations: Impacts would be SMALL. For the proposed action (Phase 1), there are no activities that would require additional ground-disturbing activities. Similar to the construction stage, cattle grazing would be prohibited within the storage and operations area. The primary changes to land use during the operations stage of the proposed action (Phase 1) would be land disturbance associated with construction of SNF storage pads and modules for additional phases, because the applicant intends to operate each phase concurrently with construction of new phases. Construction of Phases 2-20 would require 85.2 ha [210.6 ac] of land in addition to the proposed action (Phase 1). To ensure that construction of additional SNF storage pads would not adversely impact operations, Holtec would maintain an adequate buffer distance between operational and construction areas. Furthermore, during operations, the current primary land use (cattle grazing) would be prohibited on 133.5 ha [330 ac] of land. Therefore, the NRC staff concludes that land use impacts associated with the operations stage for the proposed action (Phase 1) and for Phases 2-20 of the proposed CISF project would be similar to construction and would be SMALL.

Operation of the rail spur would be consistent with the local industrial uses of the land in the vicinity of the proposed project area, which supports potash mining, oil and gas exploration and development, and oil and gas service industry facilities, many of which make use of existing rail lines for materials transportation. Maintenance of the rail spur is anticipated during the operations stage. This may require use of limited equipment for repairs but is not anticipated to require land disturbance beyond that experienced during construction of the rail spur. For these reasons, the NRC and BLM staffs conclude that impacts from operation of the rail spur on land use would be SMALL.

Decommissioning and Reclamation: Impacts would be SMALL. At the end of decommissioning and reclamation of the proposed action (Phase 1) and Phases 2-20 (including the rail spur), all lands would be returned to their preoperational use of livestock grazing. Any remaining infrastructure would constitute a small portion of the area returned to pre-project conditions. Because the land use impacts for decommissioning and reclamation do not exceed those for construction or operation of the proposed CISF and would decrease as vegetation is reestablished in reclaimed areas, the NRC staff concludes that the land use impact associated with the decommissioning and reclamation stage for the proposed action (Phase 1) and for Phases 2-20 of the proposed CISF project would be SMALL.

Decommissioning and reclamation of the rail spur and associated access road would occur at the discretion of the landowner (BLM). As part of the rail spur permit application, BLM would define activities necessary to complete decommissioning per its authority and guidelines. Impacts from decommissioning and reclamation would not exceed those associated with construction of the rail spur; therefore, the NRC and BLM staffs conclude that impacts from decommissioning and reclamation of the rail spur on land use would be SMALL.

Transportation

Construction: Impacts would be SMALL. During the construction stage of the proposed CISF, trucks would be used to transport construction supplies and equipment to the proposed project area. The regional and local transportation infrastructure that would serve the proposed CISF project would be accessed from U.S. Highway 62/180, which traverses the proposed project area.

The NRC staff's construction traffic impact analysis considered the volume of estimated construction traffic from supply shipments, waste shipments, and workers commuting and determined the estimated increase in the applicable annual average daily traffic counts on the roads used to access the proposed project area. The NRC staff estimated that a total of 70 daily construction supply and waste shipments would increase the existing volume of daily truck traffic on U.S. Highway 62/180 of 2,449 trucks per day by 5.6 percent. Based on this analysis, the supply and waste shipments for the construction stage of the proposed action (Phase 1) would have a minor impact on daily traffic on U.S. Highway 62/180 near the proposed CISF project. An estimated peak construction work force of 80 workers would commute to and from the proposed CISF project construction site using individual passenger vehicles and light trucks on a daily basis. These workers could account for an increase of 160 vehicles per day (80 vehicles each way) on U.S. Highway 62/180 during construction. This amounts to an approximate 5 percent increase in daily car traffic on U.S. Highway 62/180 from the proposed CISF project construction. Traffic impacts on larger capacity roads that feed U.S. Highway 62/180 would be less than the impacts estimated for U.S. Highway 62/180. Based on this analysis, the construction stage of the proposed action (Phase 1) would have a minor impact on the daily U.S. Highway 62/180 traffic near the proposed CISF project site. For the construction stage of Phases 2-20, buildings and infrastructure would already be constructed, so the same or a smaller construction worker commuting volume would occur compared to the construction phase of the proposed action (Phase 1) and would contribute the same or less transportation impacts. Therefore, the NRC staff concludes that the transportation impacts from the construction stage of the proposed action (Phase 1) and Phases 2-20 would be SMALL.

Construction of the rail spur would occur during the construction stage of the proposed action (Phase 1). The workforce required to construct the rail spur was included in the analysis of commuter impacts to transportation. The additional construction supplies necessary to build the rail spur would be significantly less than that required for construction of the proposed CISF. Therefore, the NRC and BLM staffs conclude that the addition of supplies and supply shipments would be less than those for the construction stage of the proposed action (Phase 1) and would therefore have a SMALL impact.

Operations: Impacts would be SMALL. During operations of the proposed CISF, Holtec would continue to use roadways for supply and waste shipments in addition to workforce commuting. Additionally, Holtec proposes using the national rail network for transportation of SNF from nuclear power plants and ISFSIs to the proposed CISF and eventually from the CISF to a geologic repository, when one becomes available. The operations impacts the NRC staff evaluated include traffic impacts from shipping equipment, supplies, and produced wastes, and from workers commuting during CISF operations. Other impacts evaluated included the radiological and nonradiological health and safety impacts to workers and the public under normal and accident conditions from the proposed nationwide rail transportation of SNF to and from the proposed CISF.

The NRC staff's traffic impact analysis for the operations stage of the proposed CISF considered the volume of estimated operations traffic from supply shipments, waste shipments, and workers commuting, then determined the estimated increase in the applicable annual average daily traffic counts on the roads used to access the proposed project area. The NRC staff estimated that 73 waste shipments would occur during operations per year or about 1 shipment every 5 days. The operations workforce would include 40 regular employees and 15 security staff at full build-out commuting daily to and from the proposed CISF project. These workers could account for an increase of 110 vehicles per day (55 vehicles each way) on U.S. Highway 62/180 during the operations stage of the proposed action (Phase 1) resulting in an estimated 3 percent increase in daily car traffic on U.S. Highway 62/180. Based on this analysis, the operations stage of the proposed action (Phase 1) would have a minor impact on the daily U.S. Highway 62/180 traffic near the proposed CISF project site. Traffic impacts on larger capacity roads that feed U.S. Highway 62/180 would be less than the impacts estimated for U.S. Highway 62/180. During the operations stage of Phases 2-20, construction of additional phases would occur concurrently with operations; therefore, up to an additional 80 construction workers would be commuting during the same time period. Thus, the total workforce commuting during operations (combined with construction of next phases) could add 270 vehicles per day (135 vehicles each way) to the existing U.S. Highway 62/180 traffic during operations, representing an 8 percent increase in daily car traffic on U.S. Highway 62/180. Based on this information, the NRC staff concludes that supply and waste shipments during the operation stage of the proposed action (Phase 1) and during Phases 2-20 would not noticeably contribute to traffic impacts and therefore the impacts would be SMALL.

During operation of any project phase, SNF would be shipped from existing storage sites at nuclear power plants or ISFSIs to the proposed CISF. These shipments must comply with applicable NRC and U.S. Department of Transportation (DOT) regulations for the transportation of radioactive materials in 10 CFR Parts 71 and 73 and 49 CFR Parts 107, 171–180, and 390–397, as appropriate to the mode of transport. The NRC staff evaluated the radiological and nonradiological health impacts to workers and the public from this project-specific transportation, considering both incident-free and accident conditions.

The potential radiological health impacts to workers and the public from incident-free transportation of SNF to and from the proposed CISF project would occur from exposures to the radiation emitted from the loaded transportation casks that are within specified regulatory limits. Radiation doses to workers involved in transportation of SNF would be limited to an annual dose of 0.05 Sv [5 rem] or less. The estimated occupational health effects for the proposed action (Phase 1), including fatal cancer, nonfatal cancer, and severe hereditary effects were low (sufficient to conclude most likely zero). For all phases (full build-out), the estimated number of occupational health effects is 1.4 (a small fraction of the estimated 440,000 baseline health effects within the same population). The NRC impact analysis also included estimates of in-transit, incident-free public doses to residents along the route, to occupants of vehicles sharing the route, and to residents near SNF transportation stops. All of the estimated public health effects from the proposed incident-free SNF transportation during the operations stage of the proposed action (Phase 1) and the operations stage of Phases 2-20 are low (most likely zero). An estimate of the maximally exposed public individual located 30 m [98 ft] from the rail track who is exposed to the direct radiation emitted from all 10,000 passing rail shipments of SNF at full build-out under normal operations resulted in an accumulated dose of 0.06 mSv [6-mrem].

The NRC staff also evaluated the potential occupational and public health impacts of the proposed SNF transportation under accident conditions. Based on prior NRC analyses of cask response to transportation accident conditions, releases of SNF would not be expected from the proposed SNF shipments under accident conditions. Under accident conditions with no release, the highest estimated dose consequence to an emergency responder that spends 10 hours at an accident site at an average distance of 5 m [16 ft] from the cask is 0.92 mSv [92 mrem]. The NRC staff also evaluated the potential radiological impacts to the public from the proposed SNF transportation under accident conditions. The accident scenario involves a 10-hour delay in movement of the cask at the accident scene where members of the public in the surrounding area {800 m [2,625 ft] in all directions} are exposed to direct radiation from the cask. The estimated health effects risks were negligible for the proposed action (Phase 1) and for full build-out.

The nonradiological impacts to workers and the public associated with the proposed SNF transportation under incident-free and accident conditions include typical occupational injuries and public traffic fatalities (e.g., accidents at rail crossings) and fatalities involving individuals trespassing on railroad tracks. For the proposed action (Phase 1), the NRC staff estimated that there would be 1.1 additional occupational injuries and 3.1×10^{-3} occupational fatalities. For the operations stage of Phases 2-20, the same estimated annual injuries and fatalities would apply. If all operations stages for the full build-out were conducted over a 20-year period, the cumulative total occupational impacts would be 22 injuries and 6.2×10^{-2} fatalities. The potential impacts to the public from transportation accidents include an estimated 0.23 fatalities for shipping 500 canisters of SNF from reactors to the proposed CISF. During the operations stage of Phases 2-20, an additional 500 canisters would be shipped to the proposed CISF per phase with an estimated number of fatalities equal to the proposed action (Phase 1) estimate, until the maximum of 10,000 canisters has been shipped. At full build-out, shipping 10,000 canisters from reactors to the proposed CISF over the duration of the proposed SNF shipping campaign results in 4.6 public fatalities.

Based on the NRC staff evaluation of the radiological and nonradiological health impacts to workers and the public from this project-specific transportation, considering both incident-free and accident conditions, the impact would be SMALL.

Removal of the SNF from the proposed CISF, or defueling, would contribute to additional transportation impacts that would be similar in nature to the impacts evaluated for shipping SNF from nuclear power plants and ISFSIs to the proposed CISF project and emplacing the canisters earlier in the operations stage. These additional shipments of SNF from the CISF to a repository would involve different routing and shipment distances than from the nuclear power plants and ISFSIs to the proposed CISF project. Additional impact analyses were conducted of the radiological and nonradiological health and safety impacts to workers and the public under normal and accident conditions from the national rail transportation of SNF from the proposed CISF project to a repository, based on an approach similar to the approach applied in the analysis of the SNF shipments to the proposed CISF. All of the estimated radiological health effects to workers and the public from the proposed SNF transportation under incident-free and accident conditions are low (likely to be zero). The nonradiological impacts for the repository shipments would be less than the impacts from the incoming SNF shipments. Therefore, the NRC staff concludes that the radiological and nonradiological impacts to workers and the public from SNF transportation from the CISF project to a geological repository during the defueling activities of the operation stage of the proposed action (Phase 1) and during the defueling activities of the operations stage of Phases 2-20 would be SMALL.

The transportation impacts of operating the proposed rail spur would be minor and limited by the short distance, lack of road crossings, and remote and sparsely populated location of the proposed rail spur and would not significantly add to the transportation impacts from the CISF project operations. Therefore, the NRC and BLM staffs conclude that impacts on transportation from operation of the rail spur during the operation stage of the proposed action (Phase 1) and during the operation stage of Phases 2-20 would be SMALL.

Decommissioning and Reclamation: Impacts would be SMALL. During the decommissioning and reclamation stage of the proposed CISF project, the primary transportation impacts would be traffic impacts from the use of trucks to transport decommissioning and reclamation waste materials to a disposal facility and from the commuting workforce.

The NRC staff's decommissioning and reclamation traffic impact analysis considered the volume of estimated traffic from reclamation waste shipments and workers commuting and determined the estimated increase in the applicable annual average daily traffic counts on the roads used to access the proposed project area. The NRC staff's estimated number of annual reclamation waste shipments was 18,950 or approximately 52 trucks per day, representing an estimated two percent increase in truck traffic from shipping the nonhazardous reclamation waste from the proposed action (Phase 1). For any other single phase (Phases 2-20), a shorter assumed duration of reclamation (1 year) could double this estimated increase in traffic.

At full build-out (Phases 1-20) of the proposed project, the NRC staff estimated that the volume of nonhazardous demolition waste from reclamation of the proposed CISF would require approximately 208 trucks per day if shipped over a 10-year reclamation period. This amount of shipping would result in an estimated annual 8 percent increase in future truck traffic. Based on this analysis, the nonhazardous reclamation waste shipments during the decommissioning and reclamation stage of the proposed CISF at full build-out would have a minor impact if the reclamation occurs over a period greater than 5 years. Additionally, the NRC staff assumes that a reclamation work force (similar to the construction workforce) of 80 workers would commute to and from the proposed CISF using individual passenger vehicles and light trucks on a daily basis for the duration of demolition and removal activities. These workers could account for an increase of 160 vehicles per day (80 vehicles each way) on U.S. Highway 62/180 during the decommissioning and reclamation stage. This amounts to a 4 percent increase in the current daily car traffic on U.S. Highway 62/180. The NRC staff concludes that the transportation impacts from reclamation waste shipments and commuting workers during the decommissioning and reclamation stage of the proposed action (Phase 1) and during the decommissioning and reclamation stage of Phases 2-20 would be SMALL. Impacts to truck traffic would be SMALL from reclamation of the proposed CISF at full build-out, if the reclamation occurs over a 10-year period.

Decommissioning of the rail spur would consist of dismantling the rail line and hauling the waste to a licensed facility, if the landowner (BLM) determines not to keep the infrastructure in place. There would be a small increase in traffic due to workers dismantling the rail line and a limited amount of materials that would need to be disposed, but the NRC and BLM staffs anticipate the increase in traffic from these activities to be equal to or less than the traffic increase associated with construction impacts, and therefore SMALL.

<u>Geology and Soils</u>

<u>Construction</u>: Impacts would be SMALL. Impacts to geology and soils during construction of the proposed CISF would be limited to soil disturbance, soil erosion, and potential soil contamination from leaks and spills of oil and hazardous materials. Holtec would implement mitigation measures, best management practices (BMPs), National Pollutant Discharge Elimination System (NPDES) permit requirements, and the Spill Prevention, Control, and Countermeasure (SPCC) Plan to limit soil loss, avoid soil contamination, and minimize stormwater runoff impacts. Therefore, the NRC staff concludes that the potential impacts to geology and soils associated with the construction stage for the proposed action (Phase 1) and for Phases 2-20 of the proposed CISF project would be SMALL.

Construction of the rail spur would require less soil disturbance and would incur fewer impacts than construction of the proposed action (Phase 1), and mitigation measures used for the proposed action (Phase 1) would also be applied. Therefore, the NRC and BLM staffs conclude that potential impacts to geology and soils resources from construction of the rail spur would be SMALL.

<u>Operations</u>: Impacts would be SMALL. Operation of the proposed action (Phase 1) and Phases 2-20 would not be expected to impact underlying bedrock, because storage structures are passive and designed to robustly contain radiological materials. Holtec would continue to implement the SPCC Plan to minimize the impacts of potential soil contamination, and stormwater runoff would continue to be regulated under NPDES permit requirements. Holtec would implement mitigation measures for stormwater management through its Stormwater Pollution Prevention Plan (SWPPP). Operation of the proposed CISF project would not be expected to impact or be impacted by seismic events, subsidence, or sinkhole development. Criteria would be incorporated into the facility design to prevent damage from seismic events such as earthquakes. The potential for sinkhole development or subsidence is low because (i) plugged and abandoned wells within the proposed project area are located outside the 133.5-ha [330-ac] storage and operations area, (ii) the proposed CISF project does not produce any liquid effluent that could facilitate dissolution, and (iii) no thick sections of soluble rocks are present at or near the land surface. Therefore, the NRC staff concludes that the impacts to geology and soils associated with the operations stage for the proposed action (Phase 1) and for Phases 2-20 of the proposed CISF project would be SMALL and that the potential impacts to the proposed CISF project from seismic events, subsidence, or sinkhole development would be SMALL.

Impacts to geology and soils from operation of the rail spur would be minimal because few, if any, additional geologic resources would be needed beyond those associated with construction of the rail spur, and mitigation measures would continue to be implemented. Therefore, the NRC and BLM staff concludes that the potential impacts to geology and soils from operation of the rail spur would be SMALL.

<u>Decommissioning and Reclamation</u>: Impacts would be SMALL. During decommissioning and reclamation of the proposed action (Phase 1) and Phases 2-20 (including the rail spur), contaminated soils would be disposed at approved and licensed waste disposal facilities. During dismantling of the proposed CISF project, soil disturbance would occur from the use of heavy equipment, such as bulldozers and graders, to demolish SNF storage facilities, buildings, and associated infrastructure. This soil disturbance would be limited to areas previously disturbed during the construction and operations stages. Mitigation measures used to reduce soil impacts during construction would be applied during decommissioning. After project

facilities and infrastructure are removed, disturbed areas would be regraded with fill from stockpiles, covered with topsoil, contoured, and reseeded with native vegetation. Therefore, the NRC staff concludes that the potential impact on geology and soils associated with the decommissioning and reclamation stage for the proposed action (Phase 1) and Phases 2-20 of the proposed CISF project would be SMALL.

Similar to the impacts to geology and soils described for the construction stage, the impacts of decommissioning and reclamation of the rail spur would be limited to soil disturbance, soil erosion, and potential soil contamination from leaks and spills of oil and hazardous materials. Mitigation measures used during construction would also be applied. Therefore, the NRC and BLM staffs conclude that potential impacts to geology and soils resources from decommissioning and reclamation of the rail spur would be SMALL.

Surface Waters and Wetlands

Construction: Impacts would be SMALL. During the construction stage of the proposed action (Phase 1), grading and clearing of the proposed project area for the SNF storage structures, site access road, security building, administration building, parking lot, concrete batch plant, laydown area, and associated infrastructure would cause surface disturbance, resulting in soil erosion and sediment runoff into nearby drainages. Holtec has committed to erosion and sediment control BMPs (e.g., sediment fences) to minimize any adverse effects, such as erosion and sedimentation, on surface water resources. Leaks and spills of fuels and lubricants from construction equipment and stormwater runoff from impervious surfaces resulting from the proposed facility construction and concrete batch plant installation could impact surface water quality. Implementation of a SPCC Plan and a SWPPP would minimize the adverse effects of any leaks or spills of fuels and lubricants. There are no floodplains located within or in the vicinity of the proposed project area. The topography of the proposed project area slopes gently northward toward two drainages, one leading to Laguna Plata to the northwest and the other to Laguna Gatuna to the east. Conditions in playa lakes that could potentially receive surface runoff from the proposed CISF project (i.e., Laguna Plata and Laguna Gatuna) are not favorable for the development of aquatic or riparian habitat. Furthermore, soils and water (when present) in Laguna Plata and Laguna Gatuna are highly mineralized. Holtec also sought and received a jurisdictional determination from the USACE, which concluded that there are no Waters of the United States, including jurisdictional wetlands, within or in the immediate vicinity of the proposed project area. Therefore, Holtec will not be required to obtain a Clean Water Act Section 401 certification.

Because Holtec would (i) implement mitigation measures to control erosion and sedimentation; (ii) develop and comply with a SPCC Plan; and (iii) obtain a required NPDES construction permit to address potential impacts from discharge to surface water and provide mitigation as needed to maintain water quality standards, the NRC staff concludes that the potential impacts to surface waters, including jurisdictional wetlands, during the construction stage for the proposed action (Phase 1) would be SMALL. As additional phases are added, Holtec would implement BMPs appropriate for each size increase in the footprint of the proposed facility and would implement storage pad designs that would adequately direct drainage over impervious surfaces during each phase addition up to full build-out (Phases 1-20). Therefore, the NRC staff concludes that impacts to surface water from construction of Phases 2-20 would also be SMALL.

Construction of the rail spur would disturb an additional 15.9 ha [39.4 ac] of BLM-managed land. The NRC and BLM staffs anticipate that impacts to surface water would be limited to soil disturbance and soil erosion associated with the land disturbance, as well as potential soil contamination from leaks and spills of oil and hazardous materials from construction equipment. Similar to those implemented for construction of the proposed CISF, Holtec would implement mitigation measures, BMPs, NPDES construction permit requirements, and spill prevention and cleanup plans to limit soil loss, avoid soil contamination, and minimize stormwater runoff impacts. Therefore, the NRC and BLM staffs conclude that the potential impacts to surface waters and wetlands from the construction of the rail spur would be SMALL.

Operations: Impacts would be SMALL. For the proposed action (Phase 1) and Phases 2-20 operations stage, the primary impact to surface water would be from runoff, although the amount of impervious cover would increase for Phases 2-20. The design and construction of the SNF storage systems and environmental monitoring measures make the potential for a release of radiological material from the proposed CISF project very low during operations. To minimize potential impacts to surface water from stormwater runoff, Holtec would (i) implement mitigation measures to control erosion, stormwater runoff, and sedimentation; (ii) develop and comply with a SPCC Plan; and (iii) develop a SWPPP prescribing mitigation, as needed, to maintain water quality standards. Nearby playa lakes have adequate capacity to accept runoff from severe one-day storm events, and conditions in these playa lakes are not favorable for development of aquatic or riparian habitat. Therefore, the NRC staff concludes that the potential impacts to surface waters and wetlands during the operations stage of the proposed action (Phase 1) and Phases 2-20 would be SMALL.

The primary impact to surface water from the rail spur would be potential runoff from disturbed areas or from leaks or spills from equipment. To minimize any adverse impacts of runoff during operation of the rail spur, Holtec would implement mitigation measures to control erosion and sedimentation. The SNF contains no liquid component, and the SNF transportation casks are sealed to prevent any liquids from contacting the SNF assemblies. Thus, there is no potential for a liquid pathway from the SNF (such as runoff from the rail spur) to contaminate nearby surface waters. Therefore, the NRC and BLM staffs conclude that the potential impacts to surface waters and wetlands during operation of the rail spur would be SMALL.

Decommissioning and Reclamation: Impacts would be SMALL. During the decommissioning and reclamation stage for the proposed action (Phase 1) and Phases 2-20, Holtec would implement mitigation measures to control erosion, stormwater runoff, and sedimentation. Holtec's required NPDES permit and SWPPP would ensure that stormwater runoff would not contaminate surface water. Therefore, the NRC staff concludes that the potential impacts to surface waters and wetlands during decommissioning and reclamation for the proposed action (Phase 1) and Phases 2-20 would be SMALL.

Decommissioning and reclamation of the rail spur would include dismantlement of the rail spur at the discretion of the land owner (BLM). Decommissioning would be based on an NRC-approved decommissioning plan, and all decommissioning activities would be carried out in accordance with 10 CFR Part 72 requirements. Therefore, the NRC and BLM staff concludes that the potential impacts to surface waters and wetlands during decommissioning of the rail spur would be SMALL.

Groundwater

Construction: Impacts would be SMALL. For the construction stage of the proposed action (Phase 1), potable water would be supplied by the City of Carlsbad Water Department via existing water lines or a new water line that is capable of supporting the water demands of all support buildings and the concrete batch plant. Excavation of site soils and alluvium for construction of the SNF storage modules is not expected to encounter groundwater, because groundwater is discontinuous within the proposed project area and occurs at sufficient depth below the excavation depth, where present. The NPDES construction permit requirements and implementation of the required BMPs would protect groundwater quality in shallow aquifers. Specifically, the NPDES permit requirements would provide controls on the amount of pollutants entering ephemeral drainages and specify mitigation measures and BMPs to prevent and clean up spills. Construction of Phases 2-20 requires less water than construction of the proposed action (Phase 1) because all facilities and infrastructure for the proposed CISF project would already have been built. In addition to consumptive use for construction, concurrent operations consume a small amount of water. Therefore, the NRC staff concludes that the impacts to groundwater during the construction stage of the proposed action (Phase 1) and Phases 2-20 would be SMALL.

Potable water for the construction of the rail spur would be supplied by an existing water pipeline or by a new water line, both of which would be capable of meeting the expected peak water demands. Additionally, the rail spur construction is not anticipated to encounter groundwater and construction of the rail spur would be under similar permit restrictions as the construction of the proposed action (Phase 1). Therefore, the NRC and BLM staffs conclude that the impacts to groundwater resources from the construction of the rail spur would be SMALL.

<u>Operations</u>: Impacts would be SMALL. For the proposed action (Phase 1) and Phases 2-20 operations stage, because of (i) the design and construction of the SNF storage systems, (ii) the SNF being composed of dry material, and (iii) geohydrologic conditions and the depth of groundwater at the proposed site, potential radiological contamination of groundwater is unlikely during operations. NPDES industrial stormwater permit requirements and implementation of BMPs would protect groundwater quality in shallow aquifers. Specifically, the NPDES permit requirements provide controls on the amounts of pollutants entering ephemeral drainages and specify mitigation measures and BMPs to prevent and clean up spills. Therefore, the NRC staff concludes that the impacts to groundwater during the operation of the proposed action (Phase 1) and Phases 2-20 would be SMALL.

For the rail spur, infiltration of stormwater runoff and leaks and spills of fuels and lubricants during operations can potentially affect the groundwater quality of near-surface aquifers. Holtec's required NPDES industrial stormwater permit would set limits on the amounts of pollutants entering ephemeral drainages that may be in hydraulic communication with near-surface aquifers. Therefore, impacts from the operations stage of the rail spur are bound by the impacts of the construction stage; thus, the NRC and BLM staffs conclude that the impacts to groundwater during the operations stage for the rail spur would be SMALL.

<u>Decommissioning and reclamation</u>: Impacts would be SMALL. During decommissioning and reclamation of the proposed action (Phase 1) and Phases 2-20, infiltration of stormwater runoff and leaks and spills of fuels and lubricants could potentially affect the groundwater quality of near-surface aquifers. Holtec's required NPDES industrial stormwater permit would set limits on the amounts of pollutants entering ephemeral drainages that may be in hydraulic communication with alluvial aquifers at the site. Holtec also committed to developing and implementing a SPCC Plan to minimize and prevent spills. The NPDES permit and SWPPP would specify additional mitigation measures and BMPs to prevent and clean up spills. Therefore, the NRC staff concludes that the potential impacts to groundwater during the decommissioning stage for the proposed action (Phase 1) and Phases 2-20 would be SMALL.

Dismantling of the rail spur may occur at the discretion of the land owner (BLM) and would be based on an NRC-approved decommissioning plan and BLM requirements. All decommissioning activities would be carried out in accordance with 10 CFR Part 72 requirements. These activities would have groundwater impacts similar in scale to the construction stage. Therefore, the NRC and BLM staffs conclude that the potential impacts to groundwater during decommissioning of the rail spur would be SMALL.

Ecological Resources

Construction: Impacts would be SMALL to MODERATE. During the construction stage of the proposed action (Phase 1) and Phases 2-20, to mitigate impacts to vegetation disturbance during construction of subsequent phases, Holtec proposes to minimize the construction footprint, to the extent practicable. However, because of changes to the ecosystem function of the vegetative communities, the NRC staff concludes that impacts to vegetation from the proposed action (Phase 1) for construction could alter noticeably, but not destabilize, the vegetative communities at the proposed CISF project, resulting in a MODERATE impact. Holtec also proposes to use mitigation measures for soil stabilization and sediment control, such as stabilizing disturbed areas with native grass species, pavement, and crushed stone to control erosion; stabilizing disturbed areas with natural and low-water maintenance landscaping; and protecting undisturbed areas with silt fencing and straw bales, as appropriate. The U.S. Fish and Wildlife Service (FWS) did not identify any Federally listed threatened or endangered plant or animal species or proposed species that are known to potentially occur at the proposed CISF project area or that the proposed CISF project may affect. The FWS identified one candidate species, the monarch butterfly (*Danaus plexippus*); however, candidate species are not afforded protection under the Endangered Species Act. Additionally, conditions in Laguna Plata and Laguna Gatuna are not favorable for the development of aquatic or riparian habitat. For all phases, Holtec would continue to monitor for and repair leaks and spills of oil and hazardous material from operating equipment, minimize fugitive dust, and conduct most construction activities during daylight hours. For construction of each individual subsequent phase, because (i) a smaller amount of land would be disturbed, (ii) fewer vehicles and workers would access the proposed project area, and (iii) Holtec has committed to mitigation measures, the potential impacts on wildlife and vegetation would be similar during the construction of individual Phases 2-20 as those for the proposed action (Phase 1). The combined area of disturbance from the construction of full build-out (Phases 1-20) would be approximately 133.5 ha [330 ac] of land. Because construction would occur over a number of years, and there would be abundant habitat available around the proposed facility to support the gradual movement of wildlife, and because the CISF would have no effect on Federally listed threatened or endangered species, the NRC staff concludes that overall ecological impacts during the construction stage for full build-out (Phases 1-20) would be SMALL to MODERATE.

Because of the smaller land area, construction of a rail spur would include similar or fewer potential impacts on ecological resources (e.g., vegetation removal, wildlife displacement and disturbances) than for the construction of the proposed action (Phase 1). Because the land area is smaller and the NRC and BLM staffs assume that the same mitigation measures Holtec has committed to use for the proposed action (Phase 1) construction (e.g., soil stabilization and sediment control, use of native grass species to stabilize the ground surface, and use of pavement and stone to control erosion) would also be used for the rail spur area, the NRC and BLM staffs conclude that the potential impacts to ecological resources from construction of the rail spur would be SMALL.

Operations: Impacts would be SMALL. For the operations stage of the proposed action (Phase 1), fewer effects to vegetative and wildlife communities would occur compared to the construction stage because the only planned land disturbance during the operations stage would be for movement of fences to support staggered construction of storage pads in later phases. The operations stage would continue to alter noticeably, but not destabilize, the vegetative communities within the proposed project area. Land available for ecological resources would be committed for use by the proposed CISF project for the license term (i.e., 40 years). No noxious weeds have been identified at the proposed storage and operations area; however, invasive plant species and noxious weeds may invade disturbed areas during the operations stage, but Holtec would control weeds with appropriate spraying techniques. Additionally, material spills from transportation vehicles, maintenance equipment, and gasoline and diesel storage tanks could also occur during the operations stage, which could kill or damage vegetation or wildlife exposed to the spilled material. However, such spills are anticipated to be few, based on permit requirements and mitigation measures that would continue to be implemented. Holtec would continue the mitigation measures implemented during the construction stage to limit potential effects on wildlife during the proposed action (Phase 1) and Phases 2-20 operations stage. For example, Holtec stated that security lighting for all ground-level facilities and equipment would be down-shielded to keep light within the boundaries of the proposed CISF project during the operations stage, helping to minimize the potential for impacts. Because conditions in Laguna Plata and Laguna Gatuna are not favorable for the development of aquatic or riparian habitat and Holtec has committed to implement stormwater management practices, the impacts to aquatic systems would be limited, and Holtec would implement measures to limit impacts to downstream environments. Effective wildlife management practices and additional surveys of the proposed CISF project would identify the potential for long-term nesting, and mitigation would prevent permanent nesting and lengthy stay times of wildlife that may potentially attempt to reside at the proposed CISF project. Thus, the potential impacts to vegetation and wildlife during operation of the proposed action (Phase 1) and for Phases 2-20 for the proposed CISF project would be SMALL.

For the rail spur, the primary impact to ecological resources would be from habitat fragmentation, the potential for the establishment of invasive weeds along the disturbed edges of the rail spur, and from the noise and vibrations of the trains. Lights on the trains at night could also disturb wildlife along the rail spur, and direct animal mortalities could also occur. Land within 3.2 km [2 mi] of the proposed rail spur has already been developed with several transportation corridors that oil and gas companies use on a regular basis; therefore, the NRC staff anticipates that the potential impacts from operation of the rail spur would not alter the use of habitats near the rail spur or isolate sensitive wildlife species in the area. Holtec would be required to comply with other applicable Federal laws, the NPDES, and would follow mitigation measures that BLM requires to limit potential effects on wildlife. Therefore, the NRC and BLM staffs conclude that the potential impacts from operation of the rail spur to ecological resources would be SMALL.

Decommissioning and Reclamation: Impacts would be SMALL to MODERATE. Replanting the disturbed areas with native species after completion of the decommissioning and reclamation activities would restore the site to a condition similar to the preconstruction condition. Impacts on vegetation during decommissioning and reclamation of the proposed CISF project would include removal of existing vegetation from the area required for equipment laydown and disassembly. However, the area disturbed would be bounded by the construction stage activities. While vegetation becomes established, potential impacts to surface-water runoff receptors, including Laguna Gatuna and Laguna Plata, would be limited because of Holtec's commitment to implement stormwater management practices. As is the case during operations, the playas are not expected to support permanent aquatic communities, because they do not permanently hold sufficiently deep water and maintain the quality of water needed to support aquatic species. Thus, there would not be aquatic communities present to impact during decommissioning. The NRC staff concludes that the impact on ecological resources from decommissioning and reclamation of the proposed action (Phase 1) and Phases 2-20 would be MODERATE until vegetation is reestablished in reseeded areas and then would be SMALL thereafter.

Dismantling the rail spur would have impacts on ecology similar in nature and scale to those impacts experienced during construction of the rail spur (e.g., vegetation removal, wildlife displacement and disturbances). The establishment of mature, native plant communities may require decades. However, because of the relatively small disturbed area of the rail spur and because Holtec commits to reseed all disturbed areas, the NRC and BLM staff conclude that ecological impacts on the rail spur area from decommissioning would be SMALL.

Air Quality

Construction: Impacts would be SMALL. The proposed action (Phase 1) construction consists of building the storage modules and pad for 500 SNF canisters and the associated infrastructure for the CISF (e.g., the site access road, cask transfer building, security building, administration building, and parking lot). These activities primarily generate combustion emissions from mobile sources as well as fugitive dust from clearing and grading of the land, and vehicle movement over unpaved roads. The proposed action (Phase 1) peak-year emission levels for all of the pollutants are below the New Mexico “no permit required thresholds” except for particulate matter PM_{10}, which is about 1.7 times this threshold. The NRC staff concludes that pollutants with emission levels below this New Mexico “no permit required threshold” would have minor impacts. For the one pollutant that is above the threshold, $PM_{10,}$ the distance between the proposed CISF emission sources and these receptors, along with the nature of the PM_{10}, reduces the potential for impacts. Pollutants disperse as distance from the source increases, and PM_{10} settles out of the air quickly. Therefore, the NRC staff concludes that the potential impacts to air quality from peak-year emission levels from the proposed action (Phase 1) and Phases 2-20 would be SMALL.

Construction of the rail spur is included as part of the proposed action (Phase 1) construction stage. Rail spur construction emissions compose only a portion of the total proposed action (Phase 1) construction emissions. The NRC and BLM staffs anticipate the rail spur construction emission levels to be below the New Mexico thresholds. The NRC and BLM staffs conclude that the potential impacts to air quality during the rail spur construction would be SMALL because the of the low emission levels.

Operations: Impacts would be SMALL. For the proposed action (Phase 1) and full build-out (Phases 1-20) operations stage, the primary activity is receiving and loading SNF into modules. Combustion emissions from equipment used to conduct this activity are the main contributors to air quality impacts. Impacts during the operations stage are either the same as or bounded by those for the peak-year impact assessment and therefore SMALL for the proposed action (Phase 1) and Phases 2-20.

During the operations stage, transportation of SNF on the rail spur occurs intermittently over the 8.9 km [5.5 mi] length of the rail spur rather than continuously generating emissions from a specific stationary location, such as operation of the CISF. Because of the intermittent and widespread nature of these emissions, the NRC and BLM staffs conclude that the potential impacts to air quality during rail spur operations would be SMALL.

Decommissioning and Reclamation: Impacts would be SMALL. The NRC staff anticipates that decommissioning and reclamation activities would generate combustion emissions from mobile sources associated with equipment and transportation. However, the levels would be much less than those of the peak-year emissions and, taking into account air quality and proximity of emission sources to receptors, the impacts would also be the same. The NRC staff concludes that the potential impacts to air quality from the decommissioning and reclamation stage for the proposed action (Phase 1) and Phases 2-20 would be SMALL. Similarly, for the rail spur, the decommissioning and reclamation activities would generate combustion emissions and have similar air quality impacts as well as proximity to receptors. Therefore, the NRC and BLM staffs conclude that the potential impacts to air quality from decommissioning and reclamation of the rail spur for the proposed action (Phase 1) and Phases 2-20 would be SMALL.

Noise

Construction: Impacts would be SMALL. For the proposed action (Phase 1) and Phases 2-20, some increased traffic associated with construction activities (e.g., building infrastructure) could increase noise levels. However, the proposed project area is undeveloped, and land in the area is currently used for mineral extraction and grazing with a number of transportation activities already occurring, particularly associated with oil and gas development. Additionally, there are no sensitive noise receptors located within the proposed project area. The nearest resident is located approximately 2.4 km [1.5 mi] away and due to the dissipation of sound with increasing distance, the current vehicular traffic rates, and that construction activities would occur predominantly during the day, the NRC staff concludes that noise impacts from the proposed action (Phase 1) and Phases 2-20 construction stage would be SMALL.

Noise impacts associated with the construction of the rail spur and associated infrastructure would include similar construction activities to those described for the construction of the proposed facility and associated infrastructure, but on a smaller scale. Therefore, the NRC and BLM staffs conclude that overall noise impacts during the construction stage of the rail spur would be SMALL.

Operations: Impacts would be SMALL. For both the proposed action (Phase 1) and Phases 2-20, noise from the operation of the proposed CISF project would be primarily generated from the delivery of casks (train or truck); operation of cranes and other loading equipment; and site vehicles (e.g., commuter vehicles or supply movements). In addition, noise point sources would include rooftop fans, air conditioners, transformers, and other equipment associated with the site infrastructure buildings. Once storage modules in each phase are fully loaded, operation noise at the storage pads is very limited because it is a passive system. Thus, the noise impacts associated with the operations stage are anticipated to be less than those from the construction stage. Therefore, the NRC staff concludes that the noise impacts from operation of the proposed action (Phase 1) and Phases 2-20 would be SMALL.

During the operations stage of all phases of the CISF, use of the rail spur would generate noise from trains operating on the spur, but these noise levels are not anticipated to exceed those generated during the construction stage of the rail spur and the proposed CISF. Therefore, the NRC and BLM staffs conclude that overall noise impacts during the operations stage for the rail spur would be SMALL.

Decommissioning and Reclamation: Impacts would be SMALL. Noise sources (e.g., heavy equipment and trucks) and impacts would be similar to those associated with the construction stage; therefore, the NRC staff concludes that the noise impacts from the decommissioning stage for the proposed action (Phase 1) and Phases 2-20 would be SMALL. Noise sources and levels associated with the dismantling of the rail spur would be similar to those incurred during the construction stage of the rail spur; therefore, the NRC and BLM staffs conclude that the noise impacts from dismantling the rail spur would be SMALL.

Historic and Cultural Resources

Construction: Impacts would be SMALL. The construction of the proposed action (Phase 1) would include multiple areas where excavation would be required to accommodate and install the underground facilities.

Several surveys have been conducted over the proposed project area to investigate potential historic and cultural resources. One historic resource was identified within the area of potential effect (APE) for the proposed action (Phase 1) construction stage and is a segment of earthen and caliche gravel two-track road. The road dates between 1920 and 1954, and artifacts located near the road included bottle glass, car parts, an insulator fragment, metal cans, tobacco tins, metal fragments, and a 1954 New Mexico license plate. However, the proposed project would not disturb the site, nor was it recommended as eligible for National Register of Historic Places (NRHP), and the NRC has determined that the resource does not constitute a historic property under the National Historic Preservation Act (NHPA). A prior survey also identified one archaeological site (Site LA 187010) immediately inside the proposed project property boundary where the rail spur crosses onto the privately-owned land of the proposed project area. The current APE intersects with this archaeological site, which had previously been described as a small prehistoric camp of unknown temporal affiliation with a diffuse scatter of lithic artifacts and burned caliche. However, on February 4, 2020, the NRC staff, the NRC's archeological contractor, a Navajo Nation Tribal representative, and Holtec's archeological contractor visited the proposed project area to inspect and assess the sites identified in the Class III survey. During the site visit, the NRC and Holtec staffs and the Tribal representative noted that Site LA 187010 consisted only of two surface finds and a presumed thermal feature, most likely a hearth. The only evidence of the thermal feature that could be identified during the site visit were approximately six pieces of thermally altered stone. No sign of burned caliche or ash was visible. The involved staffs and Tribal representative noted that such a light scatter of artifacts, without an associated datable feature, would not meet BLM criteria for definition as an archaeological site, and could be more accurately recorded as an isolated manifestation. Therefore, the consensus among all parties in attendance at the site visit was that Site LA 187010 should not be recommended eligible for listing on the NRHP. The NRC staff has requested that Holtec conduct additional fieldwork to document the current condition of Site LA 187010 and amend the Class III report and site files to note the site recommendation change of Site LA 187010. The updated Class III report, along with the NRC staff recommendations, was submitted to the New Mexico State Historic Preservation Office (NM SHPO) for concurrence on November 30, 2020. The NRC staff received NM SHPO concurrence, as documented in a letter dated December 15, 2020. Because no historic resource within the direct APE is recommended eligible for listing on the NRHP and no historic properties would be affected by construction activities, the NRC staff concludes that historic and cultural resources would not be impacted from construction of the proposed action (Phase 1), and impacts would be SMALL.

Construction of Phases 2-20 would disturb additional land. Within the protected (i.e., fenced) area, Holtec estimates that construction of the concrete pads for all 20 phases (i.e., full build-out), would disturb approximately 44.5 ha [110 ac] of land. In addition to the two historic sites identified for the proposed action (Phase 1) construction, 17 isolated occurrences are located within the direct APE for Phases 2-20 of the proposed CISF; however, isolated occurrences do not constitute archaeological sites, and, therefore, do not constitute historic properties. Because no historic or cultural resources have been identified in the direct APE that the construction of the proposed Phases 2-20 could disturb, the NRC staff's conclusion is that no historic properties would be affected by construction of Phases 2-20, and impacts to historic and cultural resources would be SMALL.

Construction of the proposed action (Phase 1) would include ground disturbance over 15.9 ha [39.4 ac] for a rail spur to connect the proposed project area to the main rail line, which is approximately 6.1 km [3.8 mi] west of the proposed project area, with a length of 8 km [5 mi]. Because no historic or cultural resources were identified within the direct APE for the rail spur, the NRC and BLM staffs conclude that the construction of the rail spur would not affect historic properties, and impacts to historic and cultural resources would be SMALL.

Operations: Impacts would be SMALL. During operations of the proposed action (Phase 1) and Phases 2-20, no new ground disturbance is anticipated beyond that associated with maintenance and traffic around the facility. Because no historic or cultural resources have been identified in the direct APE and operations would not disturb additional land, the NRC staff concludes that the operation of the proposed facility for the proposed action (Phase 1) and Phases 2-20 would result in a SMALL impact on historic and cultural resources.

No additional ground-disturbing activities would occur, and no historic or cultural resources are present within the APE of the rail spur that would be located on BLM-managed land; therefore, the NRC and BLM staffs conclude that no historic properties would be affected by operation of the rail spur on BLM land, and operation of the rail spur would result in a SMALL impact on historic and cultural resources.

Decommissioning and Reclamation: Impacts would be SMALL. Decommissioning and reclamation could result in the dismantling and removal of the proposed CISF and the rail spur. The total land disturbed for decommissioning and reclamation would not be greater than that disturbed during the construction stage, therefore the NRC staff concludes that decommissioning and reclamation of the proposed facility for the proposed action (Phase 1) and Phases 2-20 would have a SMALL impact on historic and cultural resources.

No historic or cultural resources that constitute historic properties are present within the direct APE for the rail spur on BLM-managed land; therefore, no historic and cultural impacts would result from decommissioning and reclamation of those areas. The NRC and BLM staffs conclude that decommissioning and reclamation of the rail spur would result in a SMALL impact on historic and cultural resources, and no historic properties would be affected by decommissioning and reclamation activities.

Visual and Scenic Resources

Construction: Impacts would be SMALL. As part of the proposed action (Phase 1), the most visible structure constructed would be the cask transfer building, which would be approximately 18 m [60 ft] high. Because of the relative flatness of the proposed CISF project area, the structure may be observable from nearby highways and properties. For the remaining structures associated with the proposed CISF project, visibility would be restricted to east and west traffic on U.S. Highway 62/180. The proposed CISF project structures would not be visible to any city or township with an identifiable population center. Other than the support buildings (including the cask transfer building), the proposed facility is predominantly subgrade, meaning the majority of the storage structure would be below ground surface. Although the proposed CISF project would alter the natural state of the landscape, the NRC concludes that due to the absence of regional or local high quality scenic views in the area, lack of a unique or sensitive viewshed, the subgrade design of the facility, the remote locale, and planned dust suppression mitigation, the impact to visual and scenic resources from the proposed action (Phase 1) and Phases 2-20 would result in a SMALL impact.

The rail spur is expected to be at or very near ground surface level and less visible than the other structures associated with the proposed CISF project. Therefore, NRC and BLM staffs conclude that visual and scenic resource impacts from the construction of the rail spur would also be SMALL.

<u>Operations</u>: Impacts would be SMALL. For both the proposed action (Phase 1) and Phases 2-20, the facilities built during the construction stage (particularly the cask transfer building) would continue to impact the visual and scenic resources. However, the use of security lights at the proposed CISF project would create visual impacts at night because of the contrast with the darkness of the surrounding landscape. Holtec has committed to down-shielding all security lighting for all ground-level facilities and equipment to keep light within the proposed project area to help minimize the potential impacts. Because buildings associated with the proposed CISF project would have already been constructed, the storage of SNF would be primarily subgrade, and lighting associated with security would be mitigated to minimize impacts, the NRC staff concludes that the visual and scenic resource impacts from the operations stage of the proposed action (Phase 1) and Phases 2-20 would be SMALL.

The operation of the rail spur would result in minimal impacts associated with rail shipments of SNF to and from the proposed CISF project and any associated vehicle traffic along the access road from rail maintenance. The presence of trains on the rail spur would create a temporary visual impact that is consistent with normal train operations, which already occurs in the area on the existing main rail line. Therefore, the NRC and BLM staffs conclude that the impact to visual and scenic resources for the operations stage of the rail spur would be SMALL.

<u>Decommissioning and Reclamation</u>: Impacts would be SMALL. Decommissioning and reclamation activities would be similar to those occurring during the construction stage; therefore, the NRC staff concludes that impacts to visual and scenic resources from decommissioning the proposed action (Phase 1) or Phases 2-20 (including at full build-out) would be SMALL.

Dismantling of the rail spur would include similar activities and impacts as those associated with construction of the rail spur. Therefore, the NRC and BLM staffs conclude that visual and scenic resource impacts from the decommissioning of the rail spur would be SMALL.

<u>Socioeconomics</u>

<u>Construction</u>: Impacts would be SMALL to MODERATE and beneficial. The NRC staff anticipates that economic impacts could be experienced throughout the 80-km [50-mi] region of influence (ROI) surrounding the proposed project area as a result of peak employment (135 workers per year) of the proposed CISF project [i.e., concurrent construction and

operations stages for the proposed action (Phase 1)] and associated revenue and tax generation. Expenditures for goods and services to support the peak employment of the proposed CISF project would occur both inside and outside the ROI. The NRC staff recognizes that not all individuals in the ROI are likely to be affected equally; however, most community members would share, to some degree, in the economic growth the proposed CISF project would be expected to generate. Furthermore, the NRC staff estimates a population growth in the area of less than 0.1 percent, which is not likely to cause adverse impacts on housing, schools, or other public services. Therefore, the NRC staff concludes that socioeconomic impacts resulting from construction of the proposed action (Phase 1) and Phases 2-20 (including full build-out) would be SMALL for population and housing, and MODERATE and beneficial for employment, public services, and local finance.

Construction of the rail spur will occur as part of the proposed action (Phase 1) prior to any concurrent construction and operation. The labor and costs to construct a rail spur to support the proposed action (Phase 1) would be significantly less than what would be required for peak employment of the proposed action (Phase 1) or Phases 2-20. Specifically, no additional construction workers would be expected to be hired. Therefore, the NRC and BLM staffs conclude that the potential impacts to socioeconomics from construction of the rail spur would be SMALL.

<u>Operations</u>: Impacts would be SMALL. Because the size of the operations workforce would be smaller than during the construction stage or peak of construction and operation, the NRC staff determine that there would not be a noticeable impact on public services during the operations stage. The local economy would continue to experience a SMALL beneficial impact from the purchasing of local goods and services and an increase in sales and income tax revenues.

Because the operation of the rail spur mostly involves offsite transportation of SNF, and fewer workers would be needed to operate the rail spur compared to the proposed action (Phase 1) or Phases 2-20, the NRC and BLM staffs anticipate that impacts to population, employment, wages, and community services would not change. Therefore, the NRC and BLM staffs conclude that the overall socioeconomic impacts associated with operations for the rail spur would be SMALL.

<u>Decommissioning and Reclamation</u>: Impacts would be SMALL to MODERATE and beneficial. Potential environmental impacts on socioeconomics could result from hiring additional workers compared to the operations stage of the proposed action (Phase 1) and Phases 2-20 to conduct radiological surveys; dismantle and remove equipment, materials, buildings, roads, rail, and other onsite structures; clean up areas; dispose of wastes; and reclaim disturbed areas. However, Holtec anticipates that the workforce needed for dismantling the proposed project would not exceed the number of workers needed for the construction of the proposed CISF project. If no additional workers are hired beyond the number that were directly employed during the construction stage of the proposed action (Phase 1), then the NRC staff expects that there would be no increased demand for housing and public services during the decommissioning and reclamation stage of the proposed project. Therefore, the NRC staff concludes that socioeconomic impacts resulting from decommissioning and reclamation of the proposed action (Phase 1) and Phases 2-20 would be SMALL for population and housing, and MODERATE and beneficial for employment, public services, and local finance.

There would not be detectable changes in the potential socioeconomic impacts during decommissioning and reclamation of the rail spur. Therefore, the NRC and BLM staffs conclude that the potential socioeconomic impacts of decommissioning the rail spur would be SMALL.

Environmental Justice

Construction, Operation, and Decommissioning and Reclamation: The NRC staff considered the potential physical environmental impacts and the potential radiological health effects from constructing, operating, and decommissioning and reclaiming the proposed action (Phase 1), including the rail spur, and for full build-out (Phases 2-20), to identify means or pathways for the proposed project to disproportionately affect minority or low-income populations. The NRC staff did not identify any means or pathways for the proposed project (Phase 1 or Phases 2-20) to disproportionately affect minority or low-income populations. Because land access restrictions would limit hunting, and no fish or crops on the land are available for consumption, the NRC staff concludes that there is minimal, if any, risk of radiological exposure through subsistence consumption pathways. Moreover, adverse health effects to all populations, including minority and low-income populations, are not expected under the proposed action because Holtec is expected to maintain current access restrictions; comply with license requirements, including sufficient monitoring to detect radiological releases; and maintain safety practices following a radiation protection program that addresses the NRC safety requirements in 10 CFR Parts 72 and 20 (EIS Section 4.13.1.2).

After reviewing the information presented in the license application and associated documentation, considering the information presented throughout this EIS, and considering any special pathways through which environmental justice populations could be more affected than other population groups, the NRC staff did not identify any high and adverse human health or environmental impacts and concludes that no disproportionately high and adverse impacts on any environmental justice populations would exist. Furthermore, the NRC and BLM staffs have not identified any potential impacts on the natural or physical environment from constructing, operating, or decommissioning the rail spur that would significantly and adversely affect a particular population group. Therefore, the NRC and BLM staffs conclude that the rail spur would have no disproportionately high and adverse impacts on any group, including minority and low-income populations.

Public and Occupational Health

Construction: Impacts would be SMALL. Construction activities at the proposed CISF would include clearing and grading for roads; excavating soil, building foundations, and assembling buildings; constructing the rail spur, and laying fencing. Workers and the public could be exposed to nonradiological emissions during the construction stage. Holtec has proposed implementing standard dust control measures, such as water application or chemical dust suppression compounds, to reduce and control fugitive dust emissions. Therefore, the NRC staff estimates that the inhalation of fugitive dust would not result in an increased hazard to workers and the general public during the construction stage of the proposed action (Phase 1) and Phases 2-20 of the proposed CISF project.

Nonradiological impacts to construction workers during the construction stage of the proposed action (Phase 1) and Phases 2-20 of the proposed CISF project would be limited to the normal hazards associated with construction (i.e., no unusual situations would be anticipated that would make the proposed construction activities more hazardous than normal for an industrial construction project). The proposed CISF project would be subject to Occupational Safety and Health Administration (OSHA) General Industry Standards (29 CFR Part 1910) and Construction Industry Standards (29 CFR Part 1926). These standards establish practices, procedures, exposure limits, and equipment specifications to preserve worker health and safety. Because the construction activities at the proposed CISF during any phase would be typical and subject to applicable occupational health and safety regulations, there would be only minor impacts to worker health and safety from construction-related activities. Therefore, the NRC staff concludes that the nonradiological occupational health effects of the construction stage of the proposed action (Phase 1) and the construction stage of Phases 2-20 would be minor.

The construction activities conducted for the rail spur would be significantly less than the construction activities for the proposed CISF project and therefore would be expected to result in fewer background radiological exposures or nonradiological occupational injuries and fatalities. Therefore, the NRC and BLM staffs conclude that the public and occupational health impacts of constructing the rail spur, which would be completed as part of the construction stage of the proposed action (Phase 1), would be SMALL.

<u>Operations</u>: The occupational radiological impacts from normal operations would be SMALL. Operational activities at the proposed CISF would include the receipt, transfer, handling, and storage of canistered SNF. During these activities, the radiological impacts would include expected occupational exposures to low levels of radiation. Per individual canister, the collective dose estimate for the entire work crew was 0.0082 person-Sv [0.82 person-rem]. These estimates were conservative because they did not account for shielding. The resulting single worker annual dose estimate for processing 500 canisters during any single phase was 0.025 Sv [2.5 rem]. This estimated dose, applicable to the most highly exposed group of workers, is below the 0.05 Sv/yr (5 rem/yr) occupational dose limit specified in 10 CFR 20.1201(a) for occupational exposure. Because these exposures do not exceed NRC dose limit for workers, the NRC staff concludes that the radiological impacts to workers during the operations stage of the proposed action (Phase 1) and the operations stage of Phases 2-20 would be minor.

The public radiological impacts from normal operations would be SMALL. For the operations stage of the proposed action (Phase 1) and any single phase of Phases 2-20, Holtec estimated an annual dose of 0.022 mSv [2.2 mrem] to a hypothetical individual that spends 2,000 hours at the fence line 400 m [1,300 ft] from the proposed CISF. Doses to actual individuals further away from the proposed CISF project or who spend less than 2,000 hours at the proposed project boundary would be smaller. The estimated 0.022 mSv [2.2 mrem] dose is less than the 0.25 mSv [25 mrem] regulatory limit specified in 10 CFR 72.104 for the maximum permissible annual whole-body dose to any real individual. Additionally, the 0.022 mSv [2.2 mrem] dose is less than 1 percent of the annual average natural background radiation dose in the United States of 3.1 mSv [310 mrem].

For the full build-out (Phases 1-20) of 10,000 loaded canisters, Holtec estimated an annual dose of 0.122 mSv [12.2 mrem] to a hypothetical individual that spends 2,000 hours at the fence line 400 m [1,300 ft] from the proposed CISF. Doses to actual individuals further away from the proposed CISF project or who spend less than 2,000 hours at the boundary would be smaller. The estimated 0.122 mSv [12.2 mrem] dose is less than the 0.25 mSv [25 mrem] regulatory limit specified in 10 CFR 72.104 for the maximum permissible annual whole-body dose to any real individual. Additionally, the 0.122 mSv [12.2 mrem] dose is less than 1 percent of the annual average natural background radiation dose in the United States of 3.1 mSv.

Nonradiological impacts to operations workers would be limited to the normal hazards associated with CISF operations. The proposed CISF would be subject to OSHA's General Industry Standards (29 CFR Part 1910), which establish practices, procedures, exposure limits, and equipment specifications to preserve worker health and safety. Because the operation activities at the proposed CISF project would be typical and subject to applicable occupational health and safety regulations, there would be only small impacts to nonradiological worker health and safety from operations-related activities. Therefore, the NRC staff concludes that the nonradiological occupational health impacts of the operations stage of the proposed action (Phase 1) and Phases 2-20 would be minor.

The operation of the rail spur within the proposed CISF boundary is associated with the receipt of shipments, and impacts from the shipments are assessed as part of the operation of the proposed action (Phase 1) and Phases 2-20, and as part of transportation impacts. Therefore, the NRC and BLM staffs conclude that the public and occupational health impacts of the rail spur as part of the operations stage of the proposed action (Phase 1) and Phases 2-20 would be SMALL.

Decommissioning and Reclamation: Impacts would be SMALL. Based on the effective containment of SNF during operations under normal conditions, the existing radiological and nonradiological controls and decommissioning planning, and the similarity of reclamation activities and impacts to construction, the public and occupational health impacts for the decommissioning and reclamation stage of the proposed action (Phase 1) and the decommissioning and reclamation stage of Phases 2-20 would be SMALL.

The decommissioning activities conducted for the rail spur would be significantly less than the decommissioning activities for the proposed CISF project, and therefore would be expected to result in fewer occupational injuries and fatalities. Because of the radiological protection program and the containment of the casks and canisters, the NRC and BLM staffs do not anticipate the rail spur having radiological contamination. Therefore, the NRC and BLM staffs conclude that the public and occupational health impacts of decommissioning the rail spur as part of the decommissioning stage of the proposed action (Phase 1) and Phases 2-20 would be SMALL.

Waste Management

Construction: Impacts would be SMALL. The proposed action (Phase 1) would generate a volume of 5,080 metric tons [5,600 short tons] of nonhazardous solid waste over the 2-year construction stage, which is about 5.4 percent of the annual volume of waste disposed at the Sandpoint Landfill. For construction of Phases 2-20, the total nonhazardous solid waste the proposed CISF project generated over the project would be 96,525 metric tons [106,394 short tons]. This would be about 3.3 percent of the capacity of the Sandpoint Landfill, based on multiplying the annual volume of waste disposed at this landfill by the projected lifespan of this landfill. The NRC staff considers that the amount of nonhazardous solid waste that the construction stage would generate for the proposed action (Phase 1) and Phases 2-20 would be minor in comparison to the capacity of the landfills to dispose of such waste. Additionally, the proposed action (Phase 1) and Phases 2-20 would generate 11,360 liters (L)/day [3,000 gal/day] of sanitary liquid waste. Sanitary liquid waste would be collected onsite using sewage collection tanks and underground digestion tanks and then disposed at an offsite treatment facility. Sanitary wastes would be managed in accordance with State of New Mexico requirements, and the NRC staff considers the amount of liquid sanitary waste that would be generated by the proposed CISF construction stage to be relatively minor in comparison to the capacity of publicly-owned treatment works to process such waste. Therefore, the NRC staff concludes that the impact for waste streams for both the proposed action (Phase 1) and for Phases 2-20 would be SMALL.

The amounts of waste that construction of the rail spur would generate would be much less than those generated during the construction of the proposed CISF storage pads, buildings, and other infrastructure; therefore, the NRC and BLM staffs conclude that the potential impacts to waste management for the construction stage of the rail spur would be SMALL.

Operations: Impacts would be SMALL. The proposed action (Phase 1) would involve limited activities that generate hazardous waste, such as the use of solvents or other chemicals during operations. Holtec estimates that the operations stage would generate up to 1.2 metric tons [1.32 short tons] per year of hazardous waste. Based on this volume of waste, Holtec expects to be classified as a Conditionally Exempt Small Quantity Generator (CESQG). The NRC staff considers the amount of hazardous waste that the operations stage for the proposed action (Phase 1) would generate to be minor in comparison to the capacity for disposing of such waste. The amount of nonhazardous solid waste the proposed action (Phase 1) would generate during the operations stage would be 91.1 metric tons [100.4 short tons] per year, and for Phases 2-20, 3,460 metric tons [3,814 short tons] would be generated. These volumes would be relatively minor in comparison to the capacity of the landfills. Similar to the construction stage, the proposed action (Phase 1) and Phases 2-20 would generate 11,360 liters (L)/day [3,000 gal/day] of sanitary liquid waste. The operations stage for the proposed action (Phase 1) would generate approximately 0.45 metric tons [0.5 short tons] of low-level radioactive waste (LLRW), consisting of contamination survey rags, anti-contamination garments, and other health physics materials. Phases 2-20 would generate approximately 8.61 metric tons [9.5 short tons] of LLRW. The NRC staff considers the amount of LLRW generated by the operations stage of the proposed action (Phase 1) and Phases 2-20 to be minor and anticipates that private industry would continue to meet the demand for LLRW disposal capacity into the future. The NRC staff consider the impact from all waste streams for the proposed action (Phase 1) and Phases 2-20 for the operations stage to be SMALL.

Similar to the construction stage, the NRC and BLM staffs assume that limited quantities of nonhazardous waste, hazardous waste, and sanitary waste would be generated during operations of the rail spur. These impacts would be bounded by those under the construction stage; therefore, the NRC and BLM staffs conclude that the potential impacts to waste management for the operations stage of the rail spur would be SMALL.

Decommissioning and Reclamation: Impacts would be SMALL to MODERATE. The decommissioning and reclamation stage generates nonhazardous solid waste, LLRW, hazardous solid waste, and sanitary liquid wastes. Nonhazardous demolition waste would encompass the majority of the waste that would be generated by decommissioning the proposed CISF and reclamation of the project area. The NRC staff anticipates that the State of New Mexico would put in place additional landfill facilities as part of the normal urban development needs of the area. The NRC staff assumes that the volume of nonhazardous waste would be disposed according to all applicable regulations and future capacity would remain available.

For LLRW, decommissioning would generate 0.91 metric tons [1.00 short tons] for the proposed action (Phase 1) and 17.23 metric tons [19 short tons] of waste for Phases 2-20, which would be disposed at one of the two identified disposal facilities for LLRW. Historically, private industry has met the demand for LLRW disposal capacity. The NRC expects that this trend would continue; therefore, the NRC staff consider the amount of LLRW the decommissioning stage of the proposed action (Phase 1) would generate to be minor in comparison to future disposal capacity for LLRW.

Like the construction stage, both the proposed action (Phase 1) and Phases 2-20 would generate 11,360 liters/day [3,000 gallons/day] of liquid sanitary waste, which would be relatively minor in comparison to the capacity of publicly owned treatment works to process such waste.

The NRC staff assumes that any additional hazardous waste generated for decommissioning and reclamation of the proposed action (Phase 1) and Phases 2-20 would be equal to or less than hazardous waste produced as part of the operations stage {1.2 metric ton per year [1.32 short tons]}. The NRC staff concludes that for the decommissioning and reclamation stage of the proposed action (Phase 1) and Phases 2-20, the impacts for LLRW, hazardous waste, and sanitary waste streams would be SMALL, and MODERATE for nonhazardous waste until a new landfill becomes available, after which the impact would be SMALL.

The amounts of waste decommissioning and reclamation of the rail spur would generate would be much less than those generated from decommissioning and reclamation of the proposed CISF storage pads, buildings, and other infrastructure. Therefore, the NRC and BLM staffs conclude that the potential impacts to waste management for the decommissioning and reclamation stage of the rail spur would be SMALL

CUMULATIVE IMPACTS

Chapter 5 of the EIS provides the NRC staff's evaluation of potential cumulative impacts from the construction, operations, and decommissioning and reclamation of the proposed CISF, considering other past, present, and reasonably foreseeable future actions. Cumulative impacts from past, present, and reasonably foreseeable future actions were considered and evaluated in this EIS, regardless of what agency (Federal or non-Federal) or person undertook the action. The NRC staff determined that the SMALL to MODERATE impacts from the proposed project would contribute SMALL to MODERATE impacts to the SMALL to MODERATE cumulative impacts that exist in the area due primarily to oil and gas exploration activities, nuclear facilities, and potential wind and solar projects.

SUMMARY OF COSTS AND BENEFITS OF THE PROPOSED ACTION

The cost-benefit analysis in the EIS compares the costs and benefits of the proposed action to the No-Action alternative using various scenarios and discounting rates. The proposed project would generate primarily regional and local costs and benefits, both from an environmental and economic perspective. For the environmental costs and benefits, the key distinction between the proposed CISF and the No-Action alternative is the location where the impacts occur. Under the proposed action (Phase 1), the environmental impacts of storing SNF would occur at the proposed CISF site, and environmental impacts would continue to occur at the nuclear power plant and ISFSI sites whose licensees did not transfer all fuel to the proposed CISF. Under the No-Action alternative, environmental impacts from storing SNF would continue to occur at the generation site ISFSI and new impacts would not occur at the proposed CISF site. In addition, because the proposed CISF would involve two transportation campaigns (shipment from the nuclear power plants and ISFSIs to the CISF and from the CISF to a repository), compared to one shipping campaign under the No-Action alternative, the No-Action alternative results in a net reduction in overall occupational and public exposures from the transportation of SNF because of the lower overall distance traveled.

The regional benefits of building the proposed CISF would be increased employment, economic activity, and tax revenues in the region around the proposed site. For both the proposed action (Phase 1) and full build-out (Phases 1-20), the NRC staff compared the proposed CISF costs to the No-Action alternative costs. In all cases for Phase 1, the No-Action alternative costs exceed the proposed action (Phase 1) costs (i.e., a net benefit for the proposed CISF). For full build-out (Phases 1-20), some cases resulted in a net benefit, while other cases resulted in a net cost.

NO-ACTION ALTERNATIVE

Under the No-Action alternative, the NRC would not approve the Holtec license application for the proposed CISF in Lea County, New Mexico. The No-Action alternative would result in Holtec not constructing or operating the proposed CISF. No concrete storage pad or infrastructure (e.g., rail spur or cask-handling building) for transporting and transferring SNF to the proposed CISF would be constructed. SNF destined for the proposed CISF would not be transferred from commercial reactor sites (in either dry or wet storage) to the proposed facility. In the absence of a CISF, the NRC staff assumes that SNF would remain on site in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue as detailed in generic or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available. Inclusion of the No-Action alternative in the EIS is a NEPA requirement and serves as a baseline for comparison of environmental impacts of the proposed action.

RECOMMENDATION

After comparing the impacts of the proposed action (Phase 1) to the No-Action alternative, the NRC staff, in accordance with 10 CFR 51.91(d), recommends the proposed action (Phase 1), which is the issuance of an NRC license to Holtec to construct and operate a CISF for SNF at the proposed location, subject to the determinations in the staff's safety review of the application. In addition, BLM staff recommends the issuance of a permit to construct and operate the rail spur. This recommendation is based on (i) the license application, which includes the ER and supplemental documents and Holtec's responses to the NRC staff's requests for additional information; (ii) consultation with Federal, State, Tribal, and local agencies, and input from other stakeholders, including comments on the draft EIS; (iii) independent NRC and BLM staff review; and (iv) the assessments provided in this EIS.

ABBREVIATIONS AND ACRONYMS

AADT	annual average daily traffic
AAR	Association of American Railroads
ac	acre
ACEC	area of critical environmental concern
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
AEA	Atomic Energy Act
ALARA	as low as reasonably achievable
APA	Administrative Procedure Act
APE	area of potential effect
APLIC	Avian Power Line Interaction Committee
AQCR	Air Quality Control Region
ARMS	Archaeological Records Management Section
ASCE	American Society of Civil Engineers
ASLB	Atomic Safety Licensing Board
ASLBP	Atomic Safety Licensing Board Panel
AT&SF	Atchiso, Topeka, and Santa Fe
AUM	animal unit month
BBER	Bureau of Business and Economic Research
BD	Badland
BEA	Bureau of Economic Analysis
BGEPA	Bald and Golden Eagle Protection Act
BISON-M	Biota Information System of New Mexico
BLM	U.S. Bureau of Land Management
BLM-CFO	Bureau of Land Management – Carlsbad Field Office
BLS	Bureau of Labor Statistics
BMP	best management practice
BNSF	Burlington Northern-Santa Fe
bp	before present
C	Celsius
CAP	Corrective Action Plan
cbms	centimeters below mean surface
CCA	Candidate Conservation Agreement
CCAA	Candidate Conservation Agreement with Assurances
CCD	Census County Division
CDD	Carlsbad Department of Development
CEC	Cavity Enclosure Containers
CEHMM	Center for Excellence in Hazardous Materials Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CESQG	Conditionally Exempt Small Quantity Generator
CFR	Code of Federal Regulations
CGTO	Consolidated Group of Tribes and Organizations
CISF	Consolidated Interim Storage Facility
CLSM	Controlled Low Strength Material
CO_2e	carbon dioxide equivalents

CPI	consumer price index
CSGEIS	Continued Storage Generic Environmental Impact Statement
CWA	Clean Water Act
CWF	Compact Waste Disposal Facility
dB(A)	decibel
DCSS	dry cask storage system
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DPA	Designated Potash Area
DSL	dunes sagebrush lizard
DTS	dry transfer system
EA	environmental assessment
EIS	Environmental Impact Statement
ELEA	Eddy-Lea Energy Alliance
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ER	Environmental Report
ERG	Escondia Research Group, LLC
ESA	Endangered Species Act
F	Fahrenheit
FEIS	Final Environmental Impact Statement
FEP/DUP	Fluorine Extraction Process and Depleted Uranium De-conversion Plant
ft	feet
FR	Federal Register
FRA	Federal Railroad Administration
FSEIS	Final Supplemental Environmental Impact Statement
FTE	full-time equivalents
FWF	Federal Waste Disposal Facility
FWS	U.S. Fish and Wildlife Service
GAO	Government Accounting Office
GDP	gross domestic product
GEIS	Generic Environmental Impact Statement
GHG	greenhouse gases
GLO	General Land Office
GMUs	game management units
GNEP	Global Nuclear Energy Partnership
gpm	gallons per minute
GPS	Global Positioning System
GRT	gross receipt taxes
GTCC	Greater-Than Class C
GWd	gigawatt days
ha	hectares
HCPI	Historic Cultural Property Inventory
HELMS	Hardened Extended-Life Local Monitored Surface Storage
HI-STORM UMAX	Holtec International Storage Module Underground MAXimum Capacity
HLRWC	High Level Radioactive Waste Committee

HLW	high-level radioactive waste
HOSS	Hardened Onsite Storage System
HUD	U.S. Department of Housing and Urban Development
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection
IIFP	International Isotopes Fluorine Products Inc.
IM	isolated manifestations
inbs	inches below surface
Intrepid	Intrepid Mining, LLC
IO	isolated occurrence
IPA	important plant areas
IPaC	Information Planning and Conservation
ISFSI	Independent Spent Fuel Storage Installation
ISP	Interim Storage Partners
JA	Jal association
km	kilometers
km^2	square kilometers
LCED	Lea County Economic Development
LCF	latent cancer fatalities
LLRW	low-level radioactive waste
LP	Largo-Pajarito complex
LPC	Lesser prairie-chicken
Lpm	Liters per minute
m	meter
MBTA	Migratory Bird Treaty Act
MDC	minimum detectable concentration
mi	miles
mi^2	square miles
mg/L	milligrams per liter
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MOX	mixed oxide fuel
mrem	millirem
mSv	millisieverts
MTRU	mixed transuranic waste
MTU	metric tons of uranium
mw	megawatts
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NCRP	National Council on Radiation Protection and Measurements
NEF	National Enrichment Facility
NEP	non-essential experimental population
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NM	New Mexico

NMAAQS	New Mexico Ambient Air Quality Standards
NMAC	New Mexico Administrative Code
NMBF	New Mexico Board of Finance
NMCRIS	New Mexico Cultural Resources Information Center
NMDA	New Mexico Department of Agriculture
NMDGF	New Mexico Department of Game and Fish
NMDOH	New Mexico Department of Health
NMDOT	New Mexico Department of Transportation
NMED	New Mexico Environment Department
NMHPD	New Mexico Historic Preservation Division
NMOCC	New Mexico Oil Conservation Commission
NMOSE	New Mexico Office of the State Engineer
NM SHPO	New Mexico State Historic Preservation Officer
NMSLO	New Mexico State Land Office
NMSS	Office of Nuclear Material Safety and Safeguards
NMTRD	New Mexico Taxation and Revenue Department
NMTSO	New Mexico Tech Seismological Observatory
NMWQB	New Mexico Water Quality Bureau
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NSC	National Safety Council
NTSB	National Transportation Safety Board
NWPA	Nuclear Waste Policy Act of 1982
NWR	National Wildlife Refuge
NWSC	Nuclear Waste Strategy Coalition
NWTRB	Nuclear Waste Technical Review Board
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
PB	Playas
PFYC	Potential Fossil Yield Classification
PFS	Private Fuel Storage
ppm	parts per million
PSD	Prevention of Significant Deterioration
PWR	pressurized water reactor
RAIs	requests for additional information
REIRS	Radiation Exposure Information and Reporting Systems
rem	roentgen equivalent man
REMP	Radiological Environmental Monitoring Program
ROI	region of influence
SAR	Safety Analysis Report
SE	Fine Sandy Loam
SEED	Sustainable Energy and Economic Development
SEIS	Supplemental Environmental Impact Statement
SER	Safety Evaluation Report

SFP	Support Foundation Pad
SGCN	species of greatest conservation need
SGP CHAT	Southern Great Plains Crucial Habitat Assessment Tool
SHPO	State Historic Preservation Office
SLO	State Land Office
SNF	spent nuclear fuel
SPCC	Spill Prevention, Control, and Countermeasure
SR	Simona-Upton Association
SRI	Statistical Research, Inc.
Sv	sievert
SWPPP	Storm Water Pollution Prevention Plan
SwRI®	Southwest Research Institute®
TAD	transportation and disposal
TCEQ	Texas Commission on Environmental Quality
TCP	Traditional Cultural Property
TCPA	Texas Comptroller of Public Accounts
TDS	total dissolved solids
TEDE	total effective dose equivalent
TLD	thermoluminescent dosimeters
TNMR	Texas-New Mexico Railroad
TRMTC	Tribal Radioactive Materials Transportation Committee
TRU	transuranic radioactive waste
TSCA	Toxic Substances Control Act
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
VRM	Visual Resource Management
VVM	Vertical Ventilated Modules
WCS	Waste Control Specialists
WIEB	Western Interstate Energy Board
WIPP	Waste Isolation Pilot Plant
WOTUS	Waters of the U.S.
YM	Yucca Mountain

1 INTRODUCTION

1.1 Background

By letter dated March 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) received an application from Holtec International (Holtec) requesting a license that would authorize Holtec to construct and operate a consolidated interim storage facility (CISF) for spent nuclear fuel (SNF) and Greater-Than Class C waste, along with a small quantity of mixed oxide fuel, which are collectively referred to in this document as SNF, and composed primarily of spent uranium-based fuel (Holtec, 2017). The license application includes an Environmental Report (ER) (Holtec, 2020a), a Safety Analysis Report (SAR), and other relevant documents (Holtec, 2020b). The proposed Holtec CISF would provide an option for storing SNF from nuclear power reactors for a period of 40 years. Holtec prepared the license application in accordance with requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 72, “Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste.” This environmental impact statement (EIS) was prepared consistent with NRC’s National Environmental Policy Act (NEPA)-implementing regulations contained in 10 CFR Part 51, “Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions” and the NRC staff guidance in NUREG–1748, “Environmental Review Guidance for Licensing Actions Associated with NMSS Programs” (NRC, 2003).

Spent nuclear fuel (SNF)
Nuclear reactor fuel that has been removed from a nuclear reactor because it can no longer sustain power production for economic or other reasons.

Greater-Than-Class-C waste (GTCC)
GTCC waste means low-level radioactive waste that exceeds the concentration limits of radionuclides established for Class C waste in 10 CFR 61.55.

Mixed oxide fuel (MOX)
A type of nuclear reactor fuel (often called “MOX”) that contains plutonium oxide mixed with either natural or depleted uranium oxide, in ceramic pellet form. Using plutonium reduces the amount of highly enriched uranium needed to produce a controlled reaction in commercial lightwater reactors.

1.2 Proposed Action

1.2.1 The NRC Proposed Action

The proposed action is the issuance, under the provisions of 10 CFR Part 72, of an NRC license authorizing the construction and operation of the proposed Holtec CISF in southeast New Mexico at a site located approximately halfway between the cities of Carlsbad and Hobbs, New Mexico, as discussed in more detail in EIS Section 2.2. Holtec requests authorization for the initial phase (Phase 1) of the project to store up to 8,680 metric tons of uranium (MTUs) [9,568 short tons] in 500 canisters for a license period of 40 years (Holtec, 2019). Holtec plans to subsequently request amendments to the license to store an additional 500 canisters for each of 19 expansion phases of the proposed CISF (a total of 20 phases), to be completed over the course of 20 years, and to expand the facility to eventually store up to 10,000 canisters of SNF (Holtec, 2020a).

Holtec’s expansion of the proposed project (i.e., Phases 2-20) is not part of the proposed action currently pending before the agency. However, the NRC staff considered these expansion phases in its description of the affected environment and impact determinations in this EIS, where appropriate, when the environmental impacts of the potential future expansion can be determined so as to conduct a bounded analysis for the proposed CISF project. The NRC staff conducted this analysis as a matter of discretion because Holtec provided the analysis of the environmental impacts of the future anticipated expansion of the proposed facility as part of its license application (Holtec, 2020a,b). For the bounding analysis, the NRC staff assumes the storage of up to 10,000 canisters of SNF. During operation, the proposed CISF would receive SNF from decommissioned reactor sites, as well as from operating reactors prior to decommissioning. The CISF would serve as an interim storage facility before a permanent geologic repository is available.

The NRC has previously licensed a consolidated spent fuel storage installation (Private Fuel Storage), and NRC regulations continue to allow for licensing private away-from-reactor interim spent fuel installations (e.g., G.E. Morris) under 10 CFR Part 72. For more information on the NRC's regulation of spent fuel transportation, see https://www.nrc.gov/waste/spent-fuel-transp.html.

1.2.2 U.S. Bureau of Land Management (BLM) Proposed Action

Holtec proposes building a rail spur across BLM-managed lands to connect existing rail lines to the proposed CISF site. The BLM's Federal decision is to either approve Holtec's Plan of Operations (pending submission), subject to mitigation included in the Holtec license application and this EIS, or deny approval of the Plan of Operations if it is found that Holtec's proposal would result in unnecessary or undue degradation of the public lands. The total amount of BLM-managed land expected to be disturbed by Holtec for construction and operation of the rail spur would be 15.9 hectares (ha) [39.4 acres (ac)]. The rail spur would be routed across BLM-managed land west of the proposed CISF project and would not cross any major highways (Holtec, 2020a). A site access road would also be constructed across BLM-managed land from the proposed CISF project southward to U.S. Highway 62/180 and would be approximately 1.6 kilometers (km) [1 mile (mi)] in length. Construction of the rail spur and site access road would require right-of-way approval on Federal lands from BLM.

1.3 <u>Purpose and Need for the Proposed Action</u>

1.3.1 NRC Purpose and Need

The purpose of the proposed Holtec CISF is to provide an option for storing SNF from nuclear power reactors before a permanent repository is available. SNF would be received from operating, decommissioning, and decommissioned reactor facilities.

The proposed CISF is needed to provide away-from-reactor SNF storage capacity that would allow SNF to be transferred from existing reactor sites and stored for the 40-year license term before a permanent repository is available. Additional away-from-reactor storage capacity is needed, in particular, to provide the option for away-from-reactor storage so that stored SNF at decommissioned reactor sites may be removed so the land at these sites is available for other uses.

The Nuclear Waste Policy Act of 1982 required the Federal government to site, build, and operate a geologic repository for high-level radioactive waste (HLW) and spent fuel by the mid-1990s. Several factors have contributed to the delay, but in 2003 the U.S. Department of Energy (DOE) reaffirmed the Federal Government's commitment to the ultimate disposal of the spent fuel and predicted that a repository would be available by 2048 (DOE, 2003). The delay in the availability of a Federal repository for disposal of SNF has extended the SNF storage period at reactor sites. As a result, several decommissioned reactor sites exist where a facility for storing SNF is the only remaining structure licensed by the NRC. This circumstance has delayed complete site decommissioning and prevented these sites from being put to other uses.

1.3.2 BLM Purpose and Need

The BLM purpose and need is to provide direction for managing public lands the BLM administered in accordance with its mandate under the Federal Land Policy and Management Act of 1976. The proposed rail spur is needed to efficiently transfer SNF from existing rail lines to the proposed CISF.

1.4 Scope of the EIS

The scope of the EIS includes an evaluation of the radiological and non-radiological environmental impacts of consolidated interim storage of SNF at the proposed CISF location and the No-Action alternative. This EIS also considers unavoidable adverse environmental impacts, the relationship between short-term uses of the environment and long-term productivity, and irreversible and irretrievable commitments of resources.

1.4.1 Public Participation Activities

On March 30, 2018, in accordance with 10 CFR 51.26, the NRC published a Notice of Intent (NOI) to prepare an EIS and conduct scoping in the *Federal Register* (FR), titled “Holtec International HI-STORE Consolidated Interim Storage Facility Project” (83 FR 13802). Through the NOI, the NRC invited potentially affected Federal, Tribal, State, and local governments; organizations; and members of the public to provide comments on the scope of the Holtec CISF EIS. The initial scoping period was scheduled to end on May 29, 2018, and was subsequently extended to July 30, 2018, in response to several requests for an extension (83 FR 22714). Comments were accepted via the Federal rulemaking website (www.Regulations.gov), email, or regular U.S. mail. The purpose of the scoping process (83 FR 13802) is to

- ensure that important issues and concerns are identified early and are properly studied
- identify alternatives to be examined
- identify significant issues to be analyzed in depth
- eliminate unimportant issues from detailed consideration
- identify public concerns

Public Scoping Meetings

During the 120-day scoping comment period, the NRC staff hosted six public scoping meetings, five in person and one by webinar. All comments received during these meetings were transcribed. All transcribed comments, as well as any written comments submitted in person during the scoping meetings, were considered by NRC staff and are included in the comment summaries. On Wednesday, April 25, 2018, the NRC staff conducted a public scoping meeting and webinar at NRC headquarters in Rockville, Maryland, at 7 p.m. EST. This meeting was held in the evening to accommodate stakeholders in western time zones. Approximately 45 people attended, primarily by phone. A transcript of the meeting is available in ADAMS under Accession No. ML18130A895.

Five in-person public scoping meetings were held in New Mexico. The dates and locations for these meetings were (i) April 30, 2018, in Roswell; (ii) May 1, 2018, in Hobbs; (iii) May 3, 2018, in Carlsbad; (iv) May 21, 2018, in Gallup; and (v) May 22, 2018, in Albuquerque. The NRC expanded the Roswell meeting and added the latter two meetings in response to requests from stakeholders. The number of meeting attendees was approximately 105 people in Roswell, 150 people in Hobbs, 120 people in Carlsbad, 90 people in Gallup, and 155 people in Albuquerque. Preceding each public scoping meeting, the NRC staff conducted an "open house" at the meeting facility. Transcripts from each meeting, along with handouts and the NRC presentations, can be found on the NRC website (https://www.nrc.gov/waste/spent-fuel-storage/cis/hi/public-meetings.html).

To accommodate members of the public with limited English proficiency, the NRC staff provided presentation slides, a fact sheet about the project, and information about how to comment on the project in Spanish. These materials are also available on the NRC website (https://www.nrc.gov/waste/spent-fuel-storage/cis/hi/public-meetings.html). Fluent Spanish-speaking NRC staff opened all of the public scoping meetings by stating, in Spanish, that although the meetings were being conducted in English, requests to translate into Spanish were welcomed and would be honored.

In advance of each of these meetings, meeting announcements were posted on the NRC public meeting notification system website, and notices were placed in local newspapers and radio stations. In addition, the NRC's Office of Public Affairs issued press releases and posted notice of the meetings on the NRC's Facebook and Twitter accounts.

Draft EIS Public Comment Period and Public Meetings

The NRC issued a *FR* Notice on March 20, 2020, notifying the public of the availability of the draft EIS and requesting public comment (85 FR 16150). The NRC notice provided for a 60-day public comment period, ending May 22, 2020. However, the NRC staff recognized that the pandemic and associated public health emergency created unique challenges for all stakeholders - including members of the public - to be able to participate in the public comment process. In response to requests for a comment period extension and in recognition of these challenges, the NRC extended the comment deadline on April 27, 2020, for an additional 60 days until July 22, 2020 (85 FR 23382) and again on June 24, 2020 for an additional 60 days until September 22, 2020 (85 FR 37964). This resulted in a 180-day comment period, which is 60 days longer than the 120-day public comment period provided during scoping.

As a result of the pandemic and associated public health emergency, and consistent with the practice of several other Federal agencies, the NRC modified its public interactions from in-person meetings to virtual meetings, such as webinars. This change allowed opportunities for oral comments while maintaining safety protocols for NRC staff and stakeholders. Comments received at webinar public meetings were handled and considered in the same way as those received during in-person public comment meetings: a transcript was taken of the meeting and made available to the public, and the comments were grouped with comments received through other means (e.g., mail and email) for NRC staff response. Public meetings held through webinar also allowed for national participation.

The NRC staff strives to conduct its regulatory activities in an open and transparent manner and to make information as accessible as possible to optimize public participation. For this draft EIS public comment process, the NRC staff published *FR* Notices and press releases, placed newspaper ads, posted information to the NRC website, and sent copies of materials to libraries closest to the proposed CISF site and mailed hard copies of the draft EIS to those that requested it. As previously noted, the NRC extended the public comment period to 180 days, during which comments were also received by email, mail, or through regulations.gov.

The NRC accepted all comments on the draft EIS received on or before September 22, 2020. The NRC received approximately 4,807 comment correspondence, including form letters. From these, the NRC identified 428 unique correspondence that were delineated into a total of 3,718 unique comments. Appendix D contains summaries of these comments by subject matter area and topic and the NRC staff's responses to the comments. Where applicable, the responses note which EIS sections the NRC staff edited in response to comments.

1.4.2 Issues Studied in Detail

To meet its NEPA obligations related to its review of the proposed CISF project, the NRC staff conducted an independent and detailed evaluation of the potential environmental impacts from construction, operation, and decommissioning of the proposed facility at the proposed location and of the No-Action alternative. This EIS provides a detailed analysis of the following resource areas:

- Land Use
- Transportation
- Geology and Soils
- Water Resources
    - Surface Water
    - Groundwater
- Ecology
    - Vegetation
    - Wildlife
    - Protected Species and Species of Concern
- Air Quality
- Noise
- Visual and Scenic Resources
- Historic and Cultural Resources
- Socioeconomics
- Environmental Justice
- Public and Occupational Health and Safety
- Waste Management

As part of the cumulative impacts analysis, the NRC also considers the effects the proposed project could have on global climate change. The analysis estimates the potential effect of the facility's greenhouse gas emissions based on a 40-year license term.

1.4.3 Issues Outside the Scope of the EIS

This EIS evaluates the environmental impacts of construction, operation, and decommissioning of a consolidated interim storage facility for SNF. Some issues and concerns raised during the public scoping process on the EIS (NRC, 2019a – NRC scoping report) were determined to be outside the scope of the EIS. As a result, these issues and concerns are not addressed in the EIS. These topics include (but are not limited to)

- consideration of noncommercial SNF (e.g., defense waste, foreign waste)

- concerns about nuclear power and alternatives to nuclear power

- consideration of environmental impacts of constructing and operating reprocessing facilities for commercial SNF

- concerns associated with the Yucca Mountain licensing proceeding and national progress in developing a repository

- legacy issues from prior nuclear activities not in the vicinity of the proposed project

- site-specific issues at other facilities

1.4.4 Relationship to the Continued Storage Generic Environmental Impact Statement (GEIS) and Rule

In September 2014, the NRC issued the Continued Storage Generic Environmental Impact Statement [NUREG–2157 (NRC, 2014)] and updated its Continued Storage Rule at 10 CFR 51.23. The Continued Storage GEIS analyzed the environmental effects of the continued storage (i.e., beyond a facility's license term) of SNF at both at-reactor and away-from-reactor independent spent fuel storage installations (ISFSIs) (NRC, 2014) and served as the regulatory basis for the Rule. The Rule codified the NRC's generic determinations made in the GEIS regarding the environmental impacts of continued storage of SNF beyond the licensed life of a facility.

The GEIS is applicable for the period of time after the license term of an away-from-reactor independent spent fuel storage installation (ISFSI) (i.e., a CISF) (NRC, 2014). Consistent with 10 CFR 51.23(c), this EIS serves as the site-specific review conducted for the construction and operation of the proposed CISF for the period of its proposed license term. In accordance with the regulation at 10 CFR 51.23(b), the impact determinations from the GEIS are deemed incorporated into this EIS for the timeframe beyond the period following the term of the CISF license. Thus, those impact determinations are not reanalyzed in this EIS.

1.5 Applicable Regulatory and Statutory Requirements

NEPA established national environmental policy and goals to protect, maintain, and enhance the environment and provided a process for implementing these specific goals for those Federal agencies responsible for an action. This EIS was prepared in accordance with the NRC's NEPA-implementing regulations at 10 CFR Part 51. In addition, pursuant to 10 CFR Part 72, the NRC regulations establish requirements, procedures, and criteria for the issuance of licenses to receive, transfer, and possess power reactor spent fuel, power reactor-related GTCC waste, and other radioactive materials associated with spent fuel storage in an ISFSI.

BLM regulatory requirements include the Federal Land Policy and Management Act of 1976*,* as amended, which is a Federal law that governs the way in which BLM-administered public lands are managed. This regulatory requirement would apply to the proposed CISF project connected action of construction, operation, and decommissioning of the rail spur on BLM land to transport SNF from the main rail line to the proposed CISF (NRC, 2018a). In addition, BLM would be the responsible agency for granting rights-of-way under 43 CFR Part 2800. The BLM objective under this regulation is to grant rights-of-way to any qualified individual, business, or government entity and to direct and control the use of rights-of-way on public lands in a manner that (i) protects the natural resources associated with public lands and adjacent lands; (ii) prevents unnecessary or undue degradation to public lands; (iii) promotes the use of rights-of-way considering engineering and technological compatibility, national security, and land use plans; and (iv) coordinates, to the fullest extent possible, all BLM actions under the regulations in this part with State and local governments, interested individuals, and appropriate quasi-public entities (NRC, 2018a).

New Mexico Environment Department (NMED) statutory requirements in Section 74-1-6(C) of the New Mexico Environmental Improvement Act allows NMED to enter into agreements with environmental and consumer protection agencies of other States and the Federal Government pertaining to duties of the department. Under the NRC and NMED Memorandum of Understanding, NMED has provided information on State permitting requirements as input to this EIS (NRC, 2019b).

1.6 Licensing and Permitting

1.6.1 NRC Licensing Process

By letter dated March 30, 2017, Holtec submitted a license application to the NRC for the proposed CISF project (Holtec, 2017). The NRC initially conducts an acceptance review of a license application to determine whether the application is sufficient to begin a detailed technical review. The NRC staff accepted the proposed CISF project license application for detailed technical review by letter dated July 7, 2017 (NRC, 2017).

The NRC staff's detailed technical review of Holtec's license application is composed of both a safety review and an environmental review. These two reviews are conducted in parallel. The focus of the safety review is to assess compliance with the applicable regulatory requirements at 10 CFR Part 72. The environmental review has been conducted in accordance with the regulations at 10 CFR Part 51.

1.6.2 Status of Permitting With Other Federal and State Agencies

In addition to obtaining an NRC license prior to construction of the proposed CISF project, Holtec is required to obtain all necessary permits and approvals from other Federal and State agencies during construction and operation of the proposed facility. EIS Table 1.6-1 lists the status of the required permits and approvals.

Table 1.6-1 Environmental Approvals for the Proposed CISF Project

Regulatory Agency	Description	Status*
U.S. Nuclear Regulatory Commission (NRC)	License Application	Under review. Submitted March 31, 2017
U.S. Bureau Land Management (BLM)	Land Use Permit – Rail Spur	Pending – Will apply for prior to construction
U.S. Fish and Wildlife Service (FWS)	Endangered Species Act (ESA)-Ecological surveys complete, biological evaluation conducted; no consultation required	Initial Survey Complete, biological evaluation conducted

Table 1.6-1 Environmental Approvals for the Proposed CISF Project		
Regulatory Agency	**Description**	**Status***
U.S. Environmental Protection Agency (EPA)	National Pollutant Discharge Elimination System (NPDES) Industrial Stormwater Permit	Pending
U.S. Environmental Protection Agency (EPA)	NPDES Construction Permit	Pending
New Mexico State Historic Preservation Office (NM SHPO)	National Historic Preservation Act (NHPA)-Surveys complete, Section 106 consultation completed. Two prehistoric sites are either no longer within the footprint of the proposed project activities or are not recommended as potentially eligible for listing in the National Register of Historic Places (NRHP).	NM SHPO concurrence received (ML21004A023)
New Mexico Department of Transportation (NMDOT)	NM243 Rail Road Spur ROW Crossing	Pending – Will apply for prior to construction
New Mexico Environment Department (NMED)	Groundwater Discharge Permit/Plan	Pending – Will apply for prior to construction, if required
New Mexico Environment Department (NMED)	Hazardous Waste Generation and Storage	Pending – Will apply for prior to construction
New Mexico Environment Department (NMED)	Environmental Protection Agency (EPA) Notification of Hazardous Waste Activity to obtain an EPA Identification Number	Pending – Will apply for the ID number prior to generation of waste during facility construction and operation
New Mexico Environment Department (NMED)	Petroleum Storage Tank Registration	Will register storage tanks as required
New Mexico Environment Department (NMED)	Sanitary Waste Permit	Pending – Will apply for prior to construction
*Under Review indicates that the applicant has submitted its application for the permit. Pending indicates the applicant has not yet submitted its application for the permit.		

1.7 Consultation

Federal agencies are required to comply with consultation provisions in Section 7 of the Endangered Species Act of 1973 (ESA), as amended, and Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended. Section 7 (ESA) and Section 106 (NHPA) consultations conducted for the proposed CISF project are summarized in EIS Sections 1.7.1 and 1.7.2. A list of the consultation correspondence is provided in EIS Appendix A. EIS Section 1.7.3 describes the NRC coordination with other Federal, Tribal, State, and local agencies conducted during the development of this EIS.

1.7.1 Endangered Species Act of 1973 Consultation

The ESA was enacted to prevent the further decline of endangered and threatened species and to restore those species and their critical habitats. ESA Section 7 provides for consultation with the U.S. Fish and Wildlife Service (FWS) to ensure that actions it authorizes, permits, or otherwise carries out will not jeopardize the continued existence of any listed species or adversely modify designated critical habitats. The FWS has responsibility for certain species of New Mexico wildlife under the ESA, the Migratory Bird Treaty Act (MBTA) as amended (16 USC 701-715), and the Bald and Golden Eagle Protection Act (BGEPA) as amended (16 USC 668-668c).

Between the publication of the draft EIS and the final EIS, FWS updated the official species list for the proposed project. On September 14, 2021, and May 9, 2022, the NRC staff obtained official species lists from the FWS Information Planning and Conservation (IPaC) website (FWS, 2021; FWS, 2022). This list is provided pursuant to Section 7 of the ESA and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action." The FWS official species lists are considered valid for 90 days (FWS, 2022).

The NRC staff met with the New Mexico Game and Fish Department (NMDGF) on May 2, 2018, to discuss the potential impacts on ecological resources associated with the proposed CISF. By letter dated August 31, 2018, the NMDGF (C. Hayes) submitted scoping comments on the proposed CISF project (NMDGF, 2018). The NRC staff used the interactive New Mexico Environmental Review Tool to generate a site-specific report of NMDGF recommendations regarding potential impacts to wildlife or wildlife habitats from the proposed CISF project (NMDGF, 2019). The NMDGF and NRC staffs then discussed the recommendations in the report. To date, NMDGF staff has not provided additional recommendations beyond those provided in their August 2018 scoping comments (NMDGF, 2018).

1.7.2 National Historic Preservation Act of 1966 Consultation

Section 106 of the NHPA requires that Federal agencies take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation an opportunity to comment on such undertakings. The Section 106 process seeks the views of consulting parties, including the Federal agency, the State Historic Preservation Officer, Indian Tribes, Tribal Historic Preservation Officers, local government leaders, Holtec, cooperating agencies, and the public. The NRC staff complied with NHPA requirements by performing the Section 106 consultation in coordination with performing the NEPA environmental review, in accordance with 36 CFR 800.8. By conducting the NHPA Section 106 evaluation through the NEPA process, the NRC staff was able to assess if there were historic properties the proposed project could adversely affect and potential ways to avoid, minimize, or mitigate adverse effects while identifying alternatives and preparing NEPA documentation.

The goal of consultation is to identify historic properties the undertaking potentially affects, assess the effects of the undertaking on these properties, and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties. As detailed in 36 CFR 800.2(c)(1)(i), the role of the New Mexico State Historic Preservation Office (NM SHPO) in the Section 106 process is to advise and assist Federal agencies in carrying out their Section 106 responsibilities.

The NRC initiated consultation with the NM SHPO and Federally recognized Tribes having current or historic connection to the proposed project area (NRC, 2018b). Four Tribes, the Hopi Tribe, the Kiowa Tribe of Oklahoma, the Navajo Nation, and the Pueblo of Tesuque agreed to consult on the proposed project. The NRC staff continued to consult with the NM SHPO and other consulting parties throughout the environmental review process to evaluate the effects of the proposed project on historic and cultural resources. On December 15, 2020, the NRC staff received the NM SHPO’s concurrence on its eligibility determination, thereby concluding NRC’s NHPA Section 106 activities. A full listing of correspondence can be found in Appendix A of this EIS.

1.7.3 Coordination with Other Federal, State, Local, and Tribal Agencies

The NRC staff interacted with Federal, State, local, and Tribal agencies during preparation of this EIS to gather information on potential issues, concerns, and environmental impacts related to the proposed CISF project. The consultation and coordination process included discussions with NMED, BLM, EPA, NMDGF, local organizations (e.g., county commissioners), as well as Tribal governments.

1.7.3.1 Interactions with Tribal Governments

The NRC recognizes that there are specific government-to-government consultation responsibilities regarding interactions with Federally recognized Tribal governments because of their status as sovereign nations. As such, the NRC offers Federally recognized Tribes the opportunity for government-to-government consultation consistent with the principles in its Tribal Policy Statement, which was issued on January 9, 2017 (82 FR 2402). The Tribal Policy Statement promotes effective government-to-government interactions with Indian and Alaska Native Tribes and encourages and facilitates Tribal involvement in the areas over which the NRC has jurisdiction. The NRC staff contacted all Federally recognized Indian Tribes with current or historic ties to the project location in southeast New Mexico. Eleven Tribes were contacted in total: the Apache Tribe of Oklahoma, the Comanche Nation, the Hopi Tribe, the Jicarilla Apache Nation, the Kiowa Tribe of Oklahoma, the Mescalero Apache Tribe, the Navajo Nation, the Pawnee Nation of Oklahoma, the Pueblo of Isleta, the Pueblo of Tesuque, and the Ysleta del Sur Pueblo. Appendix A of this EIS contains correspondence related to NRC’s outreach with Indian Tribes.

Four Tribes, the Hopi Tribe, the Kiowa Tribe of Oklahoma, the Navajo Nation, and the Pueblo of Tesuque, agreed to consult on the proposed project. The NRC staff continued consultation efforts by a letter dated December 12, 2019, proposing to define the area of potential effect (APE) for both direct and indirect effects and inviting Tribal representatives to a site visit (NRC, 2019c). Only the Navajo Nation participated in the planned activities. On February 4, 2020, the Navajo Nation representative attended a site visit with the NRC staff and a professional archaeologist.

By letter dated March 11, 2020, the NRC staff again reached out to eleven potentially interested Tribes with a notice of availability of the draft EIS for the Holtec CISF project. The letter explained that the NRC made a preliminary determination that the construction and operation of the CISF would not adversely affect historic properties near the site and requested comments on the draft EIS and preliminary conclusions. On August 26, 2020, the NRC staff provided the Hopi Tribe, the Kiowa Tribe of Oklahoma, the Navajo Nation, and the Pueblo of Tesuque with a copy of NRC's draft report on the identification of historic properties and its proposed eligibility recommendations, and the NRC staff requested that the Tribes review and comment on the report. The NRC staff received one response—the Hopi Tribe provided concurrence for the eligibility recommendations, as documented in a letter dated September 7, 2020. A full listing of correspondence can be found in Appendix A of this EIS.

1.7.3.2 Coordination with Federal and State Agencies

Coordination with BLM

The NRC identified the BLM as a cooperating agency for the Holtec CISF environmental review. The transfer of SNF to and from the main rail line to the proposed CISF would occur using a rail spur. The proposed rail spur would be constructed on BLM land and require BLM permitting. The Memorandum of Understanding (MOU) between the NRC and BLM can be found using ADAMS (Accession No. ML18248A133). For additional details on the BLM Federal action and purpose and need, see EIS Sections 1.2.2 and 1.3.2, respectively. BLM will be the agency responsible for issuing the appropriate right-of-way for the rail spur and permitting any other project-related actions on BLM land. This EIS will serve to fulfill the NEPA responsibilities of both the NRC and BLM, with both agencies issuing a separate Record of Decision.

Coordination with EPA

The EPA is the NPDES stormwater permitting authority for all facilities in New Mexico. The EPA also has the authority to review NEPA documents under Section 309 of the Clean Air Act. During the development of this EIS, the NRC staff consulted with the EPA to better understand the relationship between the EPA's NPDES permitting and the State of New Mexico's authority under Section 401 of the Clean Water Act (EIS Section 4.5.1). The EPA submitted comments on the draft EIS, which the NRC staff addressed as appropriate in this final EIS.

Coordination with NMED

At the request of the State of New Mexico, NMED was identified as a cooperating agency having special expertise in surface water and groundwater resources for the proposed CISF project. The NRC staff coordinated with NMED staff on water resources for this EIS to describe the affected environment, potential impacts from the proposed project, cumulative impacts, and any additional mitigation measures. The NMED does not have any obligations under NEPA related to the proposed project; however, NMED provided special expertise for water resources in and around the proposed site. NMED submitted comments on the preliminary draft EIS, which the NRC staff addressed as appropriate in this final EIS when doing so would advance the evaluation of the proposed project impacts.

1.7.3.3 Coordination with Localities

The NRC staff met with city council members of the City of Artesia on April 30, 2018; with the City of Hobbs Mayor's Office on May 1, 2018; with the Lea and Eddy County Commissioners and city managers on May 3, 2018; and with the City of Carlsbad Mayor's Office on May 3, 2018, to provide a brief overview of the NRC environmental review process and, when possible, address any questions or concerns by members of these local agencies. The NRC staff also met with the Economic Development Board of Lea County (May 1, 2018) and the Carlsbad Soil and Water Conservation Service (May 3, 2018). Lists of attendees and summaries of these discussions can be found in the NRC Site Trip Report (ADAMS Accession No. ML18164A217).

1.8 <u>References</u>

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20. "Standards for Protection Against Radiation." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51. "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." Washington, DC: U.S. Government Publishing Office.

10 CFR 51.23. Code of Federal Regulations, Title 10, *Energy*, § 51.23. "Environmental Impacts of Continued Storage of Spent Nuclear Fuel Beyond the Licensed Life for Operation of a Reactor." Washington, DC: U.S. Government Publishing Office.

10 CFR 51.26. Code of Federal Regulations, Title 10, *Energy*, § 51.26. "Requirement to Publish Notice of Intent and Conduct Scoping Process." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 72. Code of Federal Regulations, Title 10, *Energy*, Part 72. "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste." Washington, DC: U.S. Government Publishing Office.

36 CFR 800.8. Code of Federal Regulations, Title 36, *Parks, Forests, and Public Property*, § 800.8. "Coordination With the National Environmental Policy Act." Washington, DC: U.S. Government Publishing Office.

43 CFR 2800. Code of Federal Regulations, Title 43, *Public Lands: Interior*, Part 2800. "Rights-of-Way Under the Federal Land Policy and Management Act." Washington, DC: U.S. Government Publishing Office.

82 FR 2402. *Federal Register*. Vol. 82, No. 5, p. 2,402–2,417. "Tribal Policy Statement." 2017.

83 FR 13802. *Federal Register*. Vol. 83, No. 62, p. 13,802–13,804. "Holtec International HI-STORE Consolidated Interim Storage Facility Project." 2018.

83 FR 22714. *Federal Register.* Vol. 83, No. 95, p. 22,714–22,715. "Holtec International HI-STORE Consolidated Interim Storage Facility Project." 2018.

83 FR 32919. *Federal Register*. Vol. 83, No. 136, p. 32,919–32,925. "Holtec International HI-STORE Consolidated Interim Storage Facility Project." 2018.

85 FR 16150. *Federal Register*. Vol. 85, No. 55, p. 16,150–16,151. "Holtec International HI-STORE Consolidated Interim Storage Facility Project." 2020.

85 FR 23382. *Federal Register*. Vol. 85, No. 81, p. 23,382–23,383. "Holtec International HI-STORE Consolidated Interim Storage Facility Project." 2020.

85 FR 37964. *Federal Register*. Vol. 85, No. 122, p. 37,964–37,965. "Holtec International HI-STORE Consolidated Interim Storage Facility Project." 2020.

DOE. National Report Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. Washington, DC: U.S. Department of Energy. 2003. <http://energy.gov/sites/prod/files/1st%20US%20JC%20report.pdf> (Accessed 19 August 2019)

FWS. “Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project.” Project Code: 2022-0025363. Project Name: Holtec International New Mexico Spent Nuclear Fuel Storage Facility. ADAMS Accession No. ML22129A105. Albuquerque, New Mexico: U.S. Fish and Wildlife Service. 2022.

FWS. “Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.” Consultation Code: 02ENNM00-2018-SLI-0582. Project Name: Holtec International New Mexico Spent Nuclear Fuel Storage Facility. ADAMS Accession No. ML21257A381. Albuquerque, New Mexico: U.S. Fish and Wildlife Service. 2021.

Holtec. “Environmental Report-HI-STORE Consolidated Interim Storage Facility, Rev. 8.” ADAMS Accession No. ML20295A485. Marlton, New Jersey: Holtec International. 2020a.

Holtec. “Safety Analysis Report-HI-STORE Consolidated Interim Storage Facility.” ADAMS Accession No. ML20295A428. Marlton, New Jersey: Holtec International. 2020b.

Holtec. “Responses to Request for Additional Information.” ADAMS Accession No. ML19081A075. Marlton, New Jersey: Holtec International. 2019.

Holtec. “Holtec International HI-STORE CIS (Consolidated Interim Storage Facility) License Application.” ADAMS Accession No. ML17115A418. Marlton, New Jersey: Holtec International. 2017.

NMDGF. Project ID: NMERT-203. Project Title: Proposed Holtec Consolidated Interim Storage Facility. ADAMS Accession No. ML21195A387. Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2019.

NMDGF. Letter (August 31) C. Hayes, New Mexico Game and Fish Department, to Jill Caverly, NRC. RE: Holtec International HI-STORE Consolidated Interim Storage Facility Project, Environmental Impact Statement (EIS), Public Scoping; NMDGF No. 18390. ADAMS Accession No. ML18247A573. Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2018.

NRC. The Holtec Environmental Impact Statement Public Scoping Period Summary Report. ADAMS Accession No. ML19121A296. Washington, DC: U.S. Nuclear Regulatory Commission. 2019a.

NRC. “Memorandum of Understanding Between the U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards, and the New Mexico Environment Department on the Environmental Review Related to the Issuance of Authorizations to Build and Operate the Proposed Holtec International Consolidated Interim Storage Facility.” ADAMS Accession No. ML19206A094. Washington, DC: U.S. Nuclear Regulatory Commission. 2019b.

NRC. “Request For Tribal Participation At a Webinar And Site Visit For Section 106 Consultation Activities Associated With The Holtec Hi-Store Consolidated Interim Storage Facility Located In Lea County, New Mexico (Docket Number: 7201051).” ADAMS Accession No. ML19344B782. Washington, DC: U.S. Nuclear Regulatory Commission. 2019c.

NRC. "Memorandum of Understanding: Invitation to Participate as a Cooperation Agency in Preparation of the Environmental Impact Statement for the Proposed Holtec Consolidated Interim Storage Facility, Lea County, New Mexico (Docket No.: 72-1051)." ADAMS Accession No. ML18290A458. Washington, DC: U.S. Nuclear Regulatory Commission. 2018a.

NRC. Tribal Consultation Letters for Holtec CISF- Initiation of Consultation. ADAMS Accession No. ML17339A636. Washington, DC: U.S. Nuclear Regulatory Commission. 2018b.

NRC. "Acceptance Review of Holtec International's Application for Specific Independent Spent Fuel Storage Installation License for the HI-STORM Consolidated Interim Storage Facility for Spent Nuclear Fuel – Request for Supplemental Information." ADAMS Accession No. ML17191A357. Washington, DC: U.S. Nuclear Regulatory Commission. 2017.

NRC. NUREG–2157, "Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel." ADAMS Accession No. ML14196A105. Washington, DC: U.S. Nuclear Regulatory Commission. 2014.

NRC. NUREG–1748, "Environmental Review Guidance for Licensing Actions Associated With NMSS Programs." ADAMS Accession No. ML032450279. Washington, DC: U.S. Nuclear Regulatory Commission. 2003.

2 PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

By letter dated March 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) received an application from Holtec International (Holtec) requesting authorization to construct and operate a consolidated interim storage facility (CISF) for spent nuclear fuel (SNF) and Greater-Than-Class C waste in Lea County, New Mexico (Holtec, 2017). The application included an Environmental Report (ER) (Holtec, 2020a) and Safety Analysis Report (SAR) (Holtec, 2020b). The proposed Holtec CISF would provide an option for away-from-reactor interim storage of SNF and Greater-Than Class C waste as well as a small quantity of mixed oxide fuel from nuclear power reactors (collectively referred to in this document as SNF), before a permanent repository is available. Holtec prepared the license application in accordance with requirements in Title 10 of the *Code of Federal Regulations* (10 CFR), Part 72, *Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste*. This environmental impact statement (EIS) was prepared consistent with NRC's National Environmental Policy Act (NEPA)-implementing regulations contained in 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions" and the NRC staff guidance in NUREG–1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs" (NRC, 2003).

Descriptions of the proposed action and alternatives to the proposed action are provided in the following sections for use in developing the EIS. The sections discussed include (i) the proposed action; (ii) reasonable alternatives to the proposed action to be analyzed in detail in the EIS; and (iii) additional alternatives that were considered in the EIS but eliminated from detailed analysis, including reasons for elimination. The reasonable alternatives to the proposed action considered in the discussion below include the "No-Action" alternative (i.e., the license would not be authorized), as NEPA requires.

2.2 Alternatives Considered for Detailed Analysis

2.2.1 The Proposed Action

The proposed action is the issuance, under the provisions of 10 CFR Part 72, of an NRC license authorizing the construction and operation of the proposed Holtec CISF in southeastern New Mexico at a site located approximately halfway between the cities of Carlsbad and Hobbs, New Mexico. Holtec requests authorization for the initial phase (Phase 1) of the proposed project to store 5,000 metric tons of uranium (MTUs) [5,512 short tons] in 500 canisters for a license period of 40 years. However, because the capacity of individual canisters can vary, the 500 canisters proposed in the Holtec license application have the potential to hold up to 8,680 MTUs [9,568 short tons]. Therefore, the analysis in this EIS and in the corresponding safety review will analyze the storage of up to 8,680 MTUs [9,568 short tons] for Phase 1.

Holtec anticipates subsequently requesting amendments to the license to store an additional 5,000 MTUs [5,512 short tons] for each of 19 expansion phases of the proposed CISF to be completed over the course of 20 years to expand the facility to eventually store up to 10,000 canisters of SNF (Holtec, 2020a,b). Holtec's expansion of the proposed project (i.e., Phases 2-20) is not part of the proposed action currently pending before the agency. However, the NRC staff considered these expansion phases in its description of the affected environment and impact determination, where appropriate, when the environmental impacts of the potential future expansion were able to be determined so as to conduct a bounding analysis for the proposed CISF project. The NRC staff conducted this analysis as a matter of discretion because Holtec provided the analysis of the environmental impacts of the future anticipated expansion of the proposed facility as part of its license application (Holtec, 2020a). For the bounding analysis, the NRC staff assumes the storage of up to 10,000 canisters of SNF. Therefore, this EIS chapter discusses the impacts from construction and operations stage of proposed action (Phase 1) as well as subsequent phases of the proposed CISF project (i.e., Phases 2-20).

For the initial and subsequent phases of the proposed CISF, SNF would be received from operating, decommissioning, and decommissioned reactor facilities. The CISF would serve as an interim storage facility for several decades before a geologic repository is opened.

The proposed CISF would be licensed by the NRC to operate for a period of 40 years. Holtec has indicated that it may seek to renew the license for two additional renewal periods of up to 40 years each for a total of up to 120 years (Holtec, 2020a). Renewal of the 40-year license would require Holtec to submit a license renewal request, which would be subject to a new safety and environmental review [Environmental Assessment (EA) or EIS]. Therefore, the period analyzed in this EIS is the licensing period of 40 years. By the end of the license term of the proposed CISF, the NRC expects that the SNF would have been shipped to a permanent repository. This expectation of repository availability is consistent with Appendix B of the Continued Storage Generic Environmental Impact Statement [NUREG–2157 (NRC, 2014)].

Transportation of SNF to the proposed Holtec CISF would be by rail. The license application proposes that transfer of SNF from the main rail line to the CISF would occur by the construction and operation of a rail spur on land the Bureau of Land Management (BLM) owns. Additional information about the use of the rail spur is discussed in Section 2.2.1.6.

2.2.1.1 Site Location and Description

The proposed CISF project would be built and operated on approximately 421 hectares (ha) [1,040 acres (ac)] of land in Lea County, New Mexico (EIS Figure 2.2-1) (Holtec, 2020a). The storage and operations area, which is a smaller land area within the full property boundary, would include 134 ha [330 ac] of disturbed land. The proposed project area is approximately 51 kilometers (km) [32 miles (mi)] east of Carlsbad, New Mexico, and 54 km [34 mi] west of Hobbs, New Mexico (EIS Figure 2.2-1). Currently, surface property rights in the proposed CISF project area are owned by the Eddy-Lea Energy Alliance (ELEA), and the State of New Mexico owns the subsurface property rights. Holtec has committed to purchasing the surface rights to the property from ELEA (Holtec, 2020a, 2019a) if NRC licenses the proposed facility. The State of New Mexico would retain ownership of mineral rights to property within the proposed project area. The proposed project area is located 0.84 km [0.52 mi] north of U.S. Highway 62/180 and consists of mostly undeveloped land used for cattle grazing (Holtec, 2020a).

Within the proposed project area, there is a communications tower in the southwest corner; a former gas-producing well with associated tank battery located near the communications tower; a small livestock water drinker; an abandoned oil-recovery facility in the northeast corner; and an oil-recovery facility in the southeast corner (ELEA, 2007). There is one abandoned water well in the northeast portion of the proposed project area, and there are 18 plugged and abandoned oil and gas wells located on the property (Holtec, 2019a). None of the plugged and abandoned oil and gas wells are located within the storage and operations area where the

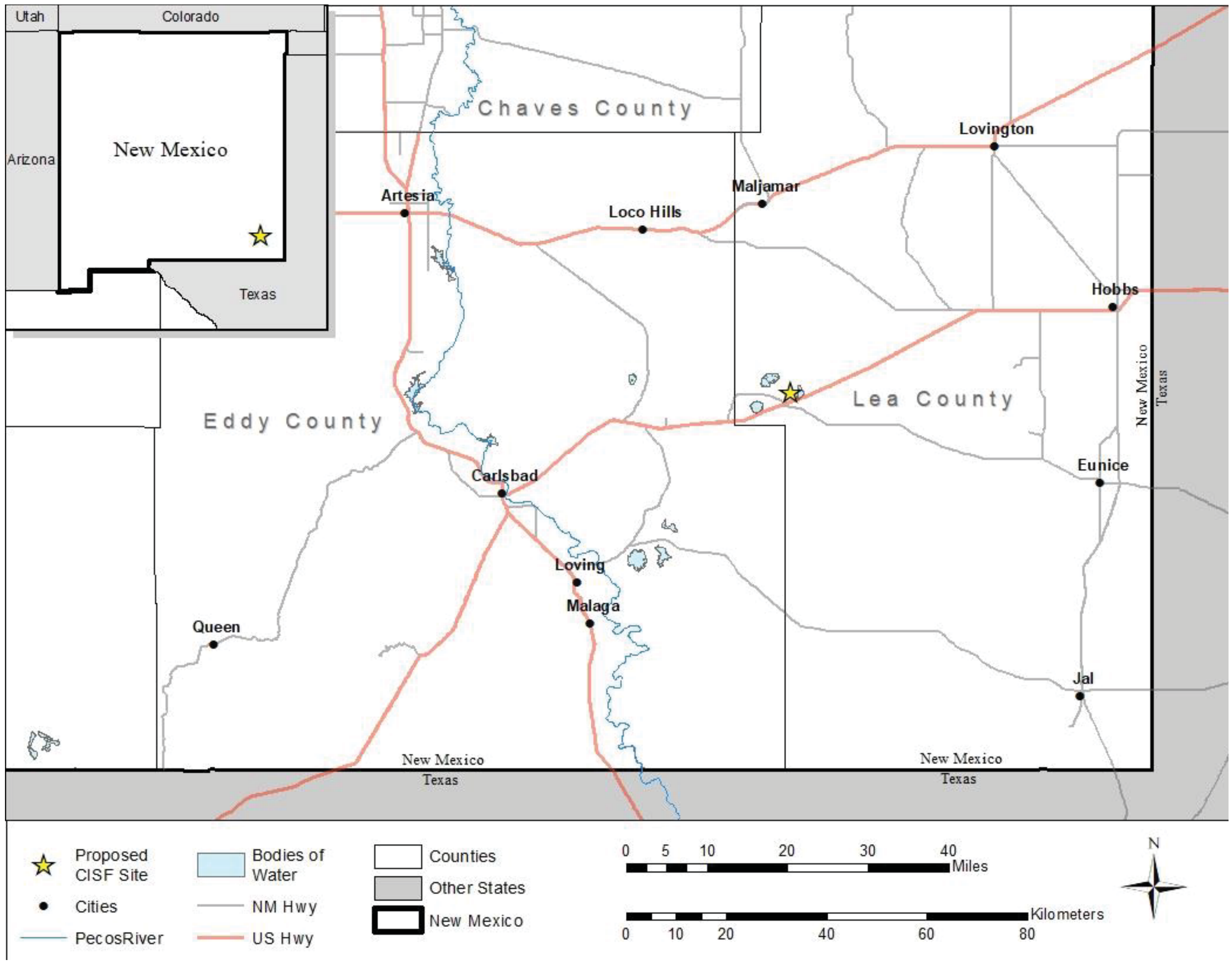

Figure 2.2-1 Proposed Project Location (Source: Holtec, 2020b)

independent spent fuel storage installation (ISFSI) would be located or where any land area that would be disturbed as part of the proposed construction and operation of the proposed CISF project.

Land uses in the vicinity of the proposed project area include oil and gas exploration and production, oil and gas related industries, potash mining, solar and wind projects, and livestock grazing, and the nearest resident is approximately 2.4 km [1.5 mi] away. There is also a large transient population of employees in the area at nearby potash mines, oil fields, an oilfield waste treatment facility, and an industrial landfill (Holtec, 2020a). The major roads in the area are county and state roads interconnecting the various population centers. U.S. Highway 285 runs south to north with U.S. Highway 62/180 running southwest to the northeast through Carlsbad and Hobbs, New Mexico. U.S. Highway 82 travels west to east from Artesia through Lovington, New Mexico (ELEA, 2007). There are several existing rights-of-way within and in the vicinity of the proposed project area. These existing rights-of-way include pipelines, roads, well pads, power lines, a telephone line, and a communications tower (ELEA, 2007; Holtec, 2020a).

Description of the Proposed Facility

The proposed CISF project would use the Holtec International Storage Module Underground MAXimum Capacity (HI-STORM UMAX) technology (certified in NRC Docket Number 7201051), which is a dry, in-ground storage system that stores a hermetically sealed canister containing SNF in a number of vertical ventilated modules (VVM) (Holtec, 2020b). For the proposed action (Phase 1) there would be 500 VVMs constructed on 48.3 ha [119.4 ac] of land within the proposed project boundary. If the NRC approves future amendments, at full build-out (Phases 1-20), the proposed facility would contain 10,000 VVMs that would be constructed in 20 phases with a storage and operations total land disturbance area of approximately 134 ha [330 ac] of land (EIS Figure 2.2-2) (Holtec, 2020a). Within the storage and operations area, there would be the HI-STORM UMAX SNF storage units licensed under 10 CFR Part 72; the cask transfer building where casks would be brought in and prepared for canister placement in permanent storage in the HI-STORM UMAX VVMs; the security building; the administration building; the site access road; and construction laydown area that would contain an equipment storage building and a concrete batch plant (EIS Figure 2.2-3).

2.2.1.2 SNF Storage Systems

In dry cask storage systems, SNF that has been cooled in a spent fuel pool (at nuclear power plant sites) for at least one year and is surrounded by inert gas inside a steel canister that is either welded or bolted closed to provide leak-tight confinement of the SNF. Each canister is then surrounded by additional steel, concrete, or other material to provide radiation shielding to workers and members of the public.

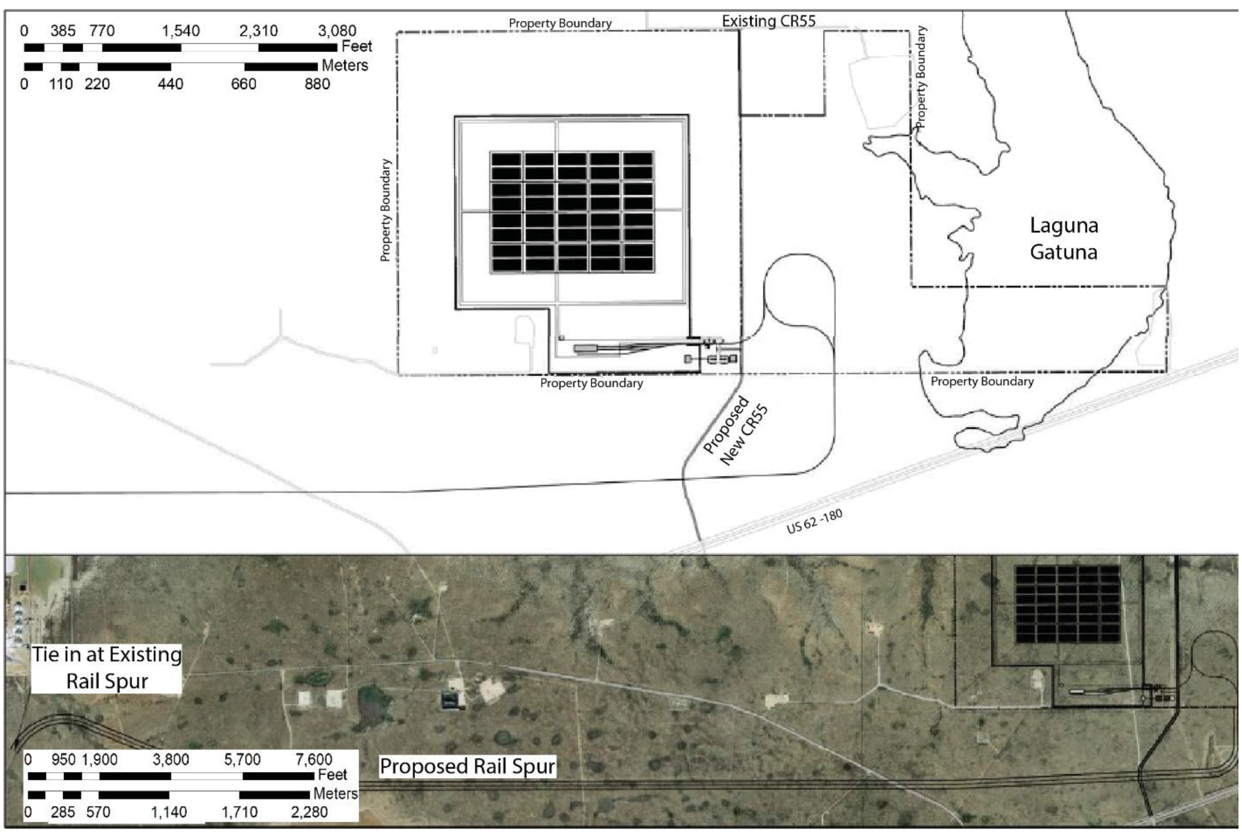

Figure 2.2-2 Aerial View of Full Build-Out (Source: Holtec, 2020b)

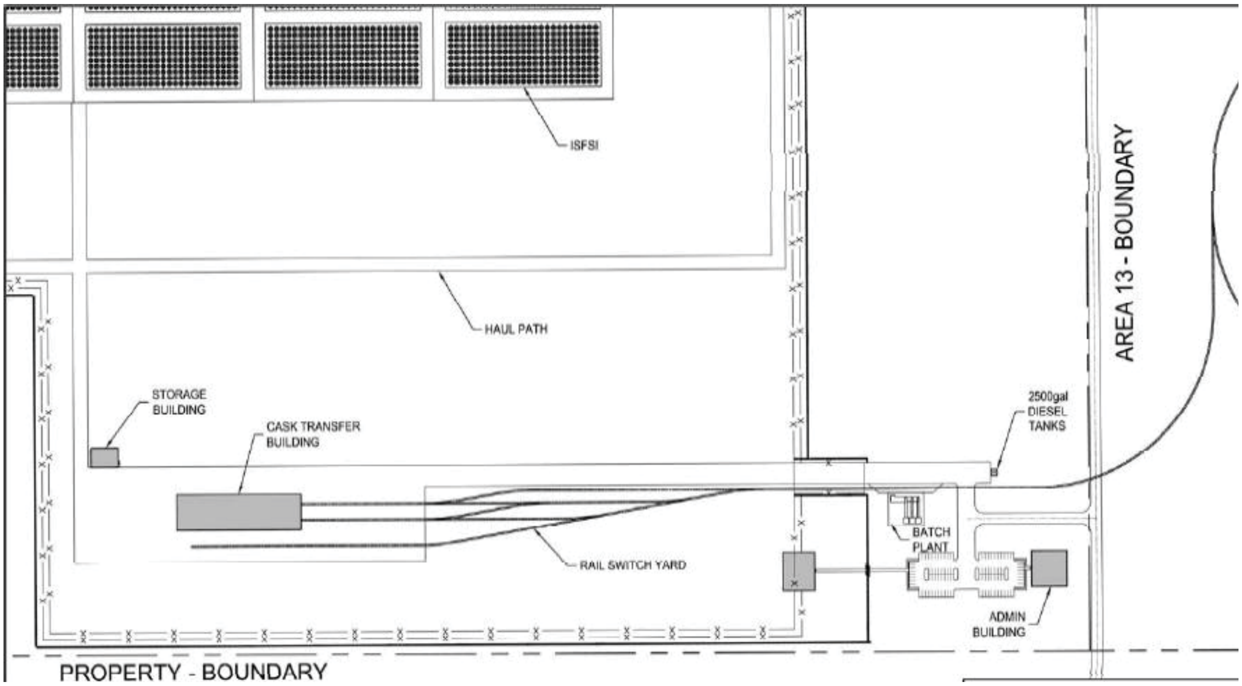

Figure 2.2-3 Proposed Project Building Layout (Source: Holtec, 2020a)

SNF waste at the proposed CISF would be stored in dry cask storage systems that the NRC previously approved. These cask systems include transportable dual-purpose (transportation/storage) or multi-purpose (transportation/storage/disposal) canister-based storage systems. Each of these systems is engineered to safely store SNF and is subject to rigorous inspections, aging management programs, maintenance, and relicensing.

The proposed CISF project would use the HI-STORM UMAX (EIS Figure 2.2-4) for in-ground storage. The HI-STORM UMAX system would vertically store the SNF underground to a total depth of approximately 6.9 meters (m) [22.5 feet (ft)] (Holtec, 2020b). The HI-STORM UMAX is designed to be fully compatible with all HI-TRAC transfer casks and canisters NRC previously certified for storage. The current Certificate of Compliance for the HI-STORM UMAX system allows for storage of SNF in two specific multi-purpose canister (MPC) types: the Holtec MPC-37 and the Holtec MPC-89.

Canister
A large rugged cylinder containing one to six dozen spent fuel assemblies. A canister, typically made of a corrosion-resistant metal, is filled with inert gas and bolted or welded closed. The sealed canister is typically emplaced inside an outer shell of steel, concrete, lead, or other material as part of a dry cask storage system.

Cask
A heavily shielded container used for the dry storage or shipment (or both) of radioactive materials, such as spent nuclear fuel (spent fuel) or other high-level radioactive waste. Casks are often made from lead, concrete, or steel. Casks must meet regulatory requirements and are not intended for long-term disposal in a repository.

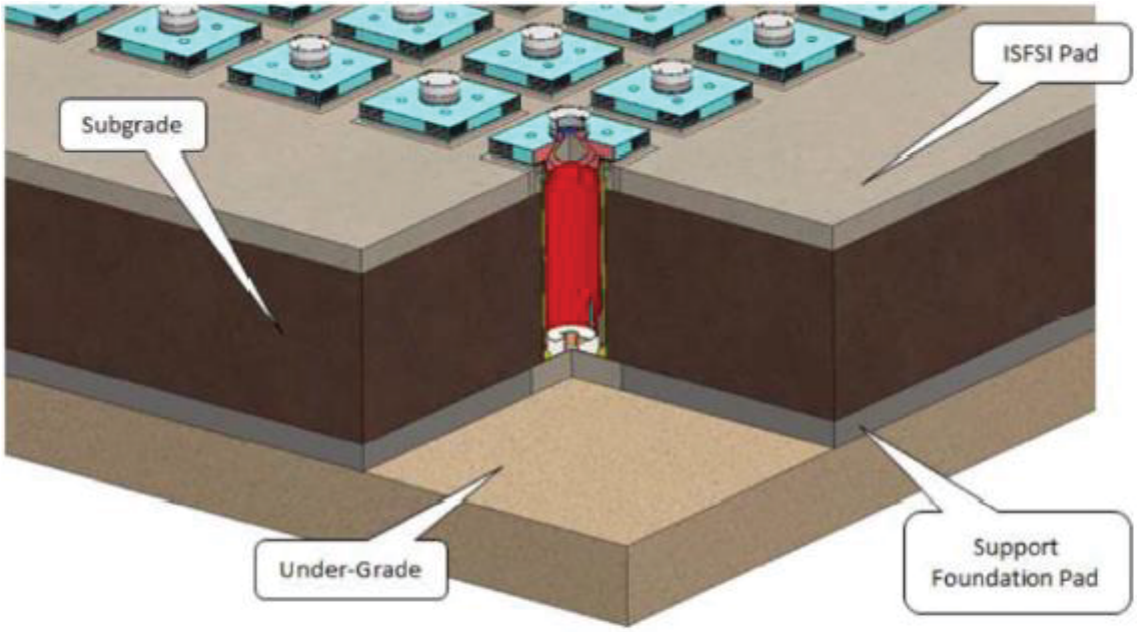

Figure 2.2-4 HI-STORM UMAX ISFSI in Partial Cut-Away View (Source: Holtec, 2020a)

If all 20 phases were constructed, the proposed CISF project would contain 10,000 VVMs units, each storing one canister of SNF. Each phase would consist of constructing 500 units with concrete approach aprons that surround two individual 250 units HI-STORM UMAX ISFSI Pads (Holtec, 2020a).

2.2.1.3 Facility Construction

During the construction of the proposed action (Phase 1) of the HI-STORE CISF, Holtec would excavate multiple areas to accommodate and install the underground portions of the facilities (Holtec, 2020b). For the proposed action (Phase 1), the proposed CISF would be prepared by excavating a pit that would house the SNF canisters in the VVMs. Approximately 135,517 cubic meters (m^3) [177,250 cubic yards (yd^3)] of soil would be excavated per phase. However, for the proposed action (Phase 1) an additional 61,547 m^3 [80,500 yd^3] of soil would be excavated for construction of the facility buildings (e.g., security and administration buildings) and associated infrastructure, the access road, relocating the existing road that currently runs through the proposed project area, and construction of the parking lot. Excavated soil would be stockpiled in an open area inside the property boundary, but outside the protected area (i.e., area with the VVMs). The expected total excavation depth would be approximately 7.6 m [25 ft] (Holtec, 2020b).

Per geotechnical borings, there are two layers of subsurface material that would be encountered during construction excavations: (i) the native caliche layer, which is approximately 3.6 m [12 ft] from the top of existing grade and (ii) the native residual soil layer, which makes up the remaining approximately 4 m [13 ft] of the required excavation depth (Holtec, 2020b).

Cask Transfer Building

The cask transfer building is where transportation casks would be brought in and the canisters removed from the casks and prepared for storage in the VVMs. The cask transfer building would be approximately 122 m [400 ft] long by 45.7 m [150 ft] wide and have a height of approximately 18 m [60 ft]. The building would be located south of the Support Foundation Pads (SFPs) and inside the protected area (Holtec, 2020a,b). The cask transfer building would likely contain two bays in a single building, but there is a possibility that it could contain multiple bays in multiple buildings for contingency or increased operational capacity. However, any modification to the cask transfer building design would be within the same land disturbance footprint (Holtec, 2020a,b). The cask transfer building would be the tallest structure within the proposed project area (Holtec, 2020a). The cask transfer building would contain a service crane and gantry crane, which would run along independent rails, with the gantry crane used to move casks.

Rail cars would enter the east side of the building, and a gantry crane would unload the casks. After unloading, rail cars would also exit the cask transfer building on the east side of the building. Along the rail line, inside the cask transfer building, there would be space for cask staging and transporter loading. Within the cask transfer building, the SNF canister would be removed from the transportation cask, the canister would be tested for integrity, and then the canister would be loaded into a transfer cask and moved onto a transporter. A transporter is a vehicle that moves and supports the transfer cask containing the SNF canister. Once loaded, the transporter would exit the building and proceed to the appropriate storage module at the HI-STORM UMAX ISFSI pad (Holtec, 2020a).

Preventative maintenance would be performed on a regular basis on the cranes, transfer equipment, shipping casks, and other equipment in the cask transfer building (Holtec, 2020a). Within the building, additional storage would be used for temporary staging of impact limiters and casks, as well as storage for maintenance tools and supplies. The cask transfer building would also include waste management areas and chemical storage areas for cleaning supplies needed to support activities at the proposed facility. In addition, a small storage building would be located northwest of the cask transfer building inside the protected area (Holtec, 2020a).

Security and Administration Building

The security building would be located east of the cask transfer building and would be part of the protected area. The single-story building would be approximately 30 m [100 ft] long by 30 m [100 ft] wide. Inside the building would be the surveillance and monitoring stations for the central alarm station, access control, and the armory. Security personnel would monitor sensors and intrusion alarms, control employee access, process visitors into the proposed facility, and control rail and vehicle access (Holtec, 2020a).

The single-story administration building, approximately 30 m [100 ft] long by 30 m [100 ft] wide, would be outside the protected area. The building would contain offices for operations, maintenance, and material control personnel; administrative functions related to processing shipments; emergency equipment and operations; a communication and tracking center; training and visitor centers; a health physics area; records storage; a conference room; a break room; and restroom facilities (Holtec, 2020a).

Concrete Batch Plant

To facilitate the construction of the proposed action (Phase 1) and any subsequent phases, Holtec anticipates installing a mobile concrete batch plant (Holtec, 2019a). The concrete batch plant would be a pre-fabricated system that is easily mobilized and demobilized using only a small crew. This onsite concrete batch plant would provide concrete onsite, rather than transporting it to the proposed project area. The concrete batch plant would be located outside of the protected area and would be capable of producing 191 m^3 [250 yd^3] an hour (Holtec, 2020b). The components of the concrete batch plant would include mechanisms for aggregate handling, water handling, cement handling, and scales as well as transfer conveyors, pneumatic systems, and dust-collection systems. Depending on the type of concrete batch plant, the New Mexico Environment Department (NMED) may require the concrete batch plant to obtain a General Construction Permit, a Title V Operating Permit, a Storm Water Pollution Prevention Plan (SWPPP), and an Air Quality Permit (Holtec, 2020b).

Support Foundation Pad (SFP) and Subgrade Features

Once the excavation pit is complete, the subsurface would be compacted and prepared (i.e., use of a heavy vibrating compactor) to receive the reinforced concrete SFP (Holtec, 2020b). After surface preparation, a mud mat (or leveling slab) would be poured to ensure there is an even surface to pour the HI-STORM UMAX SFP.

Upon completion of subgrade preparation/compaction, placement of the reinforced concrete SFP and UMAX Cavity Enclosure Containers (CECs), and backfilling would start (Holtec, 2020b). Once the SFP is poured, the CEC would be staged and leveled using designed leveling bolts. Upon completion of the CEC leveling process, formwork would be erected to grout the CEC baseplates in place, followed by the actual grouting process itself. The Self-Hardening Engineering Subgrade layer, composed of engineered backfill, Controlled Low Strength Material or lean concrete, would be installed to the appropriate elevation, and the top surface would be prepped for the top slab or ISFSI pad. As the subgrade layer is installed, excavated areas would be backfilled and utilized. This backfill material would reuse excavated soils, to the extent practicable. After the concrete is poured and set for the ISFSI pad, the HI-STORM UMAX system would be complete. Final site grading would also reuse stockpiled soils. Approximately 10 percent of the stockpiled soils would be expected to be reused for backfilling and final site grading. The remainder of stockpiled soils would be shipped offsite via heavy-haul trucks (Holtec, 2020a,b).

Facility Operations

During CISF operations, transportation casks containing canisters of SNF would arrive via rail car. Upon arrival, security personnel would perform an initial receipt inspection of the cask prior to transport into the protected area. The transportation cask would then be transported into the cask transfer building, and radiological personnel would conduct a receipt inspection of the cask (Holtec, 2020a,b). The inspection would include initial radiological surveys and an examination of the integrity of the transportation cask. The cask would then be transferred to a receiving pad using the movable gantry crane. The SNF canister would be removed from the transportation cask, tested for integrity, loaded into a transfer cask, and moved onto a transporter. Once loaded, the transporter would proceed to the appropriate storage module at the HI-STORM UMAX ISFSI pad (Holtec, 2020a). The transfer cask would be aligned with the storage location, the lower lid of the transfer cask would be removed, and the canister would be lowered onto the storage pad. The transfer cask would be disconnected, removed from the storage pad area, and the transfer cask would be returned to the cask transfer building (Holtec 2020a,b). When a geologic repository becomes available, the SNF stored at the proposed CISF would be removed and sent to the repository for disposal. Removal of the SNF from the proposed CISF, or defueling, would involve similar activities to those associated with shipping SNF from nuclear power plants and ISFSIs and emplacement of SNF at the proposed CISF project.

2.2.1.4 Facility Closure, Decommissioning, and Reclamation

Decommissioning and reclamation of the proposed facility would include the dismantling of the proposed facility and rail spur. The decommissioning evaluation in this EIS is based on currently available information and plans. At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area (Holtec, 2020a). Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; controlling erosion; and restoring and reclaiming disturbed areas. Because decommissioning and reclamation are likely to take place well into the future, technological changes that could improve the decommissioning and reclamation processes cannot be predicted. As a result, the NRC requires that licensees applying to decommission an ISFSI (such as the proposed CISF) submit a Decommissioning Plan. The requirements for the Final Decommissioning Plan are delineated in 10 CFR 72.54(d), 72.54(g), and 72.54(i). The NRC staff would undertake a separate evaluation and NEPA review and prepare an environmental assessment or EIS, as appropriate, at the time the Decommissioning Plan is submitted to the NRC.

> Decommissioning activities include conducting radiological surveys and decontaminating, if necessary. (10 CFR Part 72).
>
> Reclamation activities include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; controlling erosion; and restoring and reclaiming disturbed areas (Holtec, 2020a).

2.2.1.5 Use of the Rail Spur

The main rail line is approximately 6.1 km [3.8 mi] to the west of the proposed project area, and a private rail spur would be constructed as part of the proposed action. The rail spur would be exclusively used by Holtec (i.e., would be a non-carrier private rail spur not used by commercial rail carriers) to transport SNF from the main rail line to the proposed CISF with an approximate total length of 8 km [5 mi]. The disturbed land area for the rail spur would be 15.9 ha [39.4 ac] of BLM-managed land. The rail spur would be routed across relatively flat BLM-managed land west of the proposed CISF project and would not cross any major highways (Holtec, 2020a). A site access road would also be constructed across relatively flat BLM-managed land from the proposed CISF project southward to U.S. Highway 62/180 and would be approximately 1.6 km [1 mi] in length. Construction of the rail spur and site access road would require BLM right-of-way approval on Federal lands.

2.2.1.6 Emissions and Waste Generation

All stages of the proposed CISF (i.e., construction, operation, and decommissioning) would generate effluents and waste streams that must be handled and disposed of properly. This section describes the various types and volumes of effluents or wastes the proposed CISF generates.

Nonradiological Gaseous or Airborne Particulate Emissions

The primary nonradiological emissions the proposed CISF generated would be combustion emissions and fugitive dust. The main sources of the combustion emissions would be mobile sources and construction equipment. Combustion emissions are further categorized into non-greenhouse gases and greenhouse gases. The main sources of fugitive dust (e.g., particulate matter $PM_{2.5}$ and particulate matter PM_{10}) would be travel on unpaved roads and wind erosion from disturbed land. Particulate matter PM_{10} refers to particles that are 10 micrometers [3.9×10^{-4} in] in diameter or smaller, and $PM_{2.5}$ refers to particles that are 2.5 micrometers [9.8×10^{-5} in] in diameter or smaller.

EIS Table 2.2-1 contains the proposed action (Phase 1) estimated emission levels for each project stage (i.e., construction, operation, and decommissioning) as well as for the peak year. The peak-year emissions represent the highest emission levels associated with the proposed action (Phase 1) for each individual pollutant in any one year and therefore also represent the greatest potential impact to air quality. For the proposed action (Phase 1), no stages overlap, so the peak year for each pollutant occurs during the stage with the highest emissions levels for that pollutant. Construction activities would primarily generate combustion emissions from mobile sources as well as fugitive dust from clearing and grading of the land and vehicle movement over unpaved roads. Operation activities would primarily generate combustion emissions from equipment used to receive SNF and load it into modules or unload the SNF from the modules and remove the SNF from the proposed CISF. Decommissioning and reclamation activities are described in EIS Section 2.2.1.4. Reclamation activities would primarily generate combustion emissions from mobile sources as well as fugitive dust from clearing and grading of the land and vehicle movement over unpaved roads. For the proposed action (Phase 1) the operations stage generates the peak-year emission levels for carbon dioxide, carbon monoxide, and hazardous air pollutants. For the proposed action (Phase 1), the construction and decommissioning stages generate the same emission levels (EIS Table 2.2-1) and generate the peak-year emission levels for the other pollutants identified in EIS Table 2.2-1. This table also includes hourly emissions, which reflects the peak emissions levels of combustion sources that do not operate continuously over the year or even a day.

Table 2.2-1 Estimated Proposed Action (Phase 1) Emission Levels of Various Pollutants for the Proposed CISF

Pollutant	Construction		Operations		Decommissioning		Peak Year
	kg/h*	T/yr†	kg/h*	T/yr†	kg/h*	T/yr†	T/yr†
Carbon Dioxide	695	2,244	216	2,306	695	2,244	2,306
Carbon Monoxide	1.71	7.18	0.49	7.62	1.71	7.18	7.62
Hazardous Air Pollutants	< 0.004	0.01	< 0.004	0.02	< 0.004	0.01	0.02
Nitrogen Oxides	3.72	9.01	0.98	7.53	3.72	9.01	9.01
Particulate Matter‡ $PM_{2.5}$	0.96	1.96	0.05	0.34	0.96	1.96	1.96

Table 2.2-1	Estimated Proposed Action (Phase 1) Emission Levels of Various Pollutants for the Proposed CISF						
Pollutant	Construction		Operations		Decommissioning		Peak Year
	kg/h*	T/yr†	kg/h*	T/yr†	kg/h*	T/yr†	T/yr†
Particulate Matter‡ PM_{10}	8.01	14.82	0.07	0.53	8.01	14.82	14.82
Sulfur Dioxide	< 0.004	0.03	< 0.004	0.02	< 0.004	0.03	0.03
Volatile Organic Compounds	4.19	4.40	0.1	1.14	4.19	4.40	4.40

*Stands for kilograms per hour. To convert to pound per hour, multiply by 2.2046
†Stands for metric tons per year. To convert to short tons per year, multiply by 1.10231.
‡The proposed action includes a single concrete batch plant. If a second concrete batch plant is utilized, then NRC staff assume that the concrete batch plant emission levels would double.
Source: Holtec, 2020a and 2019b; SwRI, 2019

EIS Table 2.2-2 contains the Phases 2-20 estimated emission levels for the various project stages and the peak year. The peak year for Phases 2-20 accounts for when stages (regardless of phase) overlap. Construction stage emission levels for Phases 2-20 are estimated at 15 percent of the proposed action (Phase 1) construction stage emission levels. None of the subsequent expansion phase construction stages overlap with each other. For the operations stage, the primary activity that would generate air emissions would be the loading and unloading of SNF, and subsequent expansion operation stages would not overlap with the operations from other phases. However, operation stages would overlap with construction stages (e.g., Phase 1 operations would overlap with Phase 2 construction). For Phases 2-20, the overlapping construction and operation stages generate the peak-year emission levels for carbon dioxide, carbon monoxide, and hazardous air pollutants, and the decommissioning stage generates the peak-year emission levels for the other pollutants identified in EIS Table 2.2-2. The manner in which the stages overlap for full build-out (Phases 1-20) would be the same as the manner in which the stages overlap for Phases 2-20 (i.e., subsequent construction stages overlap with operation stages). This means the peak-year emission levels for full build-out (Phases 1-20) are the same as the peak-year emission levels for Phases 2-20.

Table 2.2-2	Estimated Phases 2-20 Emission Levels of Various Pollutants for the Proposed CISF						
Pollutant	Construction		Operations		Decommissioning		Peak Year
	kg/h*	T/yr†	kg/h*	T/yr†	kg/h*	T/yr†	T/y†
Carbon Dioxide	104	337	216	2,306	695	2,244	2,643
Carbon Monoxide	0.26	1.08	0.49	7.62	1.71	7.18	8.70
Hazardous Air Pollutants	< 0.004	< 0.004	< 0.004	0.02	< 0.004	0.01	0.02
Nitrogen Oxides	0.56	1.35	0.98	7.53	3.72	9.01	9.01
Particulate Matter‡ $PM_{2.5}$	0.14	0.29	0.05	0.34	0.96	1.96	1.96

Table 2.2-2	Estimated Phases 2-20 Emission Levels of Various Pollutants for the Proposed CISF						
Pollutant	**Construction**		**Operations**		**Decommissioning**		**Peak Year**
	kg/h*	**T/yr†**	**kg/h***	**T/yr†**	**kg/h***	**T/yr†**	**T/y†**
Particulate Matter‡ PM_{10}	1.20	2.22	0.07	0.53	8.01	14.82	14.82
Sulfur Dioxide	< 0.004	< 0.004	< 0.004	0.02	< 0.004	0.03	0.03
Volatile Organic Compounds	0.63	0.66	0.10	1.14	4.19	4.40	4.40

*Stands for kilograms per hour. To convert to pounds per hour, multiply by 2.2046

†Stands for metric tons per year. To convert to short tons per year, multiply by 1.10231.

‡The proposed action includes a single concrete batch plant. If a second concrete batch plant is used, then NRC staff assume that the concrete batch plant emission levels would double.

Source: Holtec, 2020a and 2019b; SwRI, 2019

Waste Generation

This section provides a detailed description of various waste streams the proposed CISF project generates. This section describes the types and volumes of effluents or wastes Holtec estimates would be generated during all stages of the proposed CISF and definitions of the types of waste that would be generated.

Quantities for each of the waste streams analyzed in this EIS (Section 4.14) and produced during all phases of the proposed CISF are provided in the below EIS Table 2.2-3. Depending on the stage of the proposed CISF, different types of waste are produced, including nonhazardous, low-level radiological waste (LLRW), hazardous, and sanitary.

Table 2.2-3	Quantities of Different Types of Waste Generated by the Various Stages of the Proposed CISF			
	Solid Waste			**Liquid Waste**
Stage	**Nonhazardous***	**Low-Level Radiological (LLRW)**	**Hazardous**	**Sanitary†**
Construction–Phase 1 (including rail spur)	5,080 metric tons	none	none	11,360 liters/day†
Construction–Phases 2-20	96,525 metric tons (total for Phases 2-20)	none	none	11,360 liters/day
Operation of Phase 1 capacity only (500 casks, including use of rail spur and defueling)	91.1 metric tons/year (1,110 m^3)	0.45 metric tons	1.20 metric tons/year	11,360 liters/day

Table 2.2-3 Quantities of Different Types of Waste Generated by the Various Stages of the Proposed CISF				
	Solid Waste			**Liquid Waste**
Stage	**Nonhazardous***	**Low-Level Radiological (LLRW)**	**Hazardous**	**Sanitary†**
Operation of Phases 2-20, (including rail spur and defueling)	3,460 metric tons ($42,180\ m^3$) (total for Phases 2-20)	8.61 metric tons (total for Phases 2-20)	1.20 metric tons/year	11,360 liters/day
Decommissioning – Dismantling (Phase 1, including rail spur)	281,228 metric tons ($290,000\ m^3$) ‡	0.91 metric tons	1.20 metric tons/year	11,360 liters/day
Decommissioning – Dismantling (Phases 2-20)	5,343,324 metric tons ($5,800,000\ m^3$) ‡ (total for Phases 2-20)	17.24 metric tons (total for Phases 2-20)	1.20 metric tons/ year	11,360 liters/day

*Volumes provided for nonhazardous waste were calculated as described in EIS Section 4.3.1. To convert metric tons to short tons, multiply by 1.10231
†This value is the system capacity rather than the waste generation rate. To convert liters to gallons, multiply by 0.264.
‡Nonhazardous waste volumes provided under decommissioning represent waste generated from optional reclamation, which would include removal of structures such that the land is returned to its preoperational state, or equivalent. While reclamation is not required by NRC regulations, nonhazardous waste generated from reclamation would primarily include non-radiological construction and demolition waste generated from removal of structures and facilities.
Source: Modified from Holtec (2020a, 2019a)

Nonhazardous waste
Waste that is neither radioactive nor hazardous and typically deposited in a landfill.

Nonhazardous waste includes waste that is neither radioactive nor hazardous and typically disposed of in a municipal landfill. For the proposed CISF, nonhazardous waste includes typical office/personnel waste the work force generates, concrete truck washout materials from concrete placement activities, miscellaneous construction wastes (dumpsters), and steel bins for disposal/recycling of extraneous steel material. Holtec has selected two municipal landfill facilities that have permits from the State of New Mexico to handle nonhazardous waste: (i) the Sandpoint Landfill, located 40 km [25 mi] west of the proposed CISF site and (ii) the Lea County Landfill, located east of Eunice, New Mexico.

For the proposed CISF, typical LLRW produced would include contamination survey rags, anti-contamination garments, and other health physics materials. Based on fuel storage loading campaign experience, quantities of this waste produced are dependent on the number of casks loaded and are estimated to be limited. Under normal operations, the use of NRC-certified storage casks at the proposed CISF project would fully contain the stored radioactive material. The proposed CISF would not be expected to generate LLRW other than an estimated small amount of LLRW resulting from health physics activities. Any LLRW generated would be managed (e.g., handled and stored) in accordance with an NRC-approved and 10 CFR Part 20-compliant radiation protection plan, and consequently, the possibility of releases to the environment would be minimized. LLRW generated from the proposed CISF would be transported to one of two offsite licensed disposal facilities, the Waste Control Specialists (WCS) LLRW disposal facility in Andrews County, Texas, and the Energy*Solutions* LLRW disposal facility in Clive, Utah. The WCS LLRW disposal facility is licensed by the Texas Commission on Environmental Quality (TCEQ) and authorized to receive dry packaged Class A LLRW not to exceed 26,000,000 ft^3 [736238 m^3] (TCEQ, 2019). The Energy*Solutions* LLRW disposal facility in Clive, Utah, is authorized to receive 235,550,619 ft^3 [6670051 m^3] of Class A LLRW (Energy*Solutions*, 2015).

> **Low-level radiological waste (LLRW)**
> A general term for a wide range of items that have become contaminated with radioactive material or have become radioactive through exposure to neutron radiation. The radioactivity in these wastes can range from just above natural background levels to much higher levels, such as those levels seen in parts from inside the reactor vessel in a nuclear power reactor.

For the proposed CISF, hazardous waste produced would primarily occur from the potential use of small quantities of chemicals, such as solvents, oils, and lubricants. These activities would be performed using proper handling procedures that would prevent releases of hazardous materials into the environment (Holtec, 2020a,b). As discussed in EIS Section 4.5, any spills or leaks of hazardous waste such as oils and lubricants would be managed in accordance with the SWPPP, National Pollutant Discharge Elimination System (NPDES) permits, Spill Prevention, Control, and Countermeasures Plan (SPCC Plan), and other Federal and State of New Mexico requirements [such as New Mexico Administrative Code (NMAC) 20.6.2] applicable to hazardous waste and stormwater pollution.

Holtec proposes that limited quantities of hazardous wastes would be generated that would fall within State and Federal requirements applicable to a Conditionally Exempt Small Quantity Generator (CESQG). As such, for the proposed CISF, hazardous waste would be identified, stored, and disposed of in accordance with State and Federal requirements applicable to CESQG. For the proposed CISF, mixed waste (e.g., waste that contains both radioactive and hazardous components) would not be expected to be generated based on the

> **Hazardous waste**
> A solid waste or combination of solid wastes that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may (i) cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness or (ii) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed, or otherwise managed (as defined in the Resource Conservation and Recovery Act, as amended, Public Law 94-5850).
>
> **Sanitary waste**
> Liquid or solid waste originating from humans and human activities.

proposed activities; however, if any mixed waste were generated it would be handled and stored in accordance with a 10 CFR Part 20 radiation protection plan and applicable hazardous waste requirements and would be sent to a licensed facility for disposal.

Sanitary waste produced from the proposed CISF would include waste from bathrooms, lavatories, mop sinks, and other similar fixtures located in the cask transfer building, security building, and administrative building. Sanitary wastewater would be contained using onsite sewage collection tanks and underground digestion tanks similar to septic tanks but with no drain field. In the State of New Mexico, sanitary waste management systems are regulated by NMED. Should the generation of sanitary waste exceed 18,940 liters (L) [5,000 gallons (gal)] per day, NMED would require a more comprehensive Groundwater Discharge Permit pursuant to State of New Mexico ground and surface water protection regulations in 20 NMAC 6.2.3104. Sanitary (i.e. domestic) waste management resulting from the generation of less than 18,940 L [5,000 gal] per day would require a liquid waste permit pursuant to State of New Mexico liquid waste disposal and treatment regulations in 20 NMAC 7.3.201. For the proposed CISF, the sanitary waste management systems would be designed and operated in accordance with all applicable NMED and Federal standards. After testing the waste in the collection tanks to ensure 10 CFR Part 20 release criteria and applicable State of New Mexico requirements are met, the sewage would be disposed of at an offsite treatment facility.

Stormwater runoff would be managed in accordance with a National Pollutant Discharge Elimination System (NPDES) permit. In the State of New Mexico, the Environmental Protection Agency (EPA) administers the NPDES program and issuance of NPDES permits (EPA, 2019a,b). Per current EPA regulations, Holtec would be required to apply for NPDES permits for both construction and operation stages of the proposed CISF project (EPA, 2019c,d; 2020).

2.2.1.7 Transportation

Throughout the facility lifecycle stages, Holtec would use roadways for commuting workers, equipment, supply shipments, and any produced-waste shipments. Additionally, during operations Holtec proposes using the national rail network for transportation of SNF from nuclear power plants and ISFSIs to the proposed CISF project and eventually from the CISF to a permanent geologic repository, when one becomes available.

Transportation During Construction of the Proposed CISF

During the construction stage of the proposed CISF, Holtec would use trucks to transport construction supplies and equipment to the proposed project area and to transport wastes from the proposed project area. The volume of estimated construction traffic from supply shipments, waste shipments, and workers commuting was estimated from information provided in the application (Holtec, 2020a,b).

The NRC staff approximated the number of construction supply shipments based on Holtec's estimated volume of facility decommissioning waste for Phases 1-20. Holtec estimated the mass of demolition waste based on the total volume of material in all the empty storage casks from the full build-out of the proposed CISF project. The resulting mass of 5.6 million metric tons [6.2 million short tons] (Holtec, 2020a) was converted to an annual volume of 275,000 m^3 [360,000 yd^3] for a single phase by the NRC staff using volume-to-weight conversion factors for construction and demolition waste consisting of concrete and rebar of 300 kg/m^3 [860 lb/yd^3] (EPA, 2016) and then dividing by the number of phases (20) and the years of construction

(2) per phase. The NRC staff estimated the annual volume of demolition waste per phase for the upper and lower concrete pads of the proposed CISF as 14,100 m^3 [18,500 yd^3] from facility dimensions provided in the SAR (Holtec, 2020b), assuming the top pad included 50 percent void space to allow for emplaced casks. The resulting total annual volume of demolition waste for a single phase was 290,000 m^3 [379,000 yd^3]. Assuming that approximately this volume of aggregate material would need to be shipped each year during the construction of the proposed action (Phase 1), the NRC staff's estimated number of annual supply shipments during construction is 25,300, or approximately 69 trucks per day. This estimate assumes a truck capacity of 11 m^3 [15 yd^3], which is applicable to large capacity concrete aggregate shipment volume.

Holtec also estimated the mass of waste that would be produced during the construction of the proposed action (Phase 1). These waste estimates were provided as 2,720, 2,270, and 86 metric tons [3,000, 2,500, and 95 short tons] for concrete truck washout, miscellaneous construction wastes, and steel, respectively (Holtec, 2020a). The NRC staff converted these waste estimates to volumes by applying the applicable waste volume-to-mass conversion factors (EPA, 2016) and dividing by the duration of the construction for the proposed action (Phase 1) (i.e., 2 years). The resulting annual construction waste volume was 6,940 m^3 [9,080 yd^3] resulting in 454 annual shipments (of 15 m^3 [20 yd^3] capacity) or 1.2 shipments per day. Considering the NRC staff's estimated annual construction supply and waste shipments, the total number of shipments per year during the construction phase would be 25,754, or 70 shipments per day.

For the construction stages of Phases 2-20, the approximate volume of construction supplies and wastes would be less than that required for construction of the proposed action (Phase 1) because the proposed facilities and infrastructure would already be built; however, the construction would occur in 1 year instead of 2 and therefore the number of supply shipments and waste shipments would double resulting in bounding estimates of 140 supply shipments and 2.4 waste shipments per day.

In addition to construction supply shipments, an estimated peak construction work force of 80 workers would commute to and from the proposed CISF project construction site using individual passenger vehicles and light trucks on a daily basis (Holtec, 2020a). These workers could account for an increase of 80 vehicles per day going to and from the proposed project area each day during construction, for a total of 160 trips.

The workforce required to construct the rail spur was included in the preceding analysis of the commuting construction workforce. The additional construction supplies necessary to build the rail spur would be only a small fraction of that required for construction of the proposed CISF. Therefore, the additional supplies and supply shipments associated with rail spur construction is expected to not significantly add to the preceding estimate for the construction stage of the proposed action (Phase 1).

Transportation During Operation of the Proposed CISF

During operation of the proposed CISF project, Holtec would continue to use roadways for supply and produced waste shipments, in addition to workforce commuting. Additionally, Holtec proposes using the national rail network for transportation of SNF from nuclear power plants and ISFSIs to the proposed CISF project and eventually from the CISF to a permanent geologic repository, when one becomes available.

The ER did not provide estimates of operations supply shipments; however, based on the nature of dry cask storage and the proposed operations, the NRC staff expects that the number of annual supply shipments would not significantly contribute to shipment estimates.

For waste shipments during the operations stage of the proposed action (Phase 1) and any of the subsequent Phases 2-20, Holtec estimated the annual generation of nonhazardous solid waste that would need to be shipped offsite for disposal would be approximately 91 metric tons [100 short tons] (Holtec, 2020a). The NRC staff converted Holtec's waste estimate to a volume of 1,110 m^3 [1,460 yd^3] using available conversion factors for commercial municipal waste (EPA, 2016). Assuming a hauling capacity of 15 m^3 [20 yd^3] per truck, the NRC staff estimated 73 waste shipments would occur during operations per year or about 1 shipment every 5 days. Other wastes would be generated in much smaller quantities during operations and would therefore not contribute significantly to the proposed shipping activity.

Holtec estimated that the workforce for the operations stage of the proposed action (Phase 1) would include 40 regular employees and 15 security staff at full build-out. This workforce of 55 individuals is assumed to commute to and from the proposed CISF project using separate passenger vehicles and light trucks on a daily basis (Holtec, 2020a). During the operations stage of Phases 2-20, construction of additional phases would occur concurrently with operations; therefore, up to an additional 80 construction workers would be commuting during the same time period. Therefore, the total workforce commuting during operations of Phases 2-20 (combined with construction of next phases) could add a peak of 135 commuting workers and vehicles traveling to and from the proposed project area each day.

During operation of any project phase, SNF would be shipped by rail from existing storage sites at nuclear power plants or ISFSIs to the proposed CISF. These shipments must comply with applicable NRC and U.S. Department of Transportation (DOT) regulations for the transportation of radioactive materials in 10 CFR Parts 71 and 73 and 49 CFR Parts 107, 171–180, and 390–397, as appropriate to the mode of transport. For the operations stage of the proposed action (Phase 1), Holtec proposes to ship 500 canisters of SNF from reactors to the proposed CISF (Holtec, 2020a) over the course of a year resulting in approximately 1.4 shipments per day. During the operations stage of Phases 2-20, an additional 500 canisters would be shipped to the proposed CISF per phase at the same approximate rate until the maximum of 10,000 canisters has been shipped at full build-out. When a repository becomes available, the daily number of SNF shipments to the repository would be determined by several factors but would be limited by the same loading and transfer capabilities at the CISF that factored into the average rate of SNF receipt (1.4 shipments per day).

Transportation During Decommissioning and Reclamation of the Proposed CISF

During the decommissioning and reclamation stage of the proposed CISF project, Holtec would use roadways for the transportation of waste materials and for commuting workers. Reclamation activities are those actions that Holtec has committed to completing to restore and reclaim the site during and after decommissioning.

Decommissioning activities would be limited based on the design and expected performance of the dry storage cask systems. Regarding the potential for LLRW shipments, the NRC staff expects that generated radioactive waste would be limited to small volumes because SNF canisters would remain sealed during storage, and external contamination would have been limited by required surveys at the reactor site prior to shipment, and canister inspections upon arrival at the proposed CISF project. Therefore, the volume of low-level radioactive waste shipments would be very low during decommissioning activities. The workforce and resulting number of vehicles required for commuting during decommissioning is expected to be negligible.

Reclamation transportation activities would predominantly involve shipments of demolition waste materials and workers commuting to and from the proposed CISF project area. In the absence of estimates of reclamation shipments in the ER, the NRC staff approximated the number of annual shipments based on the volume of demolition waste materials from reclamation that would need to be shipped offsite.

For the decommissioning and reclamation stages of the proposed action (Phase 1), the annual volume of nonhazardous demolition waste from reclamation activities would be the same as the preceding estimate for construction. The resulting total annual volume of demolition waste for a single phase was 289,755 m^3 [379,000 yd^3], assuming a 2-year duration of reclamation (i.e., comparable to the construction duration of Phase 1). The NRC staff estimated the number of annual reclamation waste shipments as 18,950, or approximately 52 trucks per day. This estimate assumes a waste hauling capacity of 15 m^3 [20 yd^3], which is applicable to a typical roll-off container. For the decommissioning and reclamation stage of Phases 2-20, this same waste volume estimate would also apply to the reclamation of any individual phase; however, the number of shipments could increase to 104 shipments per day if subsequent phases were reclaimed in a year's time (i.e., comparable to the construction duration of phases beyond Phase 1).

The NRC staff also estimated the volume of nonhazardous demolition waste from reclamation of the full build-out (Phases 1-20) of the proposed project. Holtec estimated the mass of demolition waste based on the total volume of material in all the empty storage casks from the full build-out of the proposed CISF project. The resulting mass of 5.6 million metric tons [6.2 million short tons] (Holtec, 2020a) was converted to a volume of 1.10×10^7 m^3 [1.44×10^7 yd^3] by the NRC staff using volume-to-weight conversion factors for demolition waste consisting of concrete and rebar of 298 kg/m^3 [860 lb/yd^3] (EPA, 2016). The NRC staff estimated the total volume of demolition waste at full build-out for the upper and lower concrete pads of the proposed CISF as 564,600 m^3 [738,500 yd^3] from the proposed facility dimensions provided in the SAR (Holtec, 2020b), assuming the top pad included 50 percent void space to allow for emplaced casks. The resulting total volume of nonhazardous demolition waste for full build-out was 1.16×10^7 m^3 [1.52×10^7 yd^3].

For the purpose of assessing the impacts of reclamation, the NRC staff assumed that this volume of waste material would be shipped during a 10-year reclamation period for the proposed CISF project. The NRC staff's estimated number of annual shipments during reclamation of full build-out was 75,800, approximately 208 trucks per day, or approximately 9 shipments per hour, assuming a 24-hour day for shipping activities. This estimate assumes a truck capacity of 15 m^3 [20 yd^3], which is applicable to a typical roll-off container. The workforce and resulting number of vehicles required for commuting during reclamation is assumed to be the same as for construction (80 workers in individual vehicles). Table 2.2-4 summarizes the estimated transportation trips by proposed project stage, phase, and purpose.

Table 2.2-4 Summary of Estimated Transportation by Proposed Project Stage, Phase, and Purpose		
CISF Lifecycle Stage and Purpose	**CISF Phase**	**Estimated Daily Vehicle Round Trips***
Construction		
Supplies	Phase 1	69
Wastes	Phase 1	1.2
Commuting Workers	Phase 1	80
Supplies	Phases 2-20	140
Wastes	Phases 2-20	2.4
Commuting Workers	Phases 2-20	80
Operations		
Wastes	Phase 1	0.2
Commuting Workers	Phase 1	55
SNF Shipments	Phase 1	1.4
Wastes	Phases 2-20	0.2
Workers	Phases 2-20	135
SNF Shipments	Phases 2-20	1.4
Decommissioning and Reclamation		
Wastes	Phase 1	52
Commuting Workers	Phase 1	80
Wastes	Phases 2-20	104
Commuting Workers	Phases 2-20	80

*Estimates of transportation vehicle round trips are based on information provided in the license application, as described in ER Section 4.3. No estimates are provided for departing SNF shipments, because the schedule for defueling depends on repository availability. The rate would be limited by the rate of canister loading and transfer capabilities at the proposed CISF.

2.2.2 No-Action Alternative

Under the No-Action alternative, the NRC would not approve the Holtec license application for the proposed CISF in Lea County, New Mexico. The No-Action alternative would result in Holtec not constructing or operating the proposed CISF. No concrete storage pad or infrastructure (e.g., rail spur or cask-handling building) for transporting and transferring SNF to the proposed CISF would be constructed. SNF destined for the proposed CISF would not be transferred from commercial reactor sites (in either dry or wet storage) to this proposed facility. In the absence of a CISF, the NRC staff assumes that SNF would remain on site in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue as detailed in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available. Inclusion of the No-Action alternative in the EIS is a NEPA requirement and serves as a baseline for comparison of environmental impacts of the proposed action.

2.3 Alternatives Eliminated from Detailed Analysis

2.3.1 Storage at a Government-Owned CISF Operated by the U.S. Department of Energy (DOE)

The U.S. Department of Energy (DOE) is planning for an integrated waste management system to transport, store, and dispose of the nation's SNF and high-level radioactive wastes (https://www.energy.gov/ne/integrated-waste-management). Such an integrated waste management system would include facilities and other key infrastructure needed to safely manage SNF from commercial nuclear reactors. The DOE's planned integrated waste management system would include pilot interim storage facilities initially focused on accepting SNF from shut down reactor sites and full-scale CISFs that provide greater SNF storage capacity. Although this alternative meets the purpose and need for the proposed action, the DOE has not released detailed information concerning the planned SNF interim storage facilities, such as site locations, SNF transportation options and details, or facility design information that would allow this alternative to be analyzed in detail. Because the DOE's integrated waste management system is in the planning stages and provides no siting, transportation, and facility design details that would be needed for a comparison of environmental impacts, this alternative was eliminated from detailed consideration in this EIS.

2.3.2 Alternative Design or Storage Technologies

2.3.2.1 Dry Cask Storage System Design Alternatives

Holtec considered other dry cask storage system (DCSS) designs as an alternative to the proposed action (Holtec, 2020b). To date, the NRC has licensed and approved SNF storage systems Holtec owns: AREVA, NAC, and Energy*Solutions*. In its license application, Holtec proposed to use its proprietary system to store SNF at the proposed CISF. A potential design alternative would be to use the AREVA, NAC, and Energy*Solutions* systems. Among the NRC-licensed and approved SNF storage systems, the NRC has determined that each of them meets appropriate safety regulations; thus, none is deemed technologically preferable to another. In the event that Holtec requests a license amendment in the future to include additional storage design technologies, Holtec would be required to submit appropriate design certifications and undergo any necessary safety and environmental reviews. The NRC staff determined that at this time the prospect of the use of additional technology is too speculative to be considered as an alternative in this EIS.

2.3.2.2 Hardened Onsite Storage Systems (HOSS)

HOSS is a concept that aims to reduce the threat and vulnerability of currently deployed DCSSs at nuclear reactor sites. The primary components of HOSS include: (i) constructing reinforced concrete and steel structures around each waste container; (ii) protecting each of these structures with mounds of concrete, steel, and gravel; and (iii) spacing the structures over a larger area (Citizens Awareness Network, 2018). The purpose of HOSS is to increase security and resistance to potential damage of DCSSs from natural disasters, accidents, and attacks. At this time, HOSS is a generalized concept, and detailed plans that would allow NRC staff to conduct a detailed safety, environmental, and cost/benefit analysis are not available. Furthermore, HOSS does not meet the purpose and need for the proposed action (provide away-from-reactor SNF storage capacity that would allow SNF to be transferred from existing reactor sites and stored for several decades before a permanent repository is available). Therefore, this alternative was eliminated from detailed consideration in this EIS.

2.3.2.3 Hardened Extended-Life Local Monitored Surface Storage (HELMS)

HELMS was suggested by commenters during scoping for consideration as an alternative to the proposed action. Similar to HOSS, HELMS is a proposal that defines a strategy to enhance the safety of SNF DCSSs (Citizens Oversight, 2018). The components of the HELMS strategy are defined as follows:

- Hardened—storage facilities having design features to resist non-nuclear attack.
- Extended Life—cask systems providing a 1,000-year design life (suggested dual-wall canister design).
- Local—cask systems located near companion nuclear plant (in-state or within regional consortia of states), but away from water resources, dense populations, and seismic zones.
- Monitored—each canister outfitted with an electronic monitoring system to detect cracks and radiation.
- Surface—spent fuel stored on surface (above ground) for cooling for at least the next 200 to 300 years.

The group Citizens Oversight and its founder, Raymond Lutz, filed a petition (NRC, 2018) with NRC for rulemaking under 10 CFR 2.802 regarding regulations and enforcement for spent fuel storage systems under 10 CFR Part 72, specifically requesting consideration of HELMS. Further, the HELMS proposal sets forth a set of criteria and general design recommendations for managing the nation’s commercially generated SNF (Citizens Oversight, 2018). However, the proposal does not include specific information about interim storage site locations, SNF transportation options and details, DCSS designs, and facility design information that would allow this alternative to be analyzed in detail in this EIS. Moreover, HELMS does not fully meet the purpose and need for the proposed action (provide away-from-reactor SNF storage capacity that would allow SNF to be transferred from existing reactor sites and stored for several decades before a permanent repository is available). In January 2020, this petition was denied by the NRC (85 FR 3860). Therefore, this alternative was eliminated from detailed consideration in this EIS.

2.3.3 Location Alternative

The NRC staff reviewed Holtec’s site-selection process and its determination regarding site alternatives. This section discusses the site-selection process and the selection criteria and describes the candidate sites for the proposed CISF. Holtec based its siting process on a process previously undertaken in 2007 as part of the ELEA response to a grant issued by DOE to develop a facility to recycle SNF and reuse constituents of the SNF to fuel other reactors and produce energy under the Global Nuclear Energy Partnership (GNEP) program. The site-selection process identified the viability of several locations and ranked the sites based on a number of factors. EIS Figure 2.3-1 shows the location of the six sites evaluated as part of the GNEP program. To evaluate whether any of the environmental impacts could be avoided or

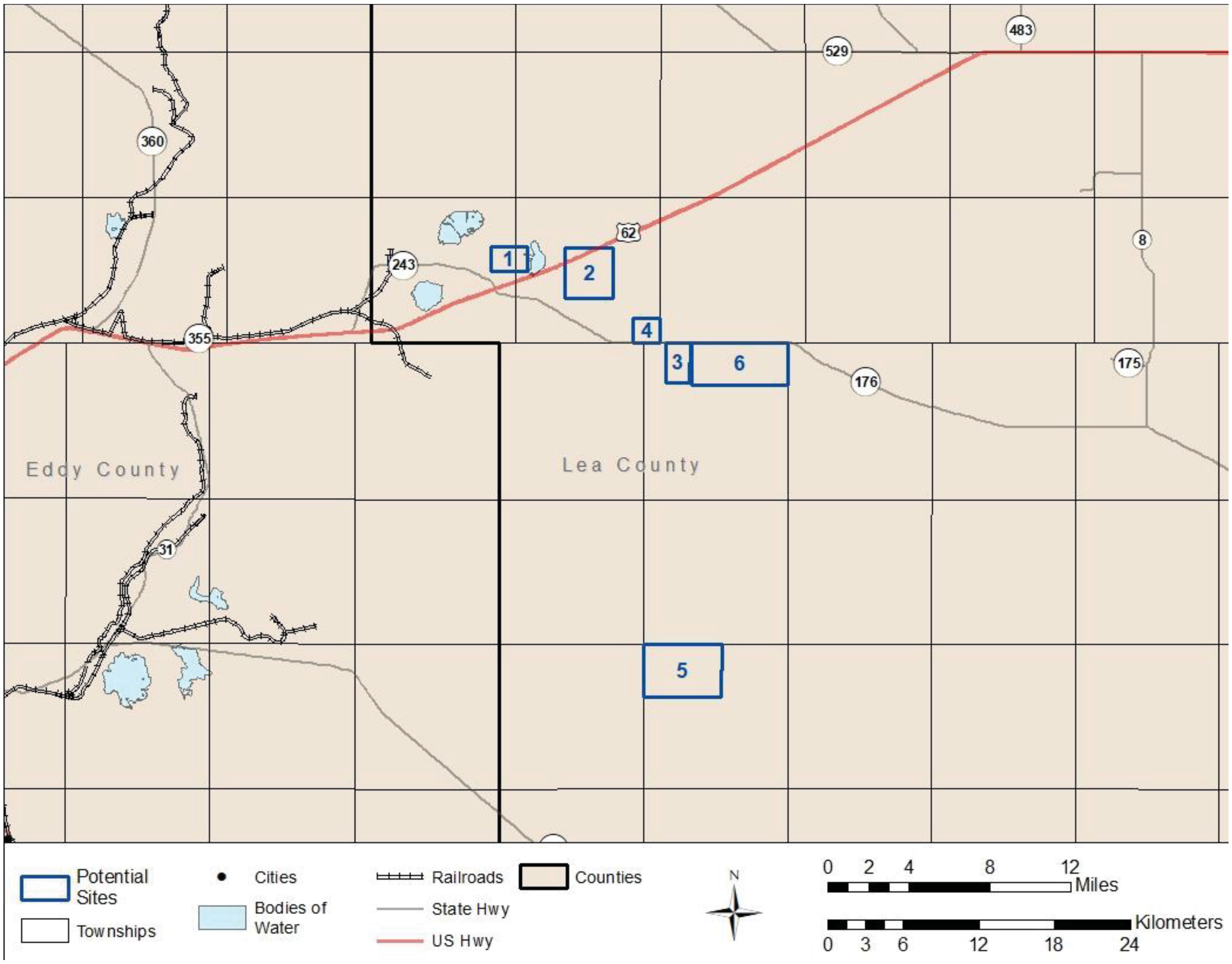

Figure 2.3-1 Potential Sites ELEA Evaluated for GNEP Siting Studies (Source: ELEA, 2007)

significantly reduced through site selection, the NRC staff evaluated the site-selection process to determine if the site Holtec proposed was the environmentally favorable location when compared to other evaluated sites.

Holtec Site-Selection Process

As part of the aforementioned 2007 GNEP grant process, DOE developed the following set of screening criteria to apply to prospective sites:

- Site data (size and availability)
- Ecological communities
- Water resources
- Critical terrestrial habitats
- Threatened and endangered species
- Regional demography
- Cultural resources
- Future projects
- Geology/seismology

- Climatology
- Hydrology/flooding
- Regulatory/permitting
- Construction costs
- Storage capacity
- Presence of other hazardous facilities with 16 km [10 mi]

Status on National Priorities List or Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (ELEA, 2007)

ELEA focused on eight sub-criteria (size, hydrology, electricity capability, population, zoning, road access, seismic stability, and water availability) to apply to prospective sites for consideration in the GNEP program. ELEA further refined those eight criteria into 31 site-specific screening factors:

- Size
- Largest contiguous area
- State owned
- Federally owned
- Privately owned
- Surface water
- Depth to water
- Faults
- Historical/archeological
- Public water supply wells
- Buffer zone potential
- Active alluvial fans
- Threatened and endangered species
- Seismic impact zones
- Unstable area/karst
- Easements/pipelines
- Utilities
- Estimated number of oil/gas wells
- Topography/slopes
- Distance to airports – Carlsbad
- Distance to airports – Hobbs
- Proximity to Carlsbad (road mileage)
- Proximity to Hobbs (road mileage)
- Proximity to Carlsbad (direct mileage)
- Proximity to Hobbs (direct mileage)
- Existing site development
- Environmental justice
- Land Use
- Access to State/Federal highway
- Rail access
- Zoning

ELEA compiled information on these characteristics for six potential sites in the region, EIS Figure 2.3-1. The information was collected from readily available sources and existing literature, which was ample because of the number of recent projects and studies in the area (ELEA, 2007)

Once the information for each of the prospective sites was tabulated, ELEA developed a screening process to systematically evaluate sites using a ranking matrix. Each criterion was assigned an importance factor ranging from 1 to 3, with 3 being the most important. For each of the criteria for an individual site, the characteristic was assigned a ranking factor from 1 to 5, 5 being the most favorable site for a particular criterion. Final scores were determined based on the combined importance factor and site characteristics. Site 1 ranked highest in the overall scores (ELEA, 2007). ELEA eliminated two of the six sites with very low scores (Sites 5 and 6) from further consideration. Of the remaining four sites, Site 1 ranked first and Site 4 ranked second.

Although the GNEP program ended, Holtec utilized information from these evaluations by ELEA conducted for the GNEP project as part of their site-selection process. Holtec considered the top ranked sites and decided that one, Site 1, offered more favorable siting factors and selected this site as the proposed action location for the currently proposed CISF. The favorable siting factors Holtec used included (i) private ownership of the land; (ii) equal distance between the cities of Hobbs and Carlsbad, which optimized access for housing, jobs, supplies and other support; (iii) proximity to U.S. Highway 62/180, which provided an advantage for transporting SNF; and (iv) Federal land south of the proposed site offered a potential for expansion of the facilities if needed. The site with the favorable factors was put forward in the Holtec license application (Holtec, 2017, 2020a,b). Holtec also reviewed the eight criteria that were developed for the GNEP facilities and determined that electricity capacity and water availability were not as important as the other six criteria, because the CISF would not require significant amounts of either. Holtec stated in its ER (Holtec, 2020a) that neither electric capacity nor water availability were factors that affected the selection of Site 1 for the GNEP nuclear facilities.

In considering site location alternatives for this EIS, the NRC staff conducted a sensitivity analysis of the siting process to ensure that the site selection was not sensitive to small changes in the relative weights of objectives or criteria. The NRC staff evaluated the information by equally ranking each of the criteria, segregating certain criteria for specific evaluation, and applying higher ranking to environmental- and safety-related criteria.

The NRC staff's first step in assessing the siting process was to review the original grading criteria. The NRC staff found that the top-weighted categories were practical because they were based on the site's suitability to host the proposed project. Those categories included faulting, seismic impact area, and presence of karst material. Next, the NRC staff performed a sensitivity analysis. First, the staff set all criteria weights equal so that no one characteristic would skew the outcome. The second step was to weight highly several specific safety and environmental characteristics (seismic impact zone, karst area, easements/pipelines faulting, topography, rail access, and zoning) to determine if that changed the site ranking. Finally, the NRC staff revised all safety and environmental characteristics to highly weight these to determine if doing this changed the site ranking. At each step of this process, Site 1 rated consistently highest. Sites 2 and 4 interchanged ranks of second and third depending on the criteria evaluated. Sites 5 and 6 consistently ranked lowest.

In addition to the results of the siting process evaluation and sensitivity analysis, the NRC staff considered the fact that Site 1 is the only site that is entirely privately owned land and where the presence of a species of concern has not been identified. Site 1 also offers the shortest distance to the nearest rail line at 9.4 km [5.9 mi]. Sites 2 and 4 ranked higher than the remaining sites but are either not entirely privately owned, contain habitat for identified species of concern, or are further from the existing rail line. Based on these considerations and the results of the NRC staff's siting process evaluation and sensitivity analysis, the NRC staff eliminated the remaining alternative sites from further consideration in this EIS.

2.3.4 Facility Layout Alternative

In determining the layout of the proposed CISF, Holtec evaluated site access considerations for workers, materials, and SNF deliveries, a process which dictated that support facilities such as the security building, the administration building, and the cask transfer building be located on the southern boundary of the proposed site. Operational efficiencies and worker dose considerations also dictated that the ISFSI pad be located in close proximity to the cask transfer building. Additionally, the proposed action (Phase 1) storage locations for SNF are proposed to be located at the northeastern-most point of the ISFSI pad so that subsequent phases of construction would have minimal interference with ongoing operations. Furthermore, environmental, safety, and security considerations indicated that the ISFSI pad be a compact design to minimize infrastructure requirements, with minimal land disturbance within the protected area, and with clear sight lines around the perimeter. This compact design would also minimize any potential impacts related to ecological and cultural resources and would minimize ground disturbance and air quality impacts. Also, 10 CFR 72.106 requires any facility or storage location for SNF to be no closer than 100 m [328 ft] from the protected area boundary. For these reasons, Holtec deemed the proposed facility layout as the optimized configuration and eliminated other layouts from consideration.

The NRC staff's review of Holtec's proposed facility layout determined that the current proposal optimizes the site access and facility layout and minimizes the potential impact to ecological and cultural resources. The staff evaluated the proposed layout of the facility and did not identify any other facility layout that was clearly superior for the proposed CISF such that it should be considered as an alternative to the proposed facility layout. Therefore, other site facility design alternatives were eliminated from detailed consideration in this EIS.

2.4 Comparison of Predicted Environmental Impacts

NUREG–1748 (NRC, 2003) categorizes the significance of potential environmental impacts as follows:

SMALL: The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE: The environmental effects are sufficient to alter noticeably, but not destabilize, important attributes of the resource.

LARGE: The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

Chapter 4 presents a detailed evaluation of the environmental impacts from the proposed action and the No-Action alternative on resource areas at the proposed CISF. EIS Table 2.4-1 compares the significance level (SMALL, MODERATE, or LARGE) of potential environmental impacts of the proposed action and the No-Action alternative. For each resource area, the NRC staff identifies the significance level during each stage of the proposed project: construction, operations, and decommissioning and reclamation.

Table 2.4-1 Summary of Impacts for the Proposed CISF Project			
	Land Use		
	Proposed Action (Phase 1)	**Phases 2-20**	**No-Action**
Construction	SMALL	SMALL	NONE
Operation	SMALL	SMALL	NONE
Decommissioning and Reclamation	SMALL	SMALL	NONE
	Transportation		
	Proposed Action (Phase 1)	**Phases 2-20**	**No-Action**
Construction	SMALL	SMALL	NONE
Operation	SMALL	SMALL	NONE
Decommissioning and Reclamation	SMALL	SMALL	NONE
	Geology and Soils		
	Proposed Action (Phase 1)	**Phases 2-20**	**No-Action**
Construction	SMALL	SMALL	NONE
Operation	SMALL	SMALL	NONE
Decommissioning and Reclamation	SMALL	SMALL	NONE
	Surface Water		
	Proposed Action (Phase 1)	**Phases 2-20**	**No-Action**
Construction	SMALL	SMALL	NONE
Operation	SMALL	SMALL	NONE
Decommissioning and Reclamation	SMALL	SMALL	NONE
	Groundwater		
	Proposed Action (Phase 1)	**Phases 2-20**	**No-Action**
Construction	SMALL	SMALL	NONE
Operation	SMALL	SMALL	NONE
Decommissioning and Reclamation	SMALL	SMALL	NONE
	Ecology		
	Proposed Action (Phase 1)	**Phases 2-20**	**No-Action**
Construction	SMALL to MODERATE	SMALL to MODERATE	NONE
Operation	SMALL to MODERATE	SMALL to MODERATE	NONE
Decommissioning and Reclamation	SMALL to MODERATE	SMALL to MODERATE	NONE
	Air Quality		
	Proposed Action (Phase 1)	**Phases 2-20**	**No-Action**
Construction	SMALL	SMALL	NONE

Table 2.4-1 Summary of Impacts for the Proposed CISF Project			
Operation	SMALL	SMALL	NONE
Decommissioning and Reclamation	SMALL	SMALL	NONE
	Noise		
	Proposed Action (Phase 1)	**Phases 2-20**	**No-Action**
Construction	SMALL	SMALL	NONE
Operation	SMALL	SMALL	NONE
Decommissioning and Reclamation	SMALL	SMALL	NONE
	Historic and Cultural		
	Proposed Action (Phase 1)	**Phases 2-20**	**No-Action**
Construction	SMALL. Based on completion of consultation under NHPA Section 106, the NRC staff's conclusion is that the proposed project would have no effect on historic properties.	SMALL. Based on completion of consultation under NHPA Section 106, the NRC staff's conclusion is that the proposed project would have no effect on historic properties.	NONE
Operation	SMALL. Based on completion of consultation under NHPA Section 106, the NRC staff's conclusion is that the proposed project would have no effect on historic properties.	SMALL. Based on completion of consultation under NHPA Section 106, the NRC staff's conclusion is that the proposed project would have no effect on historic properties.	NONE
Decommissioning and Reclamation	SMALL	SMALL	NONE
	Visual and Scenic		
	Proposed Action (Phase 1)	**Phases 2-20**	**No-Action**
Construction	SMALL	SMALL	NONE
Operation	SMALL	SMALL	NONE
Decommissioning and Reclamation	SMALL	SMALL	NONE
	Socioeconomics		
	Proposed Action (Phase 1)	**Phases 2-20**	**No-Action**
Construction	SMALL to MODERATE (beneficial to employment, public services, and local finance)	SMALL to MODERATE (beneficial to employment, public services, and local finance)	NONE

Table 2.4-1 Summary of Impacts for the Proposed CISF Project			
Operation	SMALL	SMALL	NONE
Decommissioning and Reclamation	SMALL to MODERATE (beneficial to employment, public services, and local finance)	SMALL to MODERATE (beneficial to employment, public services, and local finance)	NONE
	Environmental Justice		
	Proposed Action (Phase 1)	**Phases 2-20**	**No-Action**
Construction	No disproportionately high and adverse human health and environmental effects	No disproportionately high and adverse human health and environmental effects	No disproportionately high and adverse human health and environmental effects
Operation	No disproportionately high and adverse human health and environmental effects	No disproportionately high and adverse human health and environmental effects	No disproportionately high and adverse human health and environmental effects
Decommissioning and Reclamation	No disproportionately high and adverse human health and environmental effects	No disproportionately high and adverse human health and environmental effects	No disproportionately high and adverse human health and environmental effects
	Public and Occupational Health		
	Proposed Action (Phase 1)	**Phases 2-20**	**No-Action**
Construction	SMALL	SMALL	NONE
Operation	SMALL	SMALL	NONE
Decommissioning and Reclamation	SMALL	SMALL	NONE
	Waste Management		
	Proposed Action (Phase 1)	**Phases 2-20**	**No-Action**
Construction	SMALL	SMALL	NONE
Operation	SMALL	SMALL	NONE
Decommissioning and Reclamation	SMALL	SMALL to MODERATE (until a new landfill is established)	NONE

The predicted environmental impact to each resource area for the proposed project can also be found in the Executive Summary.

2.5 Recommendation

After comparing the impacts of the proposed action (Phase 1) to the No-Action alternative, the NRC staff, in accordance with 10 CFR Part 51.91(d), recommends the proposed action (Phase 1), which is the issuance of an NRC license to Holtec to construct and operate a CISF for SNF at the proposed location, subject to the determinations in the staff's safety review of the application. In addition, BLM staff recommends the issuance of a permit to construct and operate the rail spur. This recommendation is based on (i) the license application, which includes the ER and supplemental documents, and Holtec's responses to the NRC staff's requests for additional information; (ii) consultation with Federal, State, Tribal, local agencies, and input from other stakeholders, including comments on the draft EIS; (iii) independent NRC and BLM staff review; and (iv) the assessments provided in this EIS.

2.6 References

10 CFR 2.802. Code of Federal Regulations, Title 10, *Energy*, §2.802. "Petition for Rulemaking—Requirements for Filing." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20. "Standards for Protection Against Radiation." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 71. Code of Federal Regulations, Title 10, *Energy*, Part 71. "Packaging and Transportation of Radioactive Material." Washington, DC: U.S. Government Publishing Office.10 CFR Part 72. Code of Federal Regulations, Title 10, *Energy*, Part 72. "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste." Washington, DC: U.S. Government Publishing Office.

10 CFR 72.54(d). Code of Federal Regulations, Title 10, *Energy*, §72.54(d), "Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas." Washington, DC: U.S. Government Publishing Office.

10 CFR 72.54(g). Code of Federal Regulations, Title 10, *Energy*, §72.54(g), "Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas." Washington, DC: U.S. Government Publishing Office.

10 CFR 72.54(i). Code of Federal Regulations, Title 10, *Energy*, §72.54(i), "Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 73. Code of Federal Regulations, Title 10, *Energy*, Part 73. "Physical Protection of Plants and Materials." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 107. Code of Federal Regulations, Title 49, *Transportation*, Part 107. "Hazardous Materials Program Procedures." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 171. Code of Federal Regulations, Title 49, *Transportation*, Part 171. "General Information, Regulations, and Definitions." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 172. Code of Federal Regulations, Title 49, *Transportation*, Part 172. "Hazardous Materials Table." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 173. Code of Federal Regulations, Title 49, *Transportation*, Part 173. "Shippers-General Requirements for Shipments and Packagings." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 174. Code of Federal Regulations, Title 49, *Transportation*, Part 174. "Carriage by Rail." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 175. Code of Federal Regulations, Title 49, *Transportation*, Part 175. "Carriage by Aircraft." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 176. Code of Federal Regulations, Title 49, *Transportation*, Part 176. "Carriage by Vessel." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 177. Code of Federal Regulations, Title 49, *Transportation*, Part 177. "Carriage by Highway." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 178. Code of Federal Regulations, Title 49, *Transportation*, Part 178. "Specifications for Packagings." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 179. Code of Federal Regulations, Title 49, *Transportation*, Part 179. "Specifications for Tank Cars." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 180. Code of Federal Regulations, Title 49, *Transportation*, Part 180. "Continuing Qualification and Maintenance of Packagings." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 390. Code of Federal Regulations, Title 49, *Transportation*, Part 390. "Federal Motor Carrier Safety Regulations; General." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 391. Code of Federal Regulations, Title 49, *Transportation*, Part 391. "Qualifications of Drivers and Longer Combination Vehicle (LCV) Driver Instructors." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 392. Code of Federal Regulations, Title 49, *Transportation*, Part 392. "Driving Commercial Motor Vehicles." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 393. Code of Federal Regulations, Title 49, *Transportation*, Part 393. "Parts and Accessories Necessary for Safe Operation." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 394. Code of Federal Regulations, Title 49, *Transportation*, Part 394. "Other Regulations Relating to Transportation (Continued) Chapter III." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 395. Code of Federal Regulations, Title 49, *Transportation*, Part 395. "Hours of Service of Drivers." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 396. Code of Federal Regulations, Title 49, *Transportation*, Part 396. "Inspection, Repair, and Maintenance." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 397. Code of Federal Regulations, Title 49, *Transportation*, Part 397. "Transportation of Hazardous Materials; Driving and Parking Rules." Washington, DC: U.S. Government Publishing Office.

85 FR 3860. *Federal Register*. Vol. 85, No. 15, p. 3,860–3,867. "Requirements for the Storage of Spent Nuclear Fuel." Washington, DC: U.S. Government Printing Office. 2020.

Citizens Awareness Network. "How Can We Protect Our Communities from Nuclear Terrorism? Hardened On-Site Storage at Nuclear Reactor Sites." Shelburne Falls, Massachusetts: Citizens Awareness Network. 2018 <http://www.nukebusters.org/learn-security-1.shtml> (Accessed 8 July 2018).

Citizens Oversight, Inc. "A New Strategy: Storing Spent Nuclear Fuel, Featuring HELMS Storage: Hardened Extended-life Local Monitored Surface Storage and Dual-Wall Canisters (DWC)." ADAMS Accession No. ML18022B213. NRC Petition Version V13. El Cajon, California: Citizens Oversight. 2018.

ELEA. "GNEP Siting Report Appendix 2C." ADAMS Accession Nos. ML17310A225, ML17310A227, ML17310A230, and ML17310A231. Hobbs, New Mexico: Eddy-Lea Energy Alliance. 2007.

Energy*Solutions.* "Utah Department of Environmental Quality Division of Waste Management and Radiation Control Radioactive Material License." Salt Lake City, Utah: Division of Waste Management and Radiation Control Radioactive Materials License Supplementary Sheet. 2015. <https://deq.utah.gov/businesses-facilities/low-level-radioactive-waste-energysolutions> (Accessed 19 July 2021)

EPA. "EPA's Residual Designation Authority." Washington, DC: Environmental Protection Agency. 2020. <https://www.epa.gov/npdes/epas-residual-designation-authority> (Accessed 22 January 2020)

EPA. "Memorandum of Agreements Between EPA and States Authorized to Implement the National Pollutant Discharge Elimination System (NPDES) Program." Washington, DC: Environmental Protection Agency. 2019a. <https://www.epa.gov/compliance/memorandum-agreements-between-epa-and-states-authorized-implement-national-pollutant> (Accessed 22 January 2020)

EPA. "NPDES Stormwater Program in Region 6." Washington, DC: Environmental Protection Agency. 2019b. <https://www.epa.gov/npdes-permits/npdes-stormwater-program-region-6> (Accessed 22 January 2020)

EPA. "Stormwater Discharges from Construction Activities." Washington, DC: Environmental Protection Agency. 2019c. <https://www.epa.gov/npdes/stormwater-discharges-construction-activities> (Accessed 22 January 2020)

EPA. "Stormwater Discharges from Industrial Activities." Washington, DC: Environmental Protection Agency. 2019d. <https://www.epa.gov/npdes/stormwater-discharges-industrial-activities> (Accessed 22 January 2020)

EPA. “Volume to Weight Conversion Factors.” Washington, DC: U.S. Environmental Protection Agency. 2016. <https://www.epa.gov/sites/production/files/2016-04/documents/volume_to_weight_conversion_factors_memorandum_04192016_508fnl.pdf> (Accessed 26 May 2019)

Holtec. “Environmental Report-HI-STORE Consolidated Interim Storage Facility, Rev 8.” ADAMS Accession No. ML20295A485. Marlton, New Jersey: Holtec International. 2020a.

Holtec. “Safety Analysis Report-HI-STORE Consolidated Interim Storage Facility.” ADAMS Accession No. ML20295A428. Marlton, New Jersey: Holtec International. 2020b.

Holtec. “Responses to Request for Additional Information.” ADAMS Accession No. ML19081A075. Marlton, New Jersey: Holtec International. 2019a.

Holtec. “Responses to NRC Staff Evaluation of RAI Responses.” ADAMS Accession No. ML19248C132. Marlton, New Jersey: Holtec International. 2019b.

Holtec. “Holtec International HI-STORE CIS (Consolidated Interim Storage Facility) License Application.” ADAMS Accession No. ML17115A418. Marlton, New Jersey: Holtec International. 2017.

NRC. “Nuclear Regulatory Commission 10 CFR Part 72 [Docket No. PRM-72-8; NRC-2018-0017] Requirements for the Indefinite Storage of Spent Nuclear Fuel.” ADAMS Accession No. ML18073A384. Washington, DC: U.S. Nuclear Regulatory Commission. 2018.

NRC. NUREG–2157, “Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel.” ADAMS Accession No. ML14196A105. Washington, DC: U.S. Nuclear Regulatory Commission. 2014.

NRC. NUREG–1437. “Generic Environmental Impact Statement for License Renewal of Nuclear Plants.” ADAMS Accession No. ML13106A241. Washington, DC: U.S. Nuclear Regulatory Commission. 2013.

NRC. NUREG–1748, “Environmental Review Guidance for Licensing Actions Associated with NMSS Programs.” ADAMS Accession No. ML032450279. Washington, DC: U.S. Nuclear Regulatory Commission. 2003.

NRC. “Environmental Assessment and Finding of No Significant Impact for the Storage of Spent Nuclear Fuel in NRC-Approved Storage Casks at Nuclear Power Reactor Sites.” ADAMS Accession No. ML051230231. Washington, DC: U.S. Nuclear Regulatory Commission. 1989.

SwRI. “Scientific Notebook #1333 for the Holtec Consolidated Interim Storage Facility EIS Supporting Calculations.” ADAMS Accession No. ML19352G685. Southwest Research Institute, Center of Nuclear Waste Regulatory Analyses. 2019.

TCEQ. “Waste Control Specialists LLC Radioactive Material License.” Austin, Texas: Texas Commission on Environmental Quality, Radioactive Materials Division. 2019. <https://www.tceq.texas.gov/permitting/radmat/licensing/wcs_license_app.html#:~:text=The%20Waste%20Control%20Specialists%20LLC,their%20facility%20in%20Andrews%20County > (Accessed 19 July 2021)

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 Introduction

The proposed Holtec Consolidated Interim Storage Facility (CISF) would be located in Lea County, New Mexico. The proposed CISF project area is defined as the land within Holtec's proposed license boundary. The proposed CISF project area encompasses 421 hectares (ha) [1,040 acres (ac)] of mostly private land. The proposed CISF project area is larger than the total disturbed land area associated with the proposed action (Phase 1) or any potential license amendments (Phases 2-20). The proposed action is to construct, operate, and decommission Phase 1 of a facility, which would disturb 48.2 ha [119 ac] of land. The total land disturbed by the proposed CISF project at full build-out (Phases 2-20) would be approximately 134 ha [330 ac]. Additional information on the proposed CISF project is included in EIS Section 2.2.1. As part of the proposed action, Holtec would apply for a permit from the U.S. Bureau of Land Management (BLM) for a parcel of BLM land that would be used to access the proposed CISF project area. This right-of-way access across BLM land would be used to construct a rail spur to transport spent nuclear fuel (SNF) from the main rail line to the proposed CISF project area and is therefore considered a connected action for the purpose of this environmental review.

This chapter describes the existing environmental conditions within the proposed CISF project area and, for some resource areas, the region surrounding the proposed CISF project location. The resource areas described in this section include land use, transportation, geology and soils, water resources, ecology, noise, air quality, historic and cultural resources, visual and scenic resources, socioeconomics, public and occupational health, and current waste management practices. The descriptions of the affected environment are based upon information provided in Holtec's Environmental Report (ER) (Holtec, 2020a), Safety Analysis Report (SAR) (Holtec, 2020b), and responses to U.S. Nuclear Regulatory Commission (NRC) requests for additional information (RAIs) (Holtec, 2021, 2019a,b,c, 2018) and supplemented by additional information the NRC staff identified. The information in this chapter will form the basis for assessing the potential impacts of the proposed action (including the rail spur for SNF transport to the CISF) and the No-Action alternative (EIS Chapter 4), and also provides information for the cumulative impacts analysis (EIS Chapter 5). As previously stated, the proposed CISF project area includes all land within the proposed project boundary. To provide a thorough evaluation of the potential impacts of the proposed action (which are assessed in Chapter 4 of this EIS), for some resource areas (e.g., land use, socioeconomics), the region surrounding the proposed CISF project area is discussed and defined in this Chapter, as needed.

3.2 Land Use

This section describes current land use within a 10 kilometer (km) [6 miles (mi)] radius of the proposed CISF project area (referred to as the land use study area). Holtec provided information for this land use study area to describe the conditions within and surrounding the proposed CISF project area. Use of such a radius is reasonable, per NUREG–1748 (NRC, 2003), because of the small footprint, low profile, and passive nature of the project. Existing land uses include cattle grazing, oil and gas exploration and development, oil and gas related service industry facilities, underground potash mining, and recreational activities (Holtec, 2020a,b).

3.2.1 Surface and Subsurface Property Rights

The Eddy-Lea Energy Alliance (ELEA) currently owns the surface rights to property within the proposed CISF project area. ELEA is a limited liability company jointly owned by Eddy and Lea counties and the cities of Carlsbad and Hobbs (Holtec, 2020b). In April 2016, Holtec and ELEA executed a memorandum of agreement (MOA) describing the design, licensing, construction, and operation of the proposed CISF and the terms by which Holtec could purchase the surface rights to property within the proposed project area (ELEA, 2016). On July 19, 2016, the New Mexico Board of Finance (NMBF) approved the sale of the surface property rights to Holtec (NMBF, 2016). Holtec has committed to purchasing the surface property rights from ELEA (Holtec, 2020a, 2019a) if NRC licenses the proposed CISF.

Surface rights to property surrounding the proposed CISF project area are either privately-owned or owned by the BLM or the State of New Mexico (EIS Figure 3.2-1). Split estate occurs on privately-owned land within and surrounding the proposed CISF project area. Split estate is an estate where property rights (or ownership) to the surface and the subsurface are split between two parties. The State of New Mexico owns the subsurface property rights (commonly referred to as mineral rights) within the proposed CISF project area, and BLM or the State of New Mexico owns subsurface property rights on privately-owned surface estate surrounding the proposed CISF project area (EIS Figure 3.2-2).

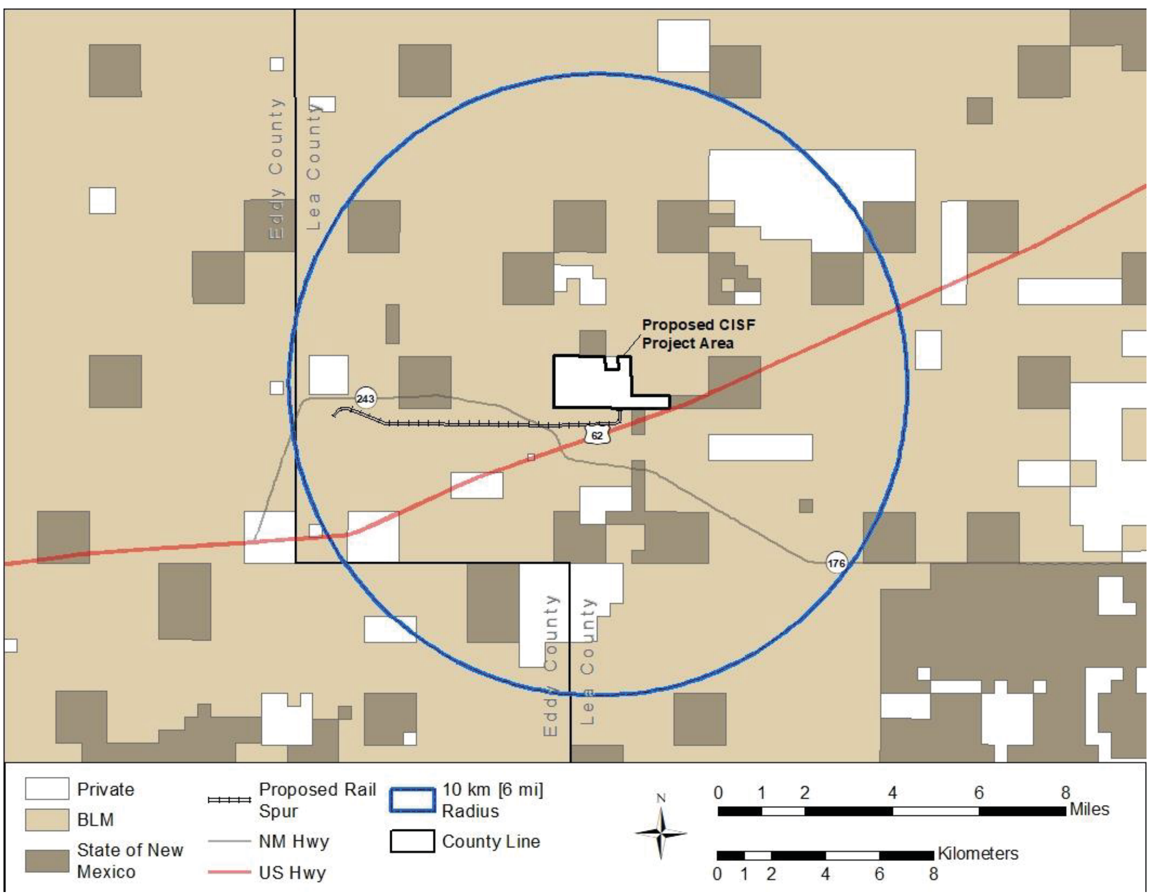

Figure 3.2-1 Surface Property Rights Ownership Within and Surrounding the Proposed CISF Project Area (Source: BLM, 2012a)

Figure 3.2-2 Subsurface Property (Mineral) Rights Ownership Within and Surrounding the Proposed CISF Project Area (Source: BLM, 2012b)

3.2.2 Land Use Classification

Land within and surrounding the proposed CISF project area has been classified by BLM as mostly rangeland used for cattle grazing (EIS Figure 3.2-3) (Holtec, 2020a). The rangeland consists of shrubland and herbaceous upland. Livestock grazing on public lands is managed by the BLM. BLM-administered grazing allotments in the vicinity of the proposed CISF project area are shown in EIS Figure 3.2-4. The terms and conditions for grazing on BLM-managed lands (such as stipulations on forage use and season of use) are set forth in permits and leases BLM issues to public land ranchers. Standard management practice on BLM-administered grazing allotments includes pasture rotation, with some of the pastures being unused for at least a portion of the year. Currently, the entire proposed CISF project area is used for cattle grazing. Other than grazing, there is no commercial agriculture in the land use study area. Because the proposed CISF project area is privately owned, it does not fall under the BLM range management rules; however, the rules apply to adjacent public lands that are managed by the same rancher who currently grazes cattle on the proposed CISF project area (Holtec, 2020a).

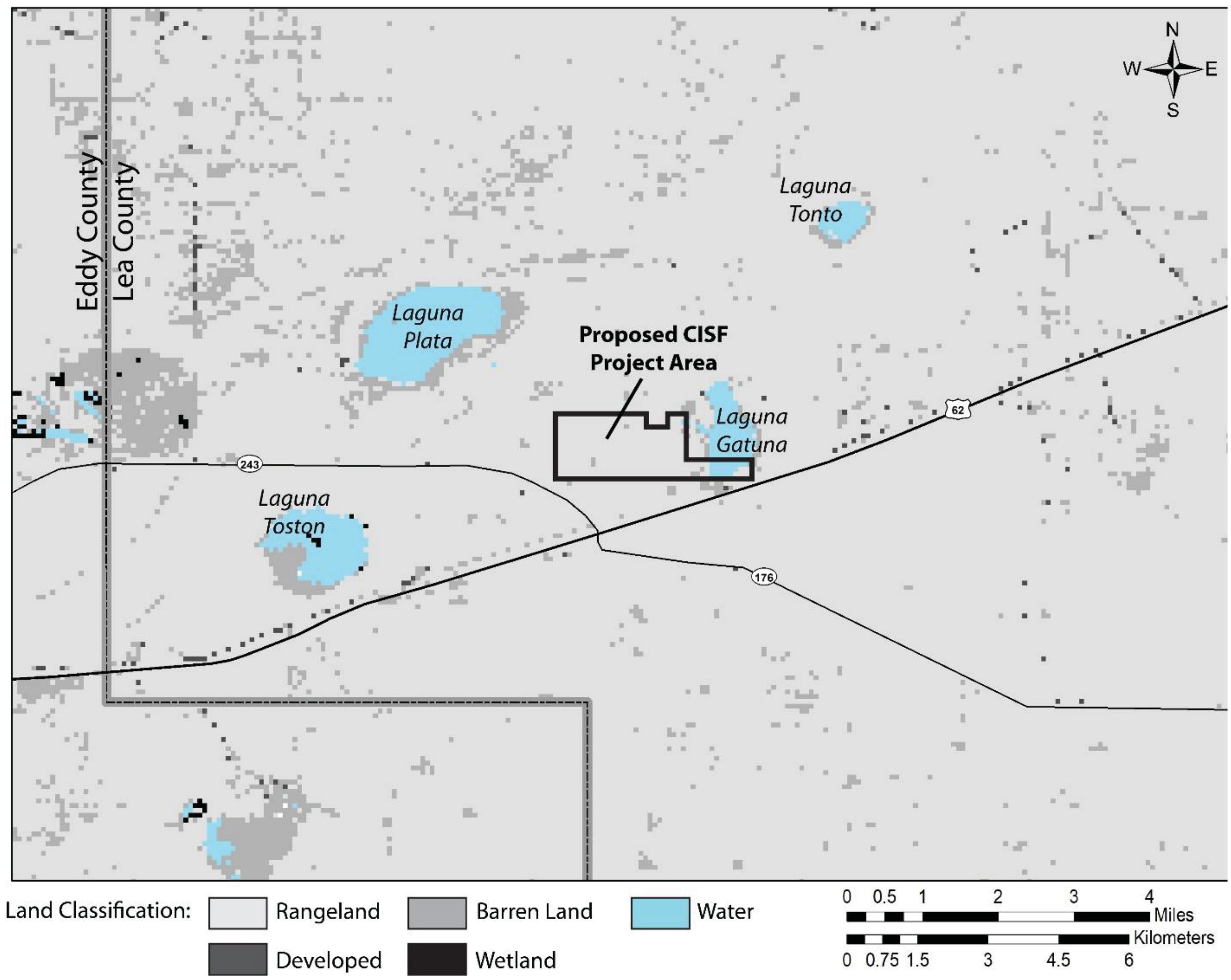

Figure 3.2-3 Land Classification Within and Surrounding the Proposed CISF Project Area (Source: USGS, 2009)

Other land use classes within and surrounding the proposed CISF project area include water, barren land, developed, and wetlands [located near the potash mine (EIS Figure 3.2-3)]. Land classified as water consists of playa lakes, including Laguna Gatuna, Laguna Plata, Laguna Toston, and Laguna Tonto (EIS Figure 3.2-3). Barren land consists mostly of salt flats and barren rock surrounding the playa lakes. Developed land comprises minor residential and commercial development. The nearest residence to the proposed CISF project area is located at the Salt Lake Ranch, 2.4 km [1.5 mi] north of the proposed CISF project area (Holtec, 2020a,b). Additional residences are located at the Bingham Ranch, 3.2 km [2 mi] to the south, and near the R360 (a hydrocarbon remediation landfarm), 3.2 km [2 mi] to the southwest. There are a total of nine occupied residences within the land use study area (Holtec, 2020b). Commercial development consists of industrial and transportation facilities associated with extractive industries (potash mining and oil and gas production). Minor wetlands consisting of emergent herbaceous vegetation are present near water bodies to the west and southwest of the proposed CISF project area near the potash mining area (EIS Section 3.5.1.5).

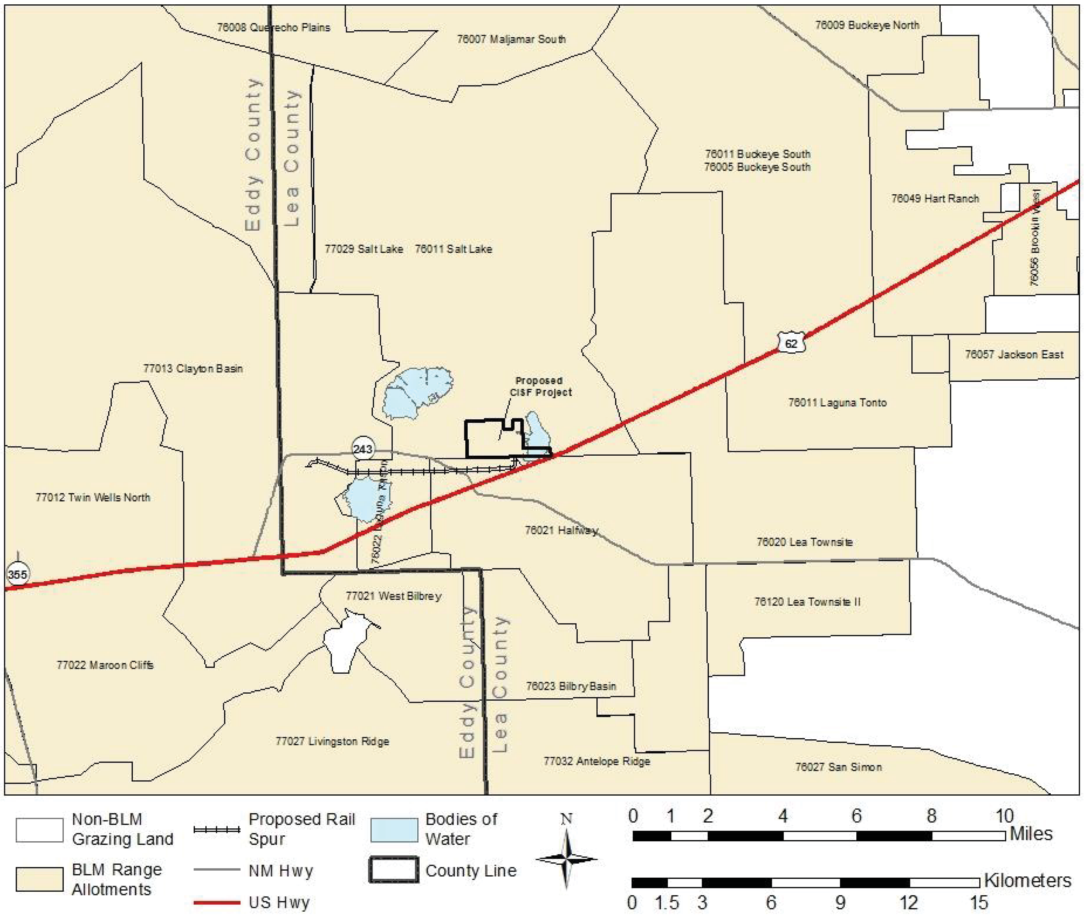

Figure 3.2-4 BLM-Managed Grazing Allotments Showing Allotment Name and Number Within and Surrounding the Proposed CISF Project Area (Source: BLM, 2011)

3.2.3 Hunting and Recreation

Recreational activities within the land use study area include big- and small-game hunting, camping, horseback riding, hiking, bird watching, and sightseeing. The proposed CISF project area is currently private property owned by ELEA and would continue to be private property after purchase by Holtec. As such, the property would be designated "Off-Limits" to the general public and "No Trespassing" signs would be posted along the property boundary, in accordance with State and Federal requirements for posting real estate property (Holtec, 2020a).

Major national and State parks and recreational areas in the vicinity of the proposed CISF project area are shown in EIS Figure 3.2-5. Carlsbad Caverns National Park is located south of Carlsbad and contains some of the largest caves in North America, including Carlsbad Cavern. Carlsbad Wilderness is desert backcountry surrounding Carlsbad Caverns National Park. The Guadalupe Back County Byway west of Carlsbad is a 48-km [30-mi] road, which ascends about 915 meters (m) [3,000 feet (ft)] from the Chihuahuan Desert into the Guadalupe Mountains. The Living Desert Zoo and Gardens is located in Carlsbad and is dedicated to the interpretation of the Chihuahuan Desert. Brantley Lake State Park, located between the cities of Carlsbad and Artesia, includes a 1,214-ha [3,000-ac] lake on the Pecos River created by construction of the Brantley Dam. Avalon Reservoir located 4.8 km [3 mi] north of Carlsbad is a shallow 27-ha [66-ac] lake on the Pecos River, and the New Mexico Department of Game and Fish (NMDGF)

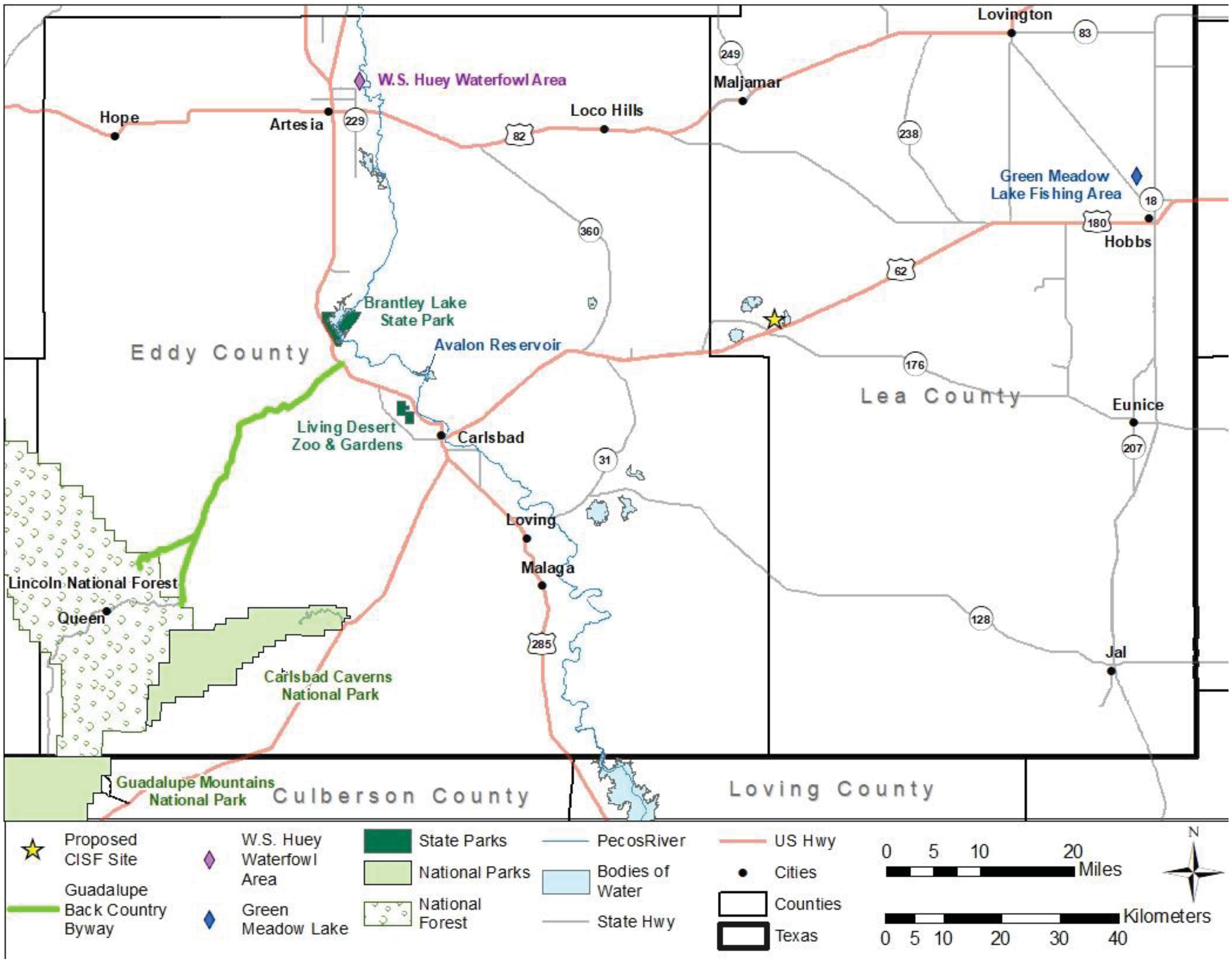

Figure 3.2-5 Major Parks and Recreational Areas in the Vicinity of the Proposed CISF Project Area (Modified from ELEA, 2007)

stocks it for fishing. The W.S. Huey Waterfowl Area, located northeast of Artesia, is a stopping and resting area for migrating waterfowl, including sandhill cranes and snow geese. Green Meadow Lake Fishing Area, located north of Hobbs, the NMDGF stocks for fishing. Local parks and recreational facilities (e.g., sport complexes, swimming pools, golf courses, hiking and biking trails, shooting ranges, and lakes) are also maintained by the cities of Carlsbad, Hobbs, Artesia, and Lovington.

3.2.4 Mineral Extraction Activities

Mineral extraction in the area of the proposed CISF project area consists of underground potash mining and oil and gas extraction (EIS Section 4.4.1.2) (Holtec, 2020a,b). As described in EIS Section 3.2.1, BLM or the State of New Mexico owns the mineral rights (potash and oil and gas) beneath the proposed CISF project area and surrounding area. These minerals are leased to production companies for development. The BLM administers mineral leases on mineral estate owned by the United States Government, and the New Mexico State Land Office administers mineral leases on mineral estate owned by the State of New Mexico.

The proposed CISF project area is in a region of active oil and gas exploration and development, with producing oil and gas fields, support services, pipelines, and compressor stations. Compressor stations are used to pump oil and gas through pipelines. The locations of compressor stations surrounding the proposed CISF project area are shown in EIS Figure 3.2-6. Other facilities related to oil and gas activity in the area include the Zia Gas Plant located approximately 11.6 km [7.2 mi] northwest of the proposed CISF project area and the R360 (a hydrocarbon remediation landfarm) located 3.2 km [2 mi] southwest of the proposed CISF project area (EIS Figure 3.2-6).

Wells associated with past and present oil and gas exploration and development within and surrounding the proposed CISF project area are shown in EIS Figure 3.2-7. Mineral rights to oil and gas resources beneath the proposed project area are owned by the State of New Mexico and are leased to two oil and gas production companies (COG Operating, LLC and XTO Delaware Basin, LLC). The eastern portion of the proposed CISF project area has 18 plugged and abandoned oil and gas wells. However, none of these plugged and abandoned oil and gas wells are located within the area where the proposed CISF pads would be located or where any land would be disturbed. The closest plugged and abandoned well to the storage and operations area is approximately 0.65 km [0.4 mi] to the east. There is one active oil/gas well on the southwest portion of Section 13 that operates at minimum production to maintain mineral rights. This well is within the area leased to COG Operating, LLC.

All oil and gas production horizons in Eddy and Lea Counties, New Mexico, are older (and therefore deeper) than the Salado Formation (Cheeseman, 1978). In the area of the proposed project area, the Salado Formation occurs at depths of 549 to 914 m [1,800 to 3,000 ft] below ground surface. Oil and gas exploration targets within and surrounding the proposed project area range from relatively shallow oil and gas at approximately 727 to 1,524 m [2,385 to 5,000 ft] in upper and middle Permian formations (EIS Section 3.4.1.2) to deep gas targets in middle Paleozoic formations in excess of 4,877 m [16,000 ft] deep (NMOCD, 2020; ELEA, 2007). Within 1.6 km [1 mi] of the proposed CISF, there are four active oil and gas wells, 12 plugged and abandoned wells, and one cancelled well. The four active wells have vertical depths ranging from 2,369 to 4,073 m [7,772 to 13,363 ft] and the 12 plugged and abandoned wells have vertical depths ranging from 938 to 958 m [3,079 to 3,144 ft] (NMOCD, 2020).

Potash is a major resource in the area of the proposed project. Numerous potash coreholes have been drilled in areas surrounding the proposed CISF project area, and there are potash leases both within and on land adjacent to the proposed CISF project area. Underground potash in the area of the proposed project is owned by BLM or the State of New Mexico and is leased to potash production companies. Potash beneath the proposed project area is owned by the State of New Mexico and is leased to Intrepid Mining LLC (Intrepid). Potash in the area of proposed project area is leased to various potash production companies, including Intrepid, Mosaic Potash, and Western Ag-Minerals.

Intrepid operates two underground potash mines (Intrepid North and Intrepid East), within 9.6 km [6 mi] of the proposed CISF project area (EIS Figure 3.2-6). The Intrepid North mine, located to the west, is no longer mining potash underground; however, surface facilities are currently being used in the manufacture of potash products. The Intrepid East mine, located to the southwest, is still mining underground potash ore (Intrepid, 2021; Holtec, 2020a). The potash in these mines is extracted from the Permian Salado Formation at depths of approximately 1,800 to 3,000 ft (Holtec, 2020b). The closest mine entrance is approximately 7.8 km [4.9 mi] from the proposed CISF project area with subsurface workings approximately

3.3 km [2.1 mi] from the southwestern boundary of the proposed CISF project area (Holtec, 2021).

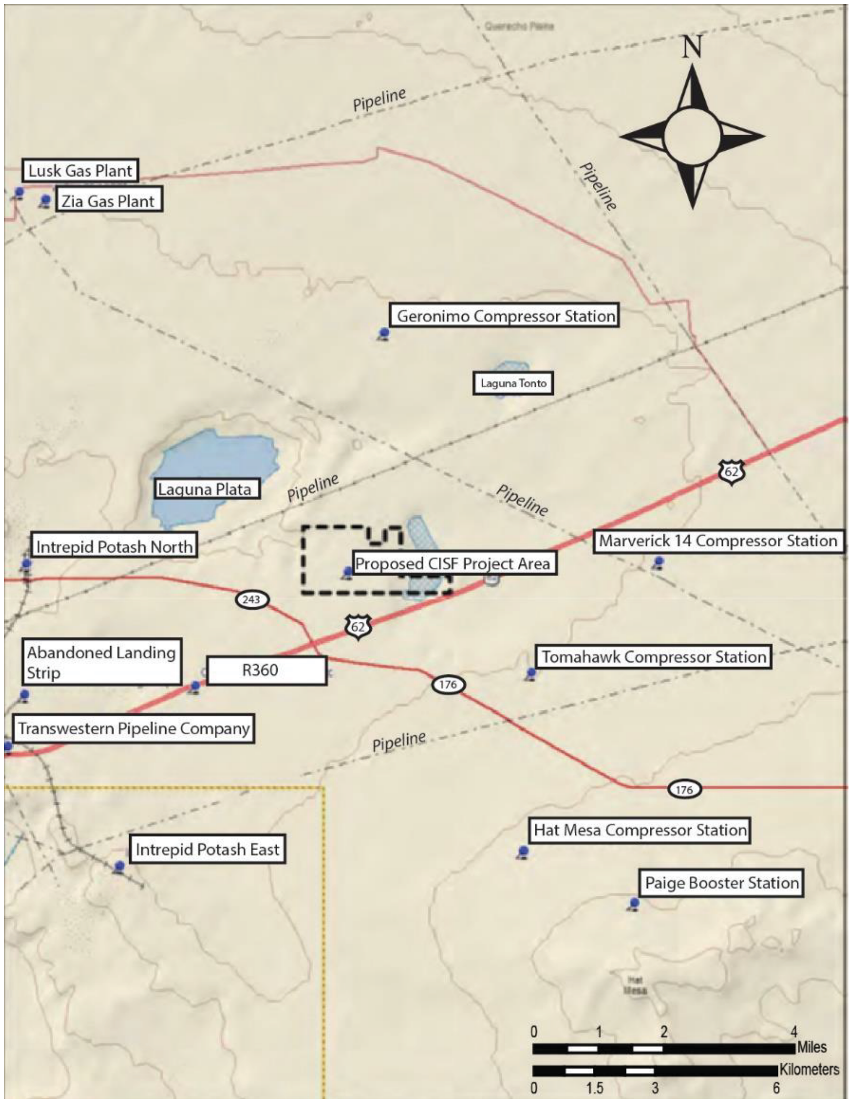

Figure 3.2-6 Facilities Surrounding the Proposed CISF Project Area (Modified from ELEA, 2007)

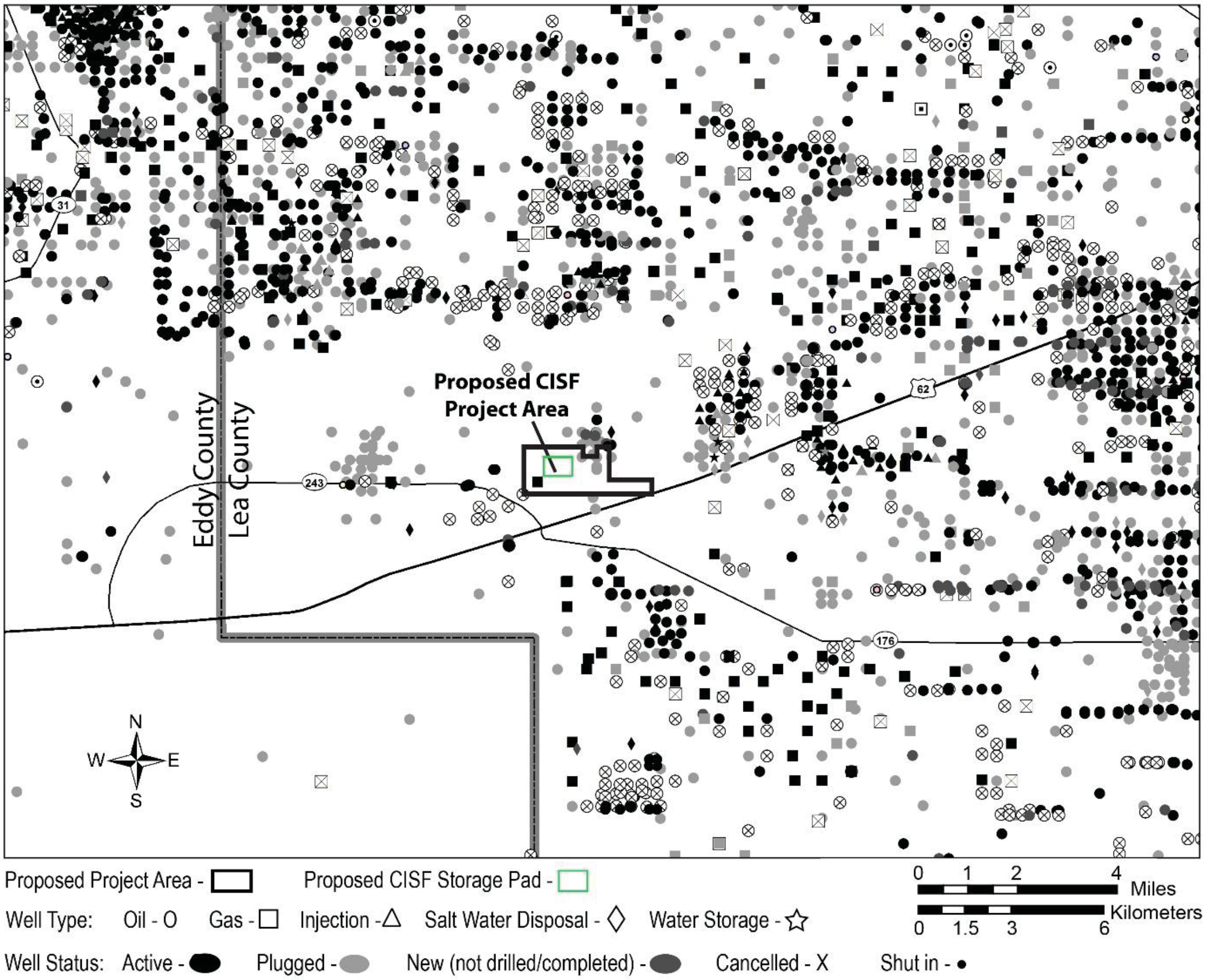

Figure 3.2-7 Oil and Gas Industry Wells Within and Surrounding the Proposed CISF Project Area (Source: NMOCD, 2016)

3.2.5 Utilities and Transportation

Oil and gas extraction is prevalent in the region, and electric power is needed at the well pads to operate pumps, compressors, and other equipment. Therefore, numerous power transmission and distribution lines exist within the region surrounding the proposed CISF project area. Xcel Energy would provide the electrical power needed for the proposed CISF project (Holtec, 2020a). An existing electrical service along the southern border of the proposed CISF project location would be used to provide electrical power for the proposed CISF project (Holtec, 2020a).

There are five pipelines that cross the proposed CISF project area: (i) a Transwestern 50.8-cm [20-in] diameter natural gas pipeline along the western boundary of the proposed CISF project area; (ii) a DCP Midstream 50.8-cm [20-in] diameter natural gas pipeline in the east central portion of the proposed CISF project area; (iii) a DCP Midstream 25.4-cm [10-in] diameter natural gas pipeline also in the east central portion of the proposed CISF project area; (iv) a Lucid Energy 25.4 cm [10 in] diameter natural gas pipeline in the east-central portion of the proposed CISF project area; and (v) a 61-cm [24-in] diameter above ground water pipeline in the western portion of the proposed CISF project area (Holtec, 2020a,b). Major oil and gas pipelines surrounding the proposed CISF project area are shown in EIS Figure 3.2-8.

The City of Carlsbad Water Department would provide potable water for construction and operation of the proposed CISF location through the existing water supply pipeline currently in place at the proposed CISF project area or via a new water line (Double Eagle, 2021; Holtec, 2020a). The City of Carlsbad Water Department has municipal wellfields that withdraw water from the Ogallala Aquifer. The existing potable water pipeline that bisects the proposed CISF project area is owned by Intrepid Mining, LLC and services their Intrepid East Facility. Intrepid is aware of the need to relocate this pipeline, and Holtec would coordinate with Intrepid to reroute this pipeline around the proposed CISF project area prior to the beginning of construction. The pipeline is a surface pipeline and would require no significant construction to reroute (Holtec, 2020a).

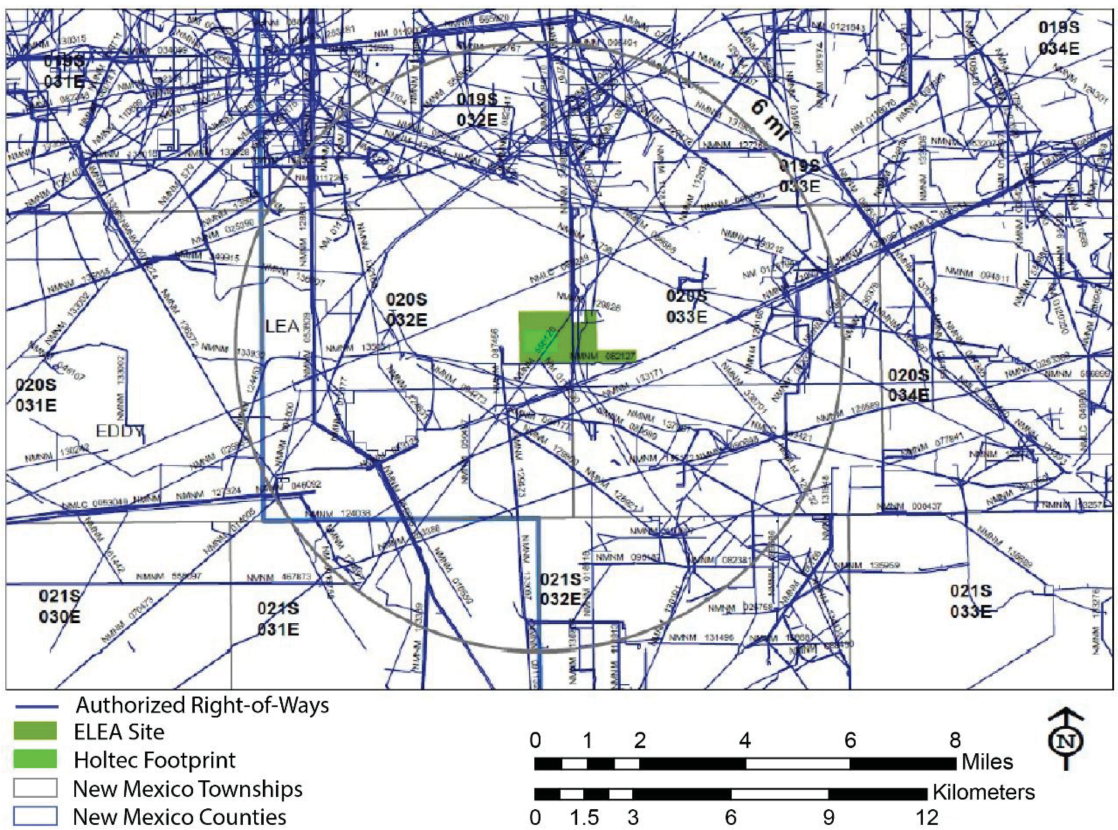

Figure 3.2-8 Pipelines Within the Land Use Study Area of the Proposed CISF Project (Holtec, 2020a)

The nearest municipal solid waste facility that serves Eddy County (and is jointly owned by Eddy County and the City of Carlsbad) is the Sandpoint Landfill, located 40 km [25 mi] west of the proposed CISF project area (Holtec, 2020a). The landfill is outside of the land use resource area radius, as defined in EIS Section 3.2. However, more information on the generation and disposal of wastes at the proposed CISF can be found in EIS Section 3.13.2. Some land in the area is used to support road and rail transportation. Road and rail transportation is discussed in more detail in EIS Section 3.3. Regional airports with services regional air carriers provide are located in Carlsbad, Hobbs, and Roswell. Small, general aviation airports are located in Artesia, Jal, and Lovington. An abandoned landing strip that is about 305 m [1,000 ft] long is located 8 km [5 mi] west of the proposed CISF project area (EIS Figure 3.2-6).

3.3 Transportation

This section describes the transportation infrastructure and conditions in the region surrounding the proposed CISF project area as well as the national transportation infrastructure and conditions that would support shipment of SNF to and from the proposed CISF. As described in EIS Section 2.2.1, Holtec has proposed to use roads to ship equipment, supplies, and produced wastes, as well as to move commuting workers during the lifecycle of the proposed CISF project. Rail is proposed as the primary means of transportation for the shipments of SNF to and from the proposed CISF project (Holtec, 2020a).

3.3.1 Regional and Local Transportation Characteristics

EIS Figure 3.2-5 shows parks and recreation areas as well as the transportation corridor of the region surrounding the proposed CISF project area. The major roads in the area consist of county and State roads interconnecting the various population centers, but only four U.S. highways traverse the area. U.S. Highway 285 runs south to north along the Pecos River through Carlsbad and to points south, including Pecos, Texas, where it intersects with Interstate 20. U.S. Highway 62/180 runs southwest to the northeast through Carlsbad, past the location of the proposed CISF project area, and continues northeast to Hobbs, New Mexico, and points beyond to the east in the direction of Fort Worth, Texas. U.S. Highway 82 travels west to east from Artesia through Lovington, New Mexico.

Regional access to the proposed CISF project area is by U.S. Highway 62/180, which is a four-lane highway that connects Carlsbad and Hobbs. In 2015, the New Mexico Department of Transportation (NMDOT) reported annual average daily traffic (AADT) on U.S. Highway 62/180 ranged from approximately 9,952 vehicles per day near Hobbs, to 5,696 vehicles per day near the proposed CISF project area (near the Eddy-Lea County line), to 7,273 vehicles per day near Carlsbad. Commercial trucks represented approximately 43 percent of the vehicles counted near the proposed CISF project area (NMDOT, 2016). U.S. Highway 62/180 is also the final major highway segment on the Waste Isolation Pilot Plant (WIPP) facility transportation route. As of 2022, there have been over13,000 shipments of waste to WIPP, traveling over 24 million km [15 million mi] (DOE, 2021). Additional information about WIPP is in Section 5.1.1.2 of this document.

Local access to the proposed CISF project area from U.S. Highway 62/180 follows Laguna Road. The intersection of Laguna Road with U.S. Highway 62/180 is approximately 0.8 km [0.5 mi] to the south of the proposed CISF project area. Laguna Road travels south to north through the proposed CISF project area and then connects to small county roads north of the proposed CISF project area (Holtec, 2020a).

Two railroads service the region surrounding the proposed CISF project area. To the west of the proposed CISF proposed area, Burlington Northern-Santa Fe (BNSF) operates the Carlsbad Subdivision (Carlsbad to Clovis, plus industrial spurs serving potash mines east of Carlsbad and east of Loving) (BNSF, 2019; Holtec, 2020a). Customers include potash mines, a petroleum refinery in Artesia, and various feed mills and agricultural-related businesses in Roswell and Portales. The Carlsbad spur ends at the Intrepid North potash facility, which is 6.1 km [3.8 mi] west of the proposed CISF project area (Holtec, 2020a). Intrepid reported loading 596 railroad cars in 2018 on this spur, averaging around 50 cars per month (Holtec, 2020a).

East of the proposed CISF project area, the Texas-New Mexico Railroad (TNMR) operates 172 km [107 mi] of track near the Texas-New Mexico border from a Union Pacific connection at Monahans, Texas, to Lovington, New Mexico. The railroad serves the oil fields of West Texas and Southeast New Mexico as well as the Waste Control Specialists (WCS) waste disposal facility. The primary cargo shipped on this track includes oilfield commodities, such as drilling mud and hydrochloric acid, fracking sand, pipe, and petroleum products, including crude oil as well as iron and steel scrap (Watco, 2021). In 2015, the operator estimated approximately 22,500 railroad carloads per year would travel on this rail (USRRB, 2016).

Holtec proposes to construct a new rail spur across uninhabited BLM-managed land due west of the proposed CISF project area to connect the Carlsbad spur located near the Intrepid potash facility to the proposed CISF project area. This extension of the rail line extends the affected environment for the connected action involving the transportation of SNF to and from the proposed CISF project to include the right-of-way for this rail spur and the area surrounding it.

3.3.2 Nationwide Transportation of SNF to and from the CISF

For transportation of SNF from a nuclear power plant site (i.e., the generation sites of SNF that could be transported to the CISF) or ISFSI, the affected environment includes transportation workers and all rural, suburban, and urban populations living along the transportation routes within range of exposure to radiation emitted from the packaged material during normal transportation activities or that could be subjected to nonradiological accident hazards or exposed in the unlikely event of a severe accident involving a release of radioactive material. The affected environment also includes people in rail cars using the same transportation route, people at stops, and workers who are involved with the transportation activities. This discussion of the affected environment supports the radiological and nonradiological impact analyses of transportation of SNF to and from the proposed CISF project (EIS Section 4.3).

All U.S. nuclear power plants sites are serviced by controlled access roads. In addition to the access roads, many of the plants also have railroad connections that can be used for moving heavy loads, including SNF. Some of the plants that are located on navigable waters, such as rivers, the Great Lakes, or oceans, have facilities to receive and ship loads on barges. Power plants that are not served by rail would need to ship SNF by truck or barge to the nearest rail facility that can accommodate an intermodal transfer of the SNF cask (DOE, 2008).

Because no arrangements regarding which nuclear power plants will ship SNF to the proposed CISF have been made yet, the exact locations of SNF shipment origins have not been determined; therefore, the details regarding the specific routes that would be used also are not known at this time. Potential origins of SNF shipments for the proposed action (Phase 1) include existing shut down and decommissioned reactor sites. If the proposed CISF is loaded to full capacity, then it is reasonable to assume that shipments of SNF would come from most or all existing reactor sites nationwide. Additionally, the SNF stored at the proposed CISF project would eventually need to be transported to an offsite geologic repository, in accordance with the national policy for SNF management established in the Nuclear Waste Policy Act of 1982, as amended (NWPA). The NWPA requires that DOE submit an application for a repository at Yucca Mountain, Nevada. Unless and until Congress amends the statutory requirement, NRC assumes that the transportation of SNF from the CISF to a repository will be to a repository at Yucca Mountain, Nevada.

The exact routes for SNF transportation to and from the proposed CISF would be determined in the future, prior to making the shipments. However, to evaluate the potential impacts of these shipments, representative or bounding routes applicable to a national SNF shipping campaign [such as those described and evaluated in Section 2.1.7.2 of DOE's final supplemental environmental impact statement for a geologic repository at Yucca Mountain (DOE, 2008) or NRC's most recent spent nuclear fuel transportation risk assessment in NUREG–2125 (NRC, 2014)] provide sufficient information about potential transportation routes to support the analysis of impacts in Chapter 4 of this EIS. The NRC staff consider the routes evaluated in these prior transportation analyses to be representative or bounding for SNF shipments to and from the proposed CISF project because they were derived based on typical transportation industry route selection practices, they considered existing power plant locations, and they cover large distances across the U.S. with diverse transportation characteristics.

3.4 Geology and Soils

A description of the geology, seismology, and soils within and in the vicinity of the proposed CISF project area is presented in this section. The geology of the proposed CISF project area in southeastern New Mexico is characterized by sediments of Quaternary age in the form of alluvial deposits of both Pleistocene and Recent age and dune sands of Recent age that overlie a thick sequence of complexly interbedded sandstone, shale, limestone, and evaporite deposits of Paleozoic to Tertiary age.

3.4.1 Regional Geology

Information presented in this section on the physiography, structure, and stratigraphy of southern Lea County, where the proposed CISF would be located, is taken largely from Nicholson and Clebsch (1961), Geology and Ground-Water Conditions in Southern Lea County, New Mexico, because this work is considered to be the most comprehensive geology reference available for this portion of New Mexico. Additional references are cited, as applicable.

3.4.1.1 Physiography

The proposed CISF project area is near the boundary of the Pecos Valley and High Plains (also referred to as the Llano Estacado or Staked Plains) sections of the Great Plains physiographic province in southeastern New Mexico (EIS Figure 3.4-1). The primary contrast between the Pecos Valley and High Plains sections is the abrupt change in topographic texture. The Pecos Valley section is a very irregular erosional surface that slopes west-southwestward toward the Pecos River, whereas the High Plains is a depositional surface of low relief that slopes southeastward. The topography of the Pecos Valley section is characterized by areas of interior drainage resulting from collapse due to dissolution, and by vast areas of both stabilized and drifting dune sand.

The proposed CISF project area is located in a vast sand dune area known as the Querecho Plains (EIS Figure 3.4-2). The continuation of this sand dune area to the east is known as the Laguna Valley. Dune sand covering the Querecho Plains and Laguna Valley is stable to semi-stable, but locally drifts. The surface is very irregular and has no drainage features except at the edges of several playas (i.e., dry-lake bed). The dune sand is generally underlain by recent alluvium, but at several locales the sand forms topographic highs where it is underlain by a caliche (i.e., hardened calcic soils) surface. The thickness of the sand deposit ranges from a few centimeters (few inches) to approximately 6 m [20 ft].

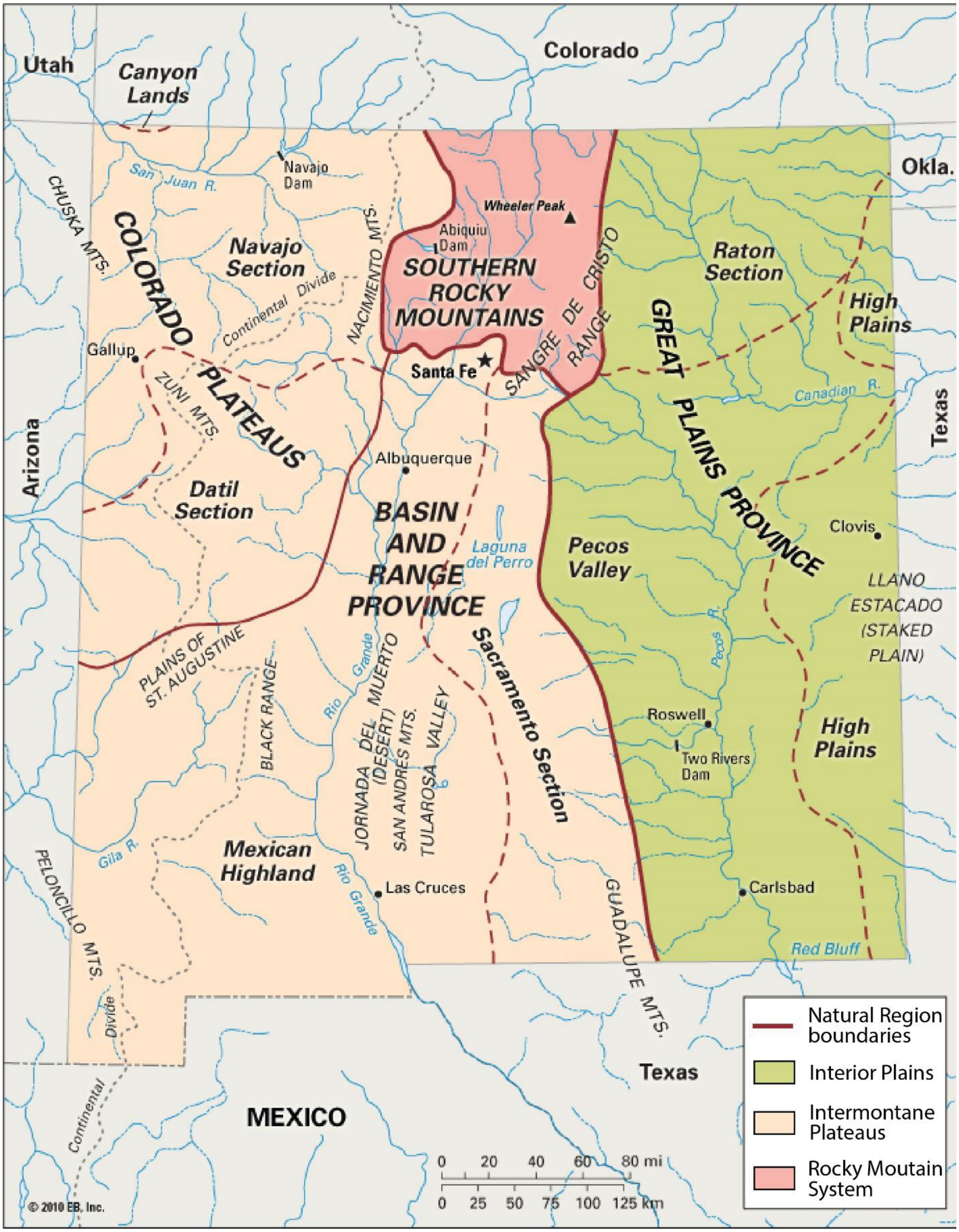

Figure 3.4-1 **Map of Physiographic Provinces in New Mexico (Source: Encyclopedia Britannica, 2010)**

Figure 3.4-2 Map of Physiographic Features in Southern Lea County and Eastern Eddy County, New Mexico (Modified from Holtec, 2020a)

Other prominent physiographic features in the vicinity of the proposed CISF project area include Mescalero Ridge, Nash Draw, Clayton Basin, Grama Ridge, and San Simon Swale. Mescalero Ridge is a prominent topographic feature that marks the southwestern limit of the High Plains. The ridge is located about 11 km [7 mi] northeast of the proposed CISF project area and rises sharply about 46 m [150 ft] above the Querecho Plains to the southwest. Mescalero Ridge is capped by a thick layer of resistant caliche, locally called caprock, which underlies the High Plains. Nash Draw and the Clayton Basin are topographic depressions to the west and southwest of the Querecho Plains. These depressions formed as a result of karstic collapse in response to dissolution (i.e., dissolving) of underlying salt and evaporite beds (Vine, 1963; Hill, 2006; Powers et al., 2006).

Grama Ridge is a topographically high area south to the Querecho Plains with a southwestward-facing scarp that borders San Simon Swale. Grama Ridge is characterized by a hard caliche surface covered in some places by sand, notably on the north where dune sand overlaps from the Querecho Plains. The surface slope and texture of the Grama Ridge area and the composition of the underlying materials indicate that it was once part of the High Plains. San Simon Swale is a large depression covered mostly by dune sand that is bounded on the northeast by Grama Ridge and on the southwest by areas of higher altitude. San Simon Swale is interpreted to have originated from a combination of deep-seated solution subsidence in Tertiary age calcretes and surface erosion of an ancestral tributary of the Pecos River (Bachman and Johnson, 1973).

3.4.1.2 Structure and Stratigraphy

The Permian Basin, a large subsurface structural feature, underlies southeastern New Mexico and a large part of western Texas. Major structural elements of the Permian Basin in southeastern New Mexico, where the proposed CISF project area and the surrounding area would be located, include parts of the Delaware Basin, Capitan Reef Complex, and Central Basin Platform (EIS Figure 3.4-3). The Central Basin Platform is a steeply fault-bounded uplift of basement rocks that forms an abrupt eastern terminus of the Delaware Basin. Between the Delaware Basin and Central Basin Platform is the Capitan Reef Complex. The Delaware Basin, Central Basin Platform, and Capitan Reef are defined on the basis of differing sedimentary depositional environments that existed during Permian (Late Paleozoic) time.

Paleozoic Rocks

During the Early and Middle Paleozoic (Ordovician to Pennsylvanian time period), southeastern New Mexico and western Texas was an embayment covered by a shallow sea that accumulated a thick sequence of marine sediments. In the Late Paleozoic period, Permian age rocks were deposited on an irregular surface formed by Late Pennsylvanian folding. Throughout most of the Permian Period, the Delaware Basin was the site of a deep marine canyon. The Permian Basin subsided more rapidly than the Central Basin Platform and continued to accumulate sediments at times when there was little or no deposition on the platform. During early Permian time, about 3,048 m [10,000 ft] of sediments consisting of sand, shale, and limestone accumulated in the basin. Uplift of the platform was active through the early and middle Paleozoic period such that most of the pre-Permian sedimentary section is missing. In middle Permian time, a back-reef or shelf area composed of limestone (Capitan Reef Complex) began forming along the margins of the basin. Significant reef developments are present through 2,134 m [7,000 ft] of Middle Permian strata along the reef complex. Middle Permian sediments on the south or basin side of the reef (fore-reef, or basin facies) are mostly clastic sandstones and shales, whereas Middle Permian sediments on the north or shelf side of the reef (back reef, or shelf facies) are primarily carbonates. In Late Permian time, sandstone and shale beds in the basin were covered by evaporates and limestone interbedded with dolomite, sand, and shale. The reef created steep slopes toward the center of the basin, and the thickness of sediments increases toward the center of the basin.

The stratigraphy of Permian to Quaternary geologic units in the Delaware Basin is shown in EIS Figure 3.4-4. Permian rocks are divided into four series: Wolfcamp, Leonard, Guadalupe, and Ochoa.

<u>Wolfcamp Series</u>: The Wolfcamp Series consists of dark shale and limestone in the Delaware Basin. The Wolfcamp is present in structurally lower parts of the Central Basin Platform where it consists mostly of limestone, but it thins and is absent in structurally higher parts of the Central Basin Platform. Both the basin and shelf facies of the Wolfcamp are targets for oil and gas exploration (Powers et al., 1978).

<u>Leonard Series</u>: The Leonard Series consists mainly of the Bone Springs limestone. In the basin area, it is black calcareous shale interbedded with black limestone and is as much as 914 m [3,000 ft] thick. Toward the basin margins and in the shelf and platform areas, the Leonard is represented by the Abo reef facies, which has a diverse lithology. The Abo reef facies in southeastern New Mexico is a prolific oil and gas-producing formation.

<u>Guadalupe Series</u>: In the Delaware Basin, the Guadalupe Series is represented by the Delaware Mountain Group, which is subdivided into three formations, from oldest to youngest: Brushy Canyon, Cherry Canyon, and Bell Canyon. Each of these formations is up to 305 m [1,000 ft] thick. These formations consist primarily of sandstones and shales in the basin facies and limestones in the shelf facies and are important oil and gas exploratory targets

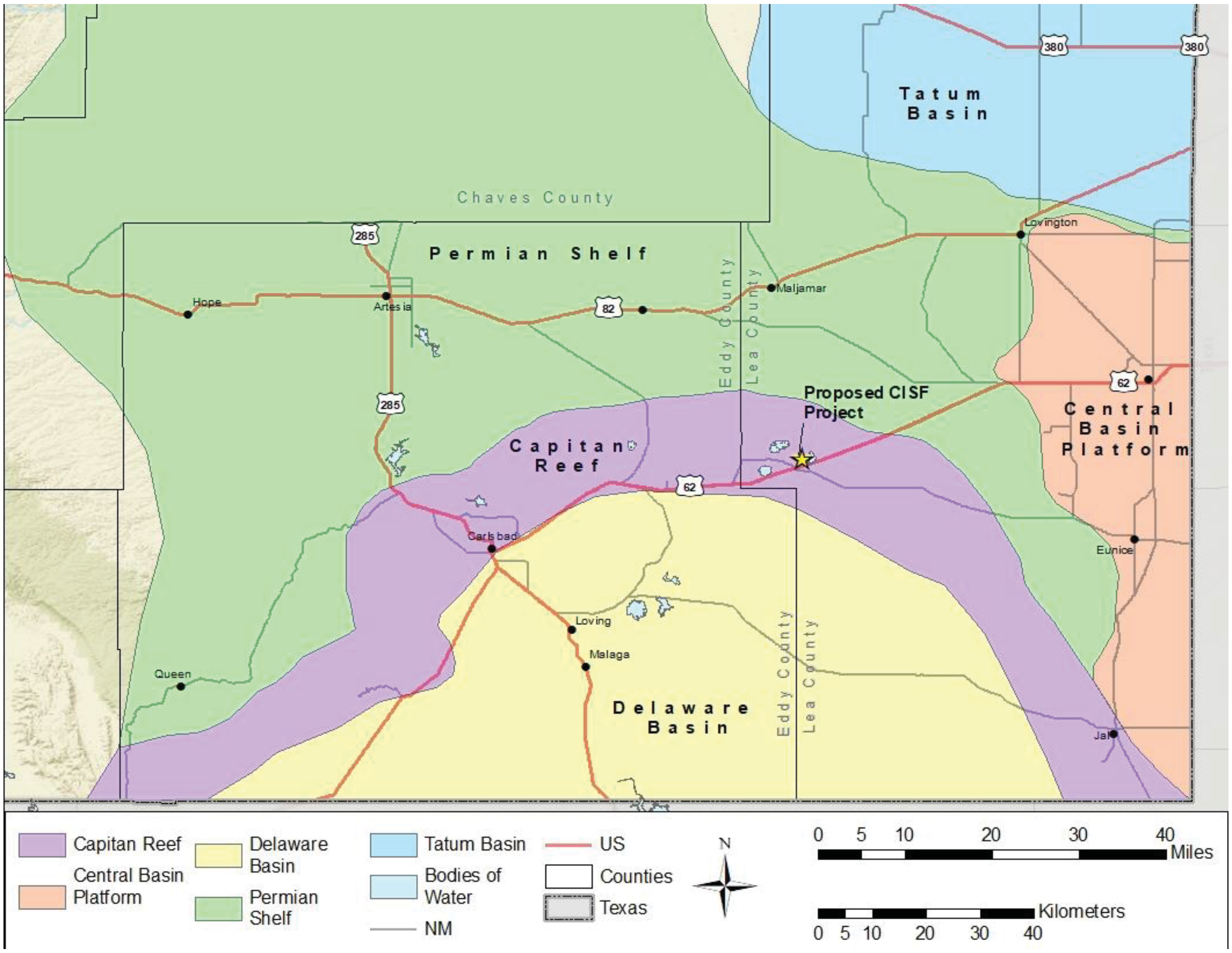

Figure 3.4-3 Major Geologic Regions of the Permian Basin of West Texas and Southeastern New Mexico (Source: Jerina, 2014)

(Vertrees et al., 1959). Toward the margins of the basin, the upper two formations of the Delaware Mountain Group (Cherry Canyon and Bell Canyon) grade into the Capitan reef facies. The Capitan is a fossiliferous, locally vuggy (i.e., consisting of small-to-medium sized cavities or voids) limestone and breccia (Hayes, 1964). The Capitan forms an arc around the west, north, and east margins of the Delaware Basin (EIS Figure 3.4-3).

Ochoa Series: The Ochoa Series consists mainly of evaporates deposited during regressions of shallow sea waters. The Ochoa is represented from oldest to youngest by the following geologic units: Castile Formation, Salado Formation, Rustler Formation, and Dewey Lake Redbeds. The Castile Formation consists primarily of anhydrite but contains some halite beds. The Castile rests unconformably on the Delaware Mountain Group but does not extend beyond the basin margin. The Castile Formation ranges in thickness from zero to about 549 m [1,800 ft]. The Salado Formation overlies the Castile Formation and extends across both the Delaware Basin and Central Basin Platform. The Salado ranges in thickness from zero to about 610 m [2,000 ft]. It consists mainly of halite with some anhydrite. The Salado also contains significant accumulations of potash mineral ore (Vine, 1963). Overlying the Salado Formation is the Rustler Formation, which consists primarily of anhydrite but includes red beds and halite.

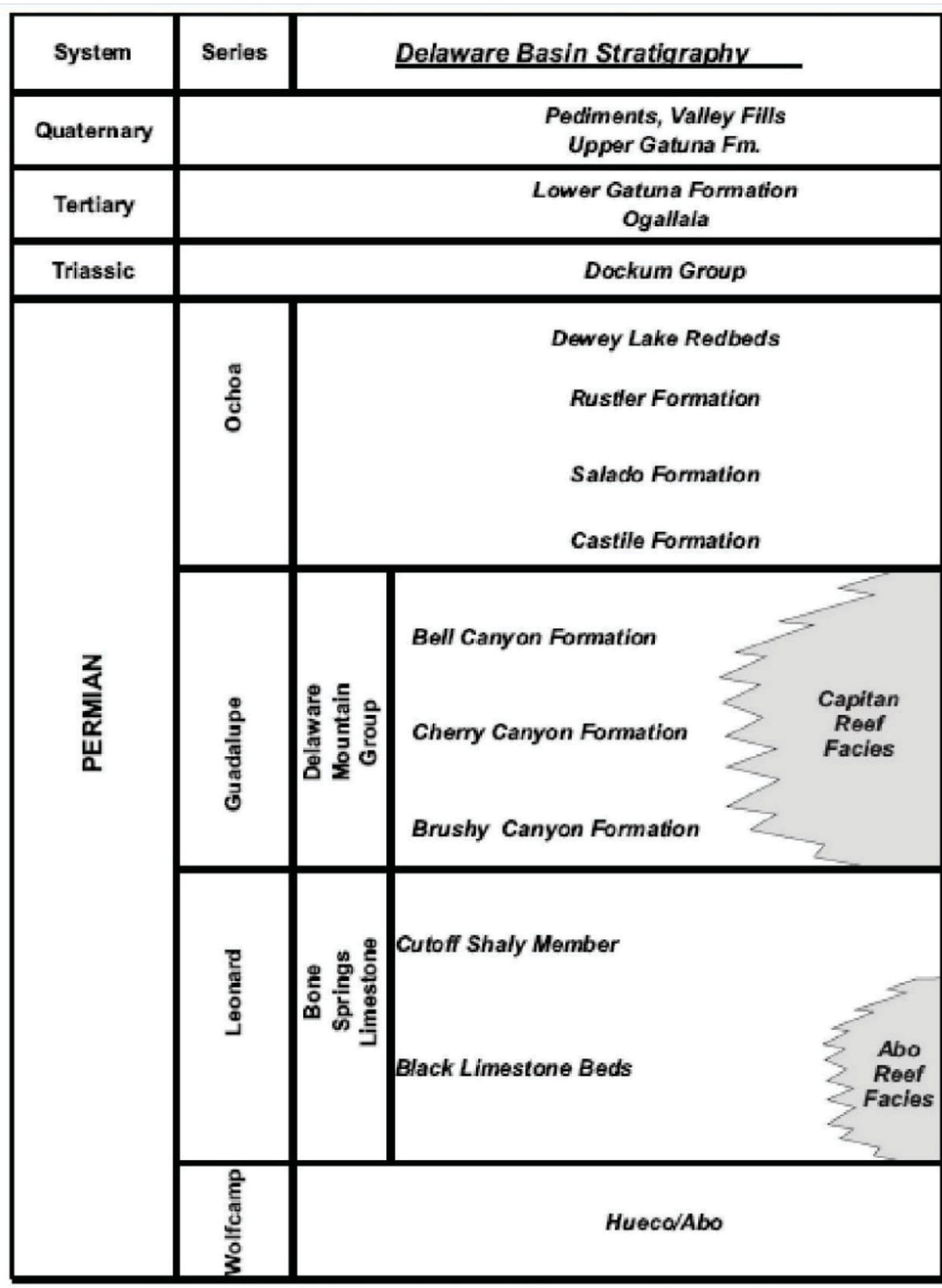

Figure 3.4-4 Stratigraphy of Permian to Quaternary-Aged Geologic Units in the Delaware Basin (Source: ELEA, 2007)

The Rustler ranges in thickness from 27 to 110 m [90 to 360 ft]. The Dewey Lake Redbeds overlie the Rustler Formation and are represented by about 183 m [600 ft] of red siltstone, shale, and sandstone commonly cemented by gypsum. This unit is laterally extensive and was deposited in shallow water remaining in the Delaware Basin before final sea regression (Mercer and Orr, 1977).

Mesozoic Rocks

In the Delaware Basin area, the Mesozoic era is represented only by Upper Triassic rocks of the Dockum Group (EIS Figure 3.4-4). The Dockum Group is separated from the Upper Permian age Dewey Lake Redbeds by an erosional unconformity. The Dockum Group is represented by the Santa Rosa Sandstone and the overlying Chinle Formation; however, the distinction between these two units cannot be made throughout the area, because of lithologic similarities and poor exposures. The Santa Rosa is fine- to coarse-grained sandstone containing minor shale layers. The thickness of the Santa Rosa ranges from about 43 m [140 ft] to more than 91 m [300 ft]. The overlying Chinle Formation ranges in thickness from zero to 387 m [1,270 ft]. The formation is thickest in the eastern part of the basin and is entirely absent in the western part, where it has been removed by erosion. The Chinle consists mainly of red and green claystone but also contains minor fine-grained sandstone and siltstone.

Cenozoic Rocks

Tertiary rocks in southeastern New Mexico are represented by the Ogallala Formation of Pliocene age. The Ogallala consists of up to 122 m [400 ft] of calcareous sand, gravel, silt, and clay deposited over an irregular terrain (Bachman, 1976). The Ogallala is capped by a layer of dense caliche, which ranges in thickness from a few meters [feet] to as much as 18 m [60 ft]. Following the Pliocene, the Ogallala was removed by erosion in much of southwestern Lea County and eastern Eddy County. The Ogallala remains beneath the High Plains (Central Basin Platform) and Grama Ridge in Lea County. The caliche capping the Ogallala is resistant to erosion and forms a prominent ledge along Mescalero Ridge.

Sediments of Quaternary age in southern Lea County are present in the form of alluvial deposits of both Pleistocene and Recent age and dune sands of Recent age. The alluvium was deposited in low-lying areas where the Ogallala Formation had been stripped away. The dune sands mantle the older alluvium and the Ogallala Formation over most of the area. The older alluvium formed the Gatuna Formation, which is likely of early to middle Pleistocene age. The Gatuna underlies the Querecho Plains, Laguna Valley, San Simon Swale, and several smaller areas in southern Lea County. The Gatuna is up to several hundred meters [several thousand feet] thick and consists of reddish brown friable sandstone, siltstone, and siliceous conglomerate with local gypsum and claystone (Powers et al., 1978). The dune sands are stable or semi-stable over most of the area but are actively drifting in some places. The thickness of the dunes ranges from a few centimeters [inches] to 9 m [30 ft], but generally the sand forms a veneer 1.5 to 3 m [5 to 10 ft] thick.

Across much of southeastern New Mexico, laterally extensive caliche deposits called the Mescalero are present above the Gatuna Formation and other alluvial materials. The Mescalero is considered the remnant of an extensive soil profile and is described as a sandy light gray to white lower nodular and upper laminar caliche zone ranging in thickness from 1 to 3 m [3 to 10 ft] (Bachman, 1973).

3.4.2 Site Geology

A map showing the topography within and in the vicinity of the proposed CISF project area is depicted in EIS Figure 3.4-5. Ground elevation ranges from about 1,067 to 1,082 m [3,500 ft to

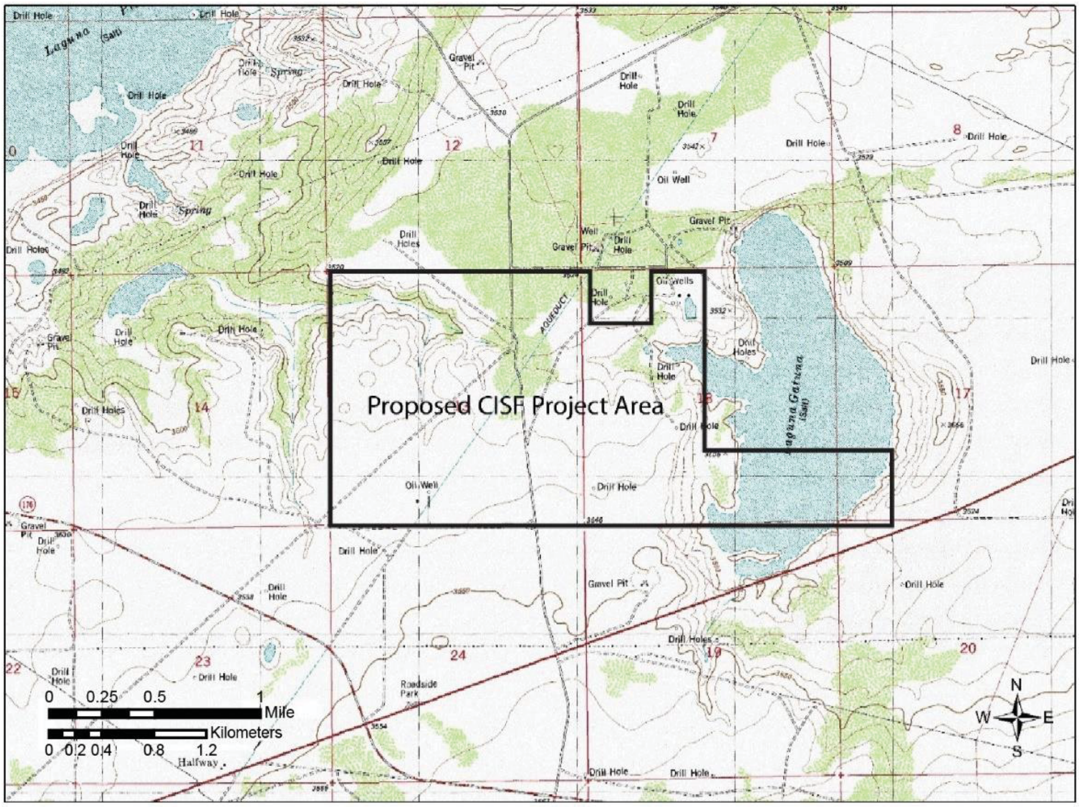

Figure 3.4-5 Topographic Map of the Proposed CISF Project Area and Surrounding Area (Source: USGS, 2013)

3,550 ft] across the proposed CISF project area. Ground elevation is highest along the southern boundary of the proposed CISF project area and slopes gently northward and eastward toward two drainages. One of these drainages leads to Laguna Plata to the northwest and the other drainage leads to Laguna Gatuna to the east.

A map showing surface geology within and in the vicinity of the proposed CISF project area is depicted in EIS Figure 3.4-6. The ground surface at the proposed CISF project area is covered by a laterally extensive veneer of Quaternary alluvial deposits. Drillhole logs indicate that the alluvial deposits range from 7.6 to 12.2 m [25 to 40 ft] in thickness across the proposed CISF project area and consist of surface soil (topsoil), a caliche caprock, and underlying residual soil (ELEA, 2007; Holtec, 2020b; GEI Consultants, 2017). Topsoil covering the ground surface ranges from 0 to 0.6 m [0 to 2 ft] in thickness and consists of varying amounts of sand and clay (Holtec, 2020b; GEI Consultants, 2017). A laterally continuous layer of caliche (referred to as the Mescalero) is present beneath the topsoil. The caliche ranges from 0.6 to 4.1 m [2 to 13.5 ft] in thickness across the proposed CISF project area (ELEA, 2007; Holtec, 2020b; GEI Consultants, 2017). Residual soil consisting of clayey sand or sandy clay with trace gravel is present beneath the caliche. The residual soil ranges from 5.2 to 8.5 m [17 to 28 ft] in thickness across the proposed CISF project area (ELEA, 2007; GEI Consultants, 2017).

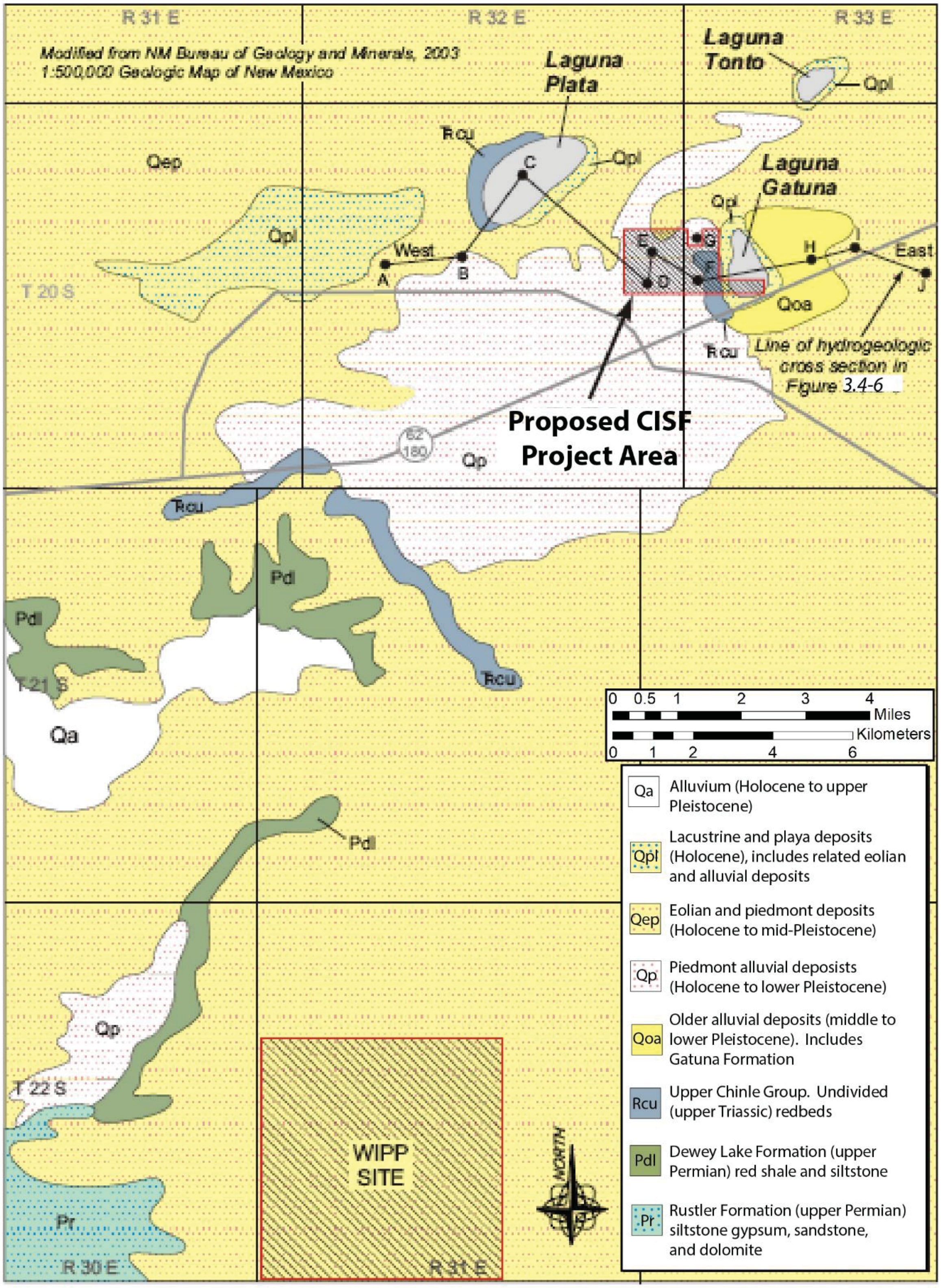

Figure 3.4-6 Map of Surface Geology Within and in the Vicinity of the Proposed CISF Project Area (Modified from ELEA, 2007)

A geologic cross-section showing subsurface stratigraphy within and in the vicinity of the proposed CISF project area is depicted in EIS Figure 3.4-7. The geologic cross-section was constructed from available oil and water well logs (ELEA, 2007). Quaternary alluvial deposits within and surrounding the proposed CISF project area (described previously) are underlain by bedrock of the Triassic Dockum Group (ELEA, 2007; Holtec, 2020b). As described previously, the Dockum Group is composed of shale, siltstone, and sandstone of the Santa Rosa Formation and the overlying Chinle Formation. Lithologic information from geotechnical borings within the proposed CISF project area indicate that the Chinle Formation is encountered at depths from 8.4 to 12.3 m [27.5 to 40.5 ft] and consists of poorly indurated mudstone with interbedded lenses of moderately to well indurated siltstones and conglomerate (GEI Consultants, 2017). Results of eight *in-situ* permeability tests performed in the Chinle Formation ranged from 3.2×10^{-7} to 7.7×10^{-6} cm/s [1.2×10^{-7} to 3.0×10^{-6} in/s], indicating very low permeability material (GEI Consultants, 2017). The Santa Rosa Formation was encountered at a depth of about 65.5 m [215 ft] in the geotechnical borings and consists of fine- to coarse-grained sandstone, with minor reddish-brown siltstones and conglomerates (GEI Consultants, 2017).

Results of two *in-situ* permeability tests performed in the Santa Rosa Formation indicated permeability in the range of 3.4×10^{-7} to 9.2×10^{-7}cm/s [1.3×10^{-7} to 3.6×10^{-7} in/s], indicating very low permeability material (GEI Consultants, 2017). Geotechnical borings were terminated before reaching the base of the Santa Rosa Formation (GEI Consultants, 2017); however, information from well logs indicate that the Dockum Group (Chinle and Santa Rosa Formations) is about 183 m [600 ft] thick beneath the proposed CISF project area (EIS Figure 3.4-7).

The Dockum Group at the proposed CISF project area is underlain by the Upper Permian Dewey Lake Redbeds, which is about 152 m [500 ft] thick beneath the proposed CISF project area (EIS Figure 3.4-7).

3.4.3 Soils

As described in Section 3.4.2, surface soil (topsoil) at the proposed CISF project area ranges from 0 to 0.6 m [0 to 2 ft in] thickness and consists of varying amounts of sand and clay (Holtec, 2020b; GEI Consultants, 2017). A soil survey map of the proposed CISF project area is depicted in EIS Figure 3.4-8. The Simona fine sandy loam (SE) and Simona-Upton association (SR) compose the majority (about 60 percent) of soils within the proposed CISF project area. SE and SR soils are located in the south central, southeastern, and north central portions of the proposed CISF project area. These soils are calcareous eolian deposits derived from sedimentary rocks and consist of fine sandy loam underlain by gravelly fine sandy loam.

Other soils mapped within the proposed CISF project area include Badland (BD), Jal association (JA), Largo-Pajarito complex (LP), and Playas (PB) (EIS Figure 3.4-8). These soils occur along the eastern boundary of the proposed CISF project area within and surrounding Laguna Gatuna. All of these soils are derived from sedimentary rocks. BD soils are erosional remnants of bedrock alluvium and eolian deposits that occur along slopes leading to Laguna Gatuna. JA soils are calcareous alluvium and eolian deposits consisting of sandy loam and loam that occur along the rim of Laguna Gatuna. LP soils are calcareous loamy alluvium consisting of loam and silty clay loam that occur along backslopes of Laguna Gatuna.

PB soils are mixed alluvium and lacustrine deposits consisting of silty clay loam and clay that occurs on the floor of Laguna Gatuna.

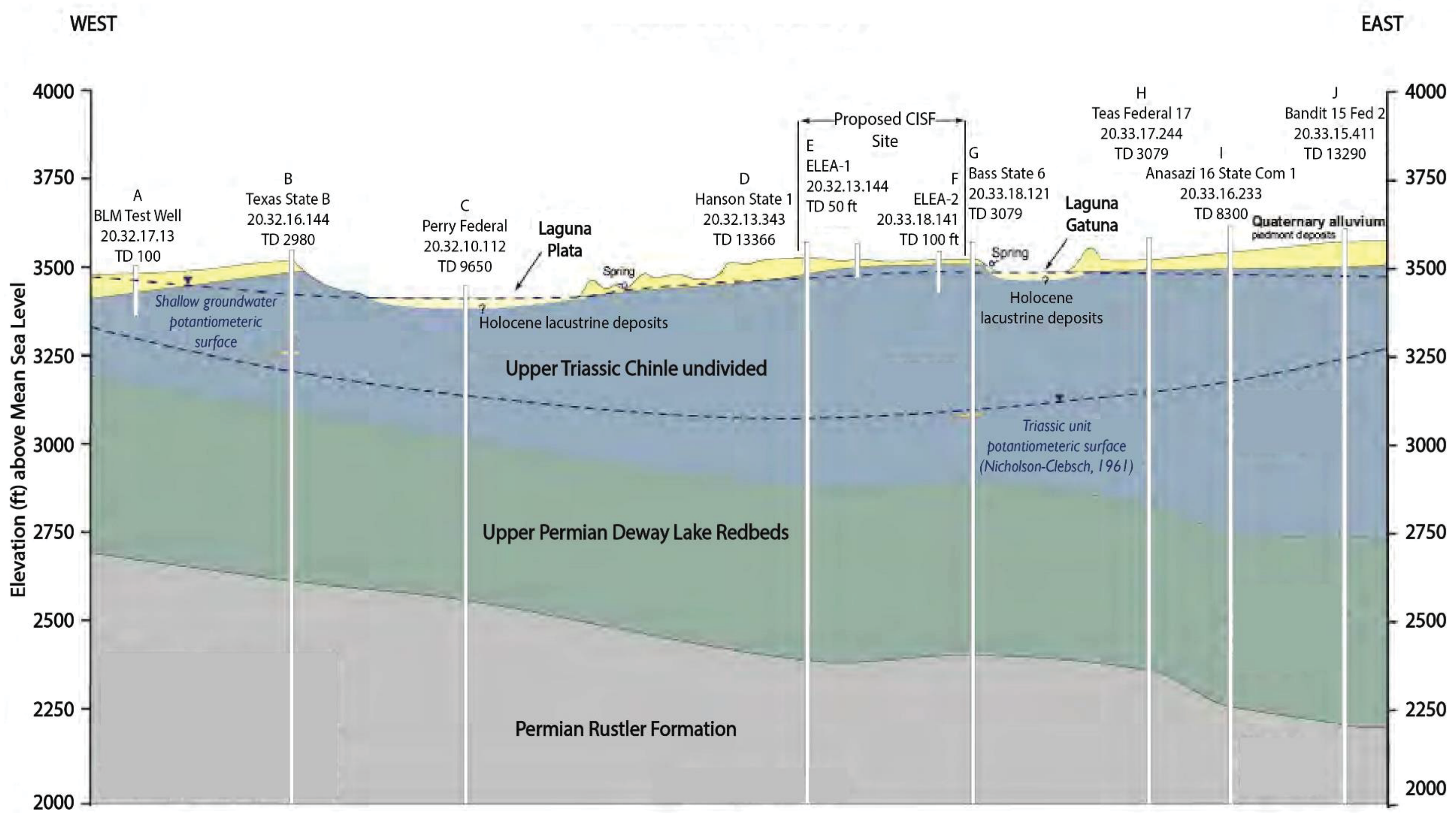

Figure 3.4-7 Hydrogeologic Cross-Section (Modified from ELEA, 2007)

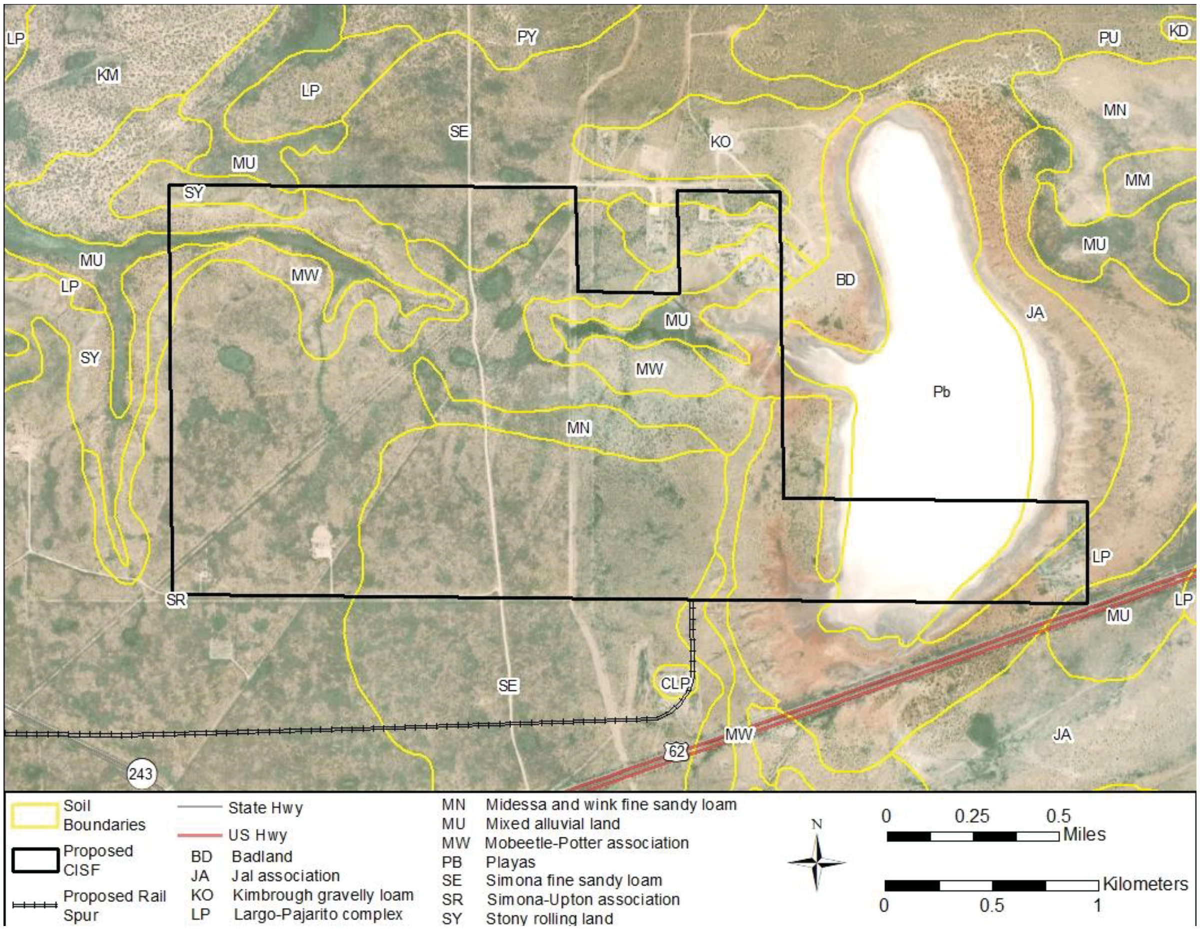

Figure 3.4-8 Soil Survey Map of Proposed CISF Project Area (Source: USDA, 2019a)

3.4.4 Seismicity

Seismic source zones within 320 km [200 mi] of the proposed CISF project area include the Rio Grande Rift located to the west and southwest and the Central Basin Platform located to the east (EIS Figure 3.4-9). Prior to 1962, earthquake activity in New Mexico was mostly limited to the Rio Grande Rift region. Earthquakes recorded by the USGS from 1973 to August 2017 in the region surrounding the proposed CISF project area are shown in EIS Figure 3.4-9. Most of these earthquakes have had low to moderate magnitude (Richter scale magnitudes between 2.5 and 5.0). From 1973 to August 2017, the majority of earthquake activity was located southeast of the proposed CISF project area in west Texas, to the west/northwest in central New Mexico, and to the southwest along the Mexico-Texas border (EIS Figure 3.4-9). The closest earthquake to the proposed CISF project area occurred on March 18, 2012. This earthquake was located about 39 km [24 mi] southwest of the proposed CISF project area and had a magnitude of 3.1. The seismic information also indicates a cluster of earthquakes (typically 2.5 to 4.0 magnitude) located about 80.5 km [50 mi] west of the proposed CISF project area (EIS Figure 3.4-9). This cluster of seismic activity is suspected to be induced by wastewater injection from natural gas production into deep wells (ELEA, 2007; Holtec, 2020a). Four earthquakes with magnitudes of 5.0 or above have occurred within 320 km [200 mi] of the

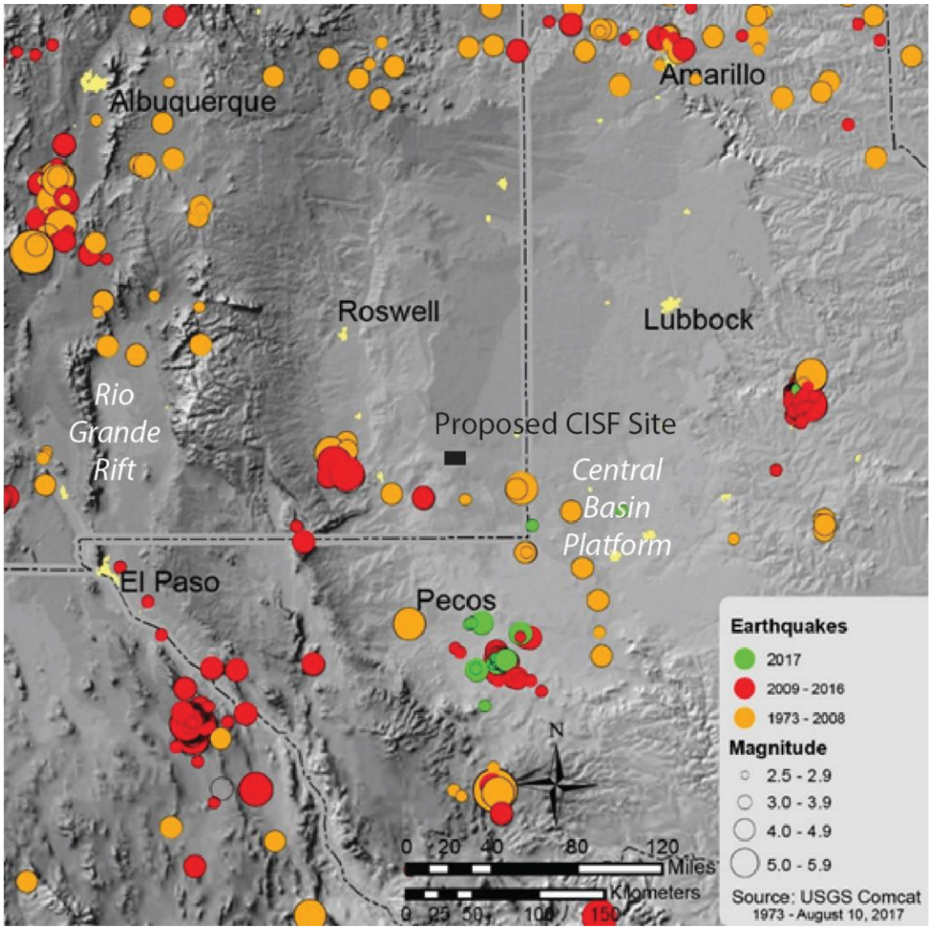

Figure 3.4-9 Earthquakes in the Region of the Proposed CISF Project Area from 1973 to August 10, 2017 (Modified from USGS, 2017)

proposed CISF project area. The Valentine, Texas, earthquake occurred on August 16, 1931, and had a magnitude of 6.5. This earthquake was located about 225 km [140 mi] southwest of the proposed CISF project area. A recent magnitude 5.0 earthquake was recorded in west Texas near the New Mexico border on March 26, 2020, about 80.5 km [50 mi] west of the proposed CISF project area.

On January 2, 1992, an earthquake with a magnitude of 5.0 was recorded near Eunice. This earthquake was located about 63 km [39 mi] east of the proposed CISF project area. On April 14, 1995, an earthquake with a magnitude of 5.7 was recorded near Alpine, Texas, about 265 km [165 mi] south of the proposed CISF project area.

Earthquakes recorded by the USGS from August 2017 to November 2020 in the region surrounding the proposed CISF project area are shown in EIS Figure 3.4-10. During this timeframe, the most active seismic areas within 320 km [200 mi] of the proposed CISF project area are in west Texas to the south and southeast (EIS Figure 3.4-10). The seismicity in this area correlates with the locations of oil and gas fields and is likely induced by production, secondary recovery, and waste injection into deep wells (ELEA, 2007; Holtec, 2020a). Clusters

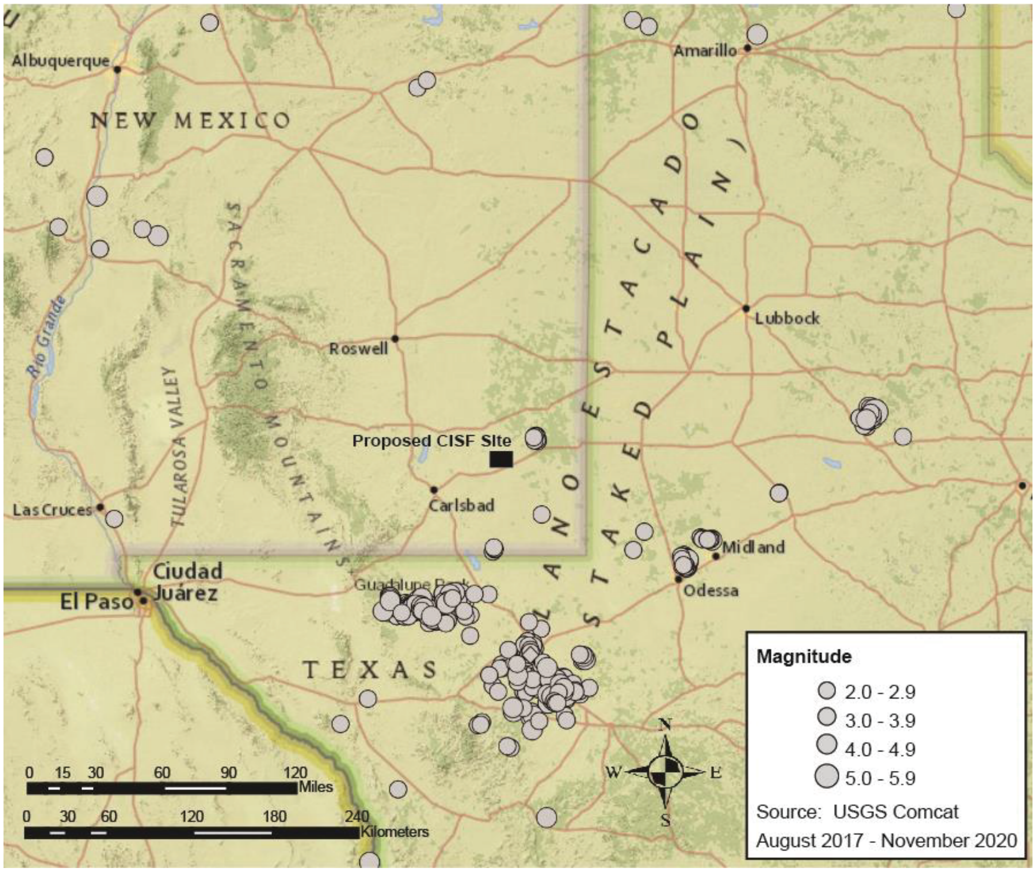

Figure 3.4-10 Earthquakes in the Region of the Proposed CISF Project Area from August 2017 to December 2020 (USGS, 2020)

of earthquakes associated with the locations of oil and gas fields in west Texas typically have magnitudes ranging from 2.5 to 4.0 (EIS Figure 3.4-10). In addition to the earthquakes recorded by the USGS in Figure 3.4-10, seismic monitoring networks operated by the University of Texas Bureau of Economic Geology (BEG) and the New Mexico Tech Seismological Observatory (NMTSO) have recorded over 2,500 earthquakes in southeastern New Mexico and west Texas since August 2017 (BEG, 2020; NMTSO, 2020). These earthquakes typically have magnitudes ranging from 2.0 to 4.0 (Holtec, 2020a). As shown in EIS Figure 3.4-10, between August 2017 and December 2020, the closest seismic activity to the proposed CISF project area was a cluster of earthquakes with magnitudes ranging from 2.3 to 3.1 that occurred in June 2020 approximately 29 km [18 mi] northeast of the proposed CISF site (Figure 3.4-10).

A recent study conducted by Snee and Zoback (2018) used stress data to estimate or model the potential for slip on mapped faults across the Permian Basin in response to injection-related pressure changes at depths that might be associated with future oil and gas development activities. This study concluded that existing faults located in the northeastern Delaware Basin where the proposed project area is located are unlikely (<10 percent probability) to slip in response to fluid-pressure increase (Snee and Zoback, 2018).

A seismic hazard map of the southwestern U.S. showing earthquake ground motion (peak ground acceleration) for a probability of 10 percent in the next 50 years is depicted in EIS Figure 3.4-11. For southeastern New Mexico where the proposed CISF project area is located, EIS Figure 3.4-11 shows that there is a 10 percent probability that an earthquake will occur with a ground motion of 0.01 to 0.02 standard gravity in the next 50 years. This means that there is a 10 percent probability that an earthquake will occur in the next 50 years that will cause the ground to move at a rate of 0.098 to 0.196 m/s^2 [0.32 to 0.64 ft/s^2], which corresponds to a Modified Mercalli Intensity Scale of III to IV (or a Richter Scale magnitude of 3 to 4). An earthquake with a Modified Mercalli Intensity of III (or Richter Scale magnitude of 3) would slightly shake a building similar to when a heavy truck passes by a house, while an earthquake with a Modified Mercalli Intensity of IV (or Richter Scale magnitude of 4) would cause pictures to fall off walls and furniture to move. This actual amount of damage that could result from ground motions depends on factors such as the distance to the epicenter of the earthquake, duration of shaking, attenuation of the earthquake energy as it propagates from the epicenter to the location, and the local amplification caused by the location's near-surface soil conditions.

The location of Quaternary-age faults in the southwestern U.S. are depicted in EIS Figure 3.4-12. Quaternary faults are those that have been active during the past 1.6 million years (USGS, 2018a). The closest Quaternary-age fault to the proposed CISF project area is the Guadalupe Fault located about 85 mi to the southwest (EIS Figure 3.4-12). The Guadalupe Fault is a normal fault with a slip rate of less than 0.2 mm/yr [0.01 in/yr] (USGS, 2018a). The Guadalupe Fault is a capable fault (i.e., it has exhibited movement at or near the ground surface at least once within the past 35,000 years, as defined in 10 CFR 100, Appendix A.III). Within a 320 km [200 mi] radius of the proposed CISF project area, numerous other Quaternary-age faults are located to the west and southwest. These faults are within or along the margins of the Rio Grande Rift of central New Mexico. In addition to the Guadalupe Fault, three other capable faults are located within a 200-mi radius of the proposed CISF project area: the Alamogordo, San Andres Mountains, and East Franklin Mountains faults (EIS Figure 3.4-12). All of these faults are normal faults with slip rates of less than 0.2 mm/yr [0.01 in/yr] (USGS, 2018a).

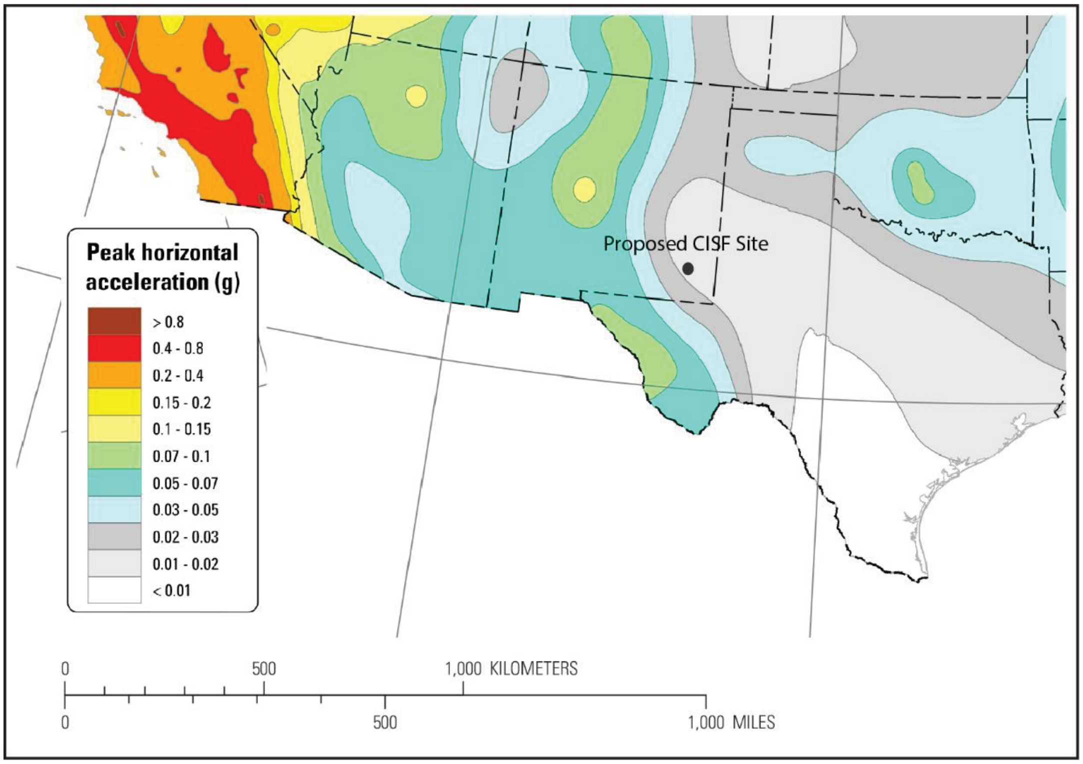

Figure 3.4-11 National Seismic Hazard Map Showing the 10 Percent Probability of Exceeding a Peak Ground Acceleration (PGA) in 50 Years (Modified from USGS, 2018b)

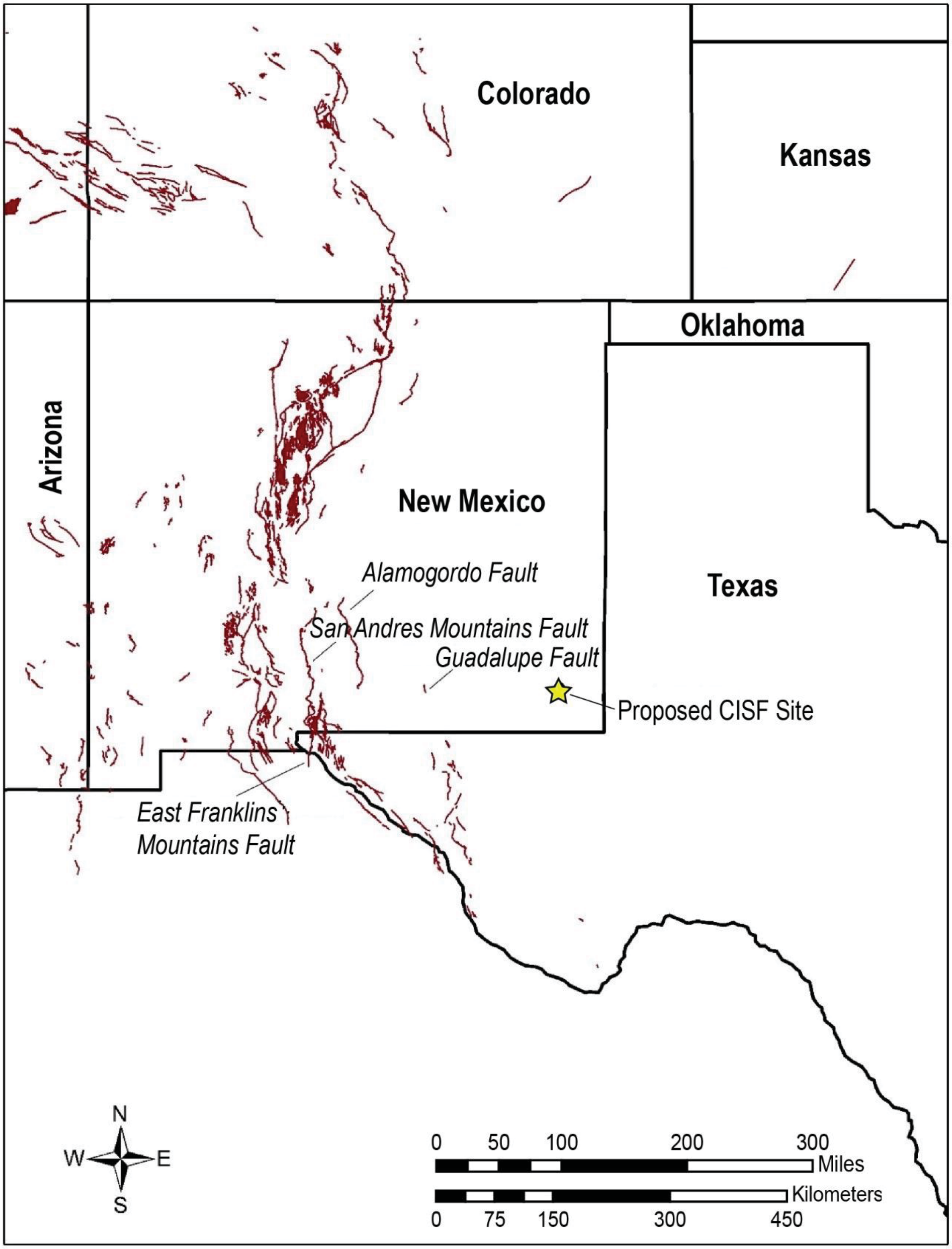

Figure 3.4-12 Quaternary Faults in the Southwestern U.S. (Source: USGS, 2018a)

3.4.5 Subsidence and Sinkholes

Sinkholes and karst fissures formed in gypsum bedrock are common features of the lower Pecos region of west Texas and southeastern New Mexico. New sinkholes form almost annually, often associated with upward artesian flow of groundwater from regional karstic aquifers that underline evaporitic rocks at the surface (Land, 2003, 2006). A number of these sinkholes are of anthropogenic (man-made) origin and are associated with improperly cased abandoned oil and water wells, or with solution mining of salt beds in the shallow subsurface (Land, 2009, 2013). The location of anthropogenic sinkholes and dissolution features in southeastern New Mexico and west Texas are shown in EIS Figure 3.4-13 and include the Wink, Jal, Jim's Water Service, Loco Hills, and Denver City sinkholes and the I&W Brine Well. All of these features formed around a well location and the sinkholes have diameters ranging from 30 to over 213 m [100 to over 700 ft] in diameter (Land, 2013). The Wink sinkholes in Winkler County, Texas, are approximately 120 km [75 mi] southeast of the proposed CISF project area and probably formed by dissolution of salt beds in the upper Permian Salado Formation that resulted from an improperly cased, abandoned oil well (Johnson et al., 2003). The Jal Sinkhole near Jal is approximately 80 km [50 mi] southeast of the proposed CISF project area and also probably formed by dissolution of salt beds in the Salado Formation caused by an improperly cased water well (Powers, 2003). The Jim's Water Service Sinkhole, Loco Hills Sinkhole, Denver City Sinkhole, and I&W Brine Well resulted from injection of freshwater into underlying salt beds and pumping out the resulting brine for use as oilfield drilling fluid (Land, 2013). The Jim's Water Service, Loco Hills, and Denver City sinkholes are located in relatively remote areas; however, the I&W Brine Well is located in a more densely populated area within the City of Carlsbad (EIS Figure 3.4-13). Recent studies employing satellite imagery have identified movement of the ground surface across an approximate 10,360 km^2 [4,000 mi^2] area of west Texas that includes Winkler, Ward, Reeves, and Pecos counties (Kim et al., 2016; SMU Research News, 2018). In one area, as much as 102 cm [40 in] of subsidence was identified over the past 2.5 years. This area is about 0.8 km [0.5 mi] east of the Wink No. 2 sinkhole in Winkler County, Texas, where there are two subsidence bowls. The rapid sinking in this area is most likely caused by water leaking through abandoned wells into the Salado Formation and dissolving salt layers (SMU Research News, 2018).

Another recent study employing satellite imagery identified a significant amount of subsidence in several distinct areas located within potash mining areas east of Carlsbad (Zhang et al., 2018). Subsidence caused by potash mining results from the collapse of strata above the mining level. In response to this collapse, the overlying and surrounding rock deforms, which may result in surface collapse (subsidence) and potential sinkhole development. As a general rule, the amount of subsidence (i.e., the depth of surface collapse) cannot exceed the thickness of mined potash zone. The areas of distinct subsidence the satellite imagery study identified are located approximately 16 km [10 mi] west-southwest of the proposed CISF project area (Zhang et al., 2018). The authors of the study found little correlation between the rate of subsidence and groundwater levels or precipitation, suggesting that the subsidence was not induced by natural occurrence. Instead, the authors observed a strong correlation between the rate of subsidence and the potash production rate, indicating that potash extraction is the cause of the subsidence (Zhang et al., 2018).

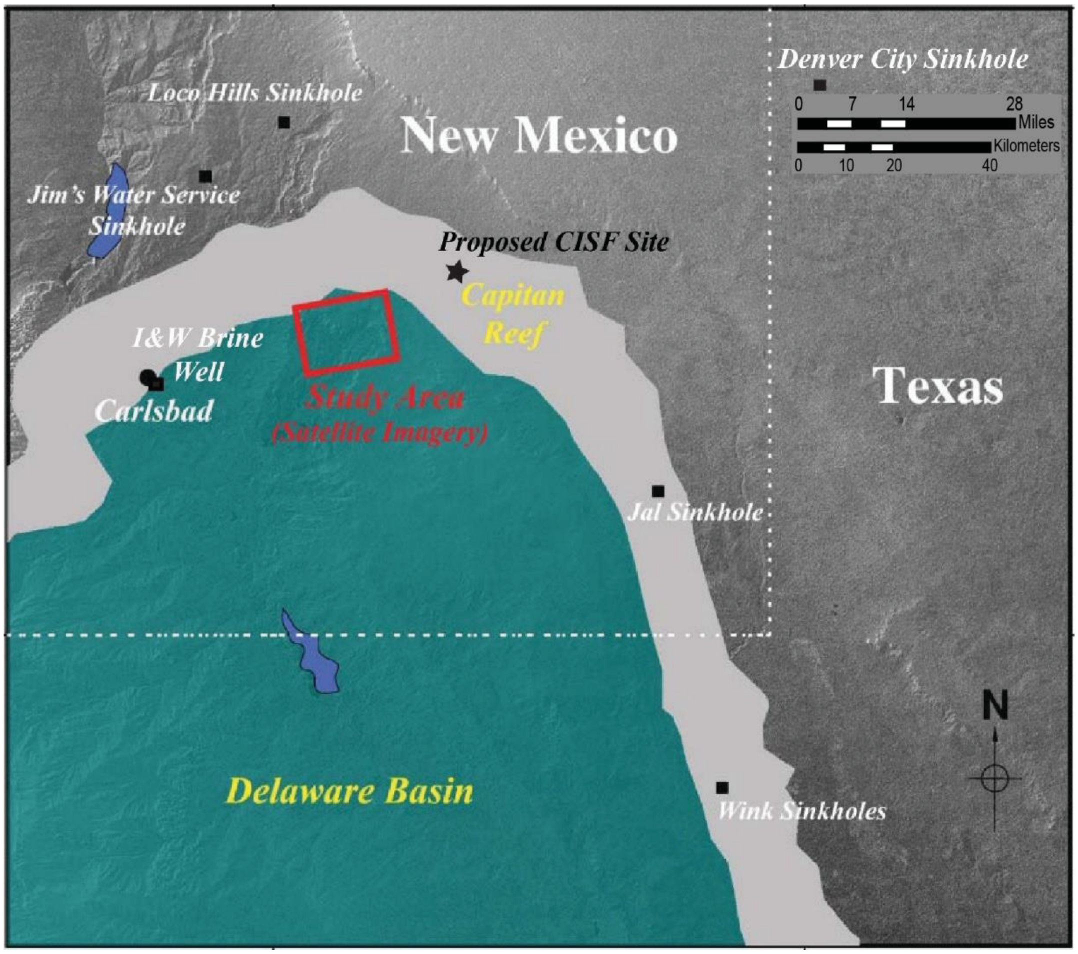

Figure 3.4-13 Regional Map of Southeastern New Mexico and West Texas Showing Locations of Anthropogenic Sinkholes and Satellite Imagery Study Area Discussed in the Text (Modified from Zhang et al., 2018)

3.5 <u>Water Resources</u>

This section presents a description of water resources, including surface water and groundwater hydrology, water use, and water quality within and in the vicinity of the proposed CISF project area.

3.5.1 Surface Water Resources

3.5.1.1 Surface Water Features and Flow

The proposed CISF project area lies within the Pecos River drainage basin, as shown in EIS Figure 3.5-1. The Pecos River generally flows year-round and extends from northern New Mexico to its confluence with the Rio Grande in southwest Texas. Tributaries convey rainfall and snowmelt to the Pecos River mainstream. Major tributaries supplying water to the Pecos River drain from the western mountains eastward. A few of these major tributaries have perennial flow, but none maintains a surface flow over its entire length. The vast majority of tributaries to the Pecos River flowing westward are ephemeral arroyos and many of the surface

Figure 3.5-1 Map of the Pecos River Drainage Basin (Source: Modified from USGS, 2018c)

drainage features east of the Pecos River are closed depressions that do not provide surface flow to the Pecos.

The proposed CISF project area is located 42 km [26 mi] east of the Pecos River (EIS Figure 3.5-1) in the Laguna Plata drainage subbasin (EIS Figure 3.5-2). No perennial streams are located within the proposed CISF project area. Surface drainage at the proposed CISF project area flows into two ephemeral playa lakes having no external drainage: Laguna Gatuna to the east and Laguna Plata to the northwest (EIS Figure 3.5-2). The NRC identified two other ephemeral playa lakes (Laguna Tonto to the northeast and Laguna Toston to the southwest) within 10 km [6 mi] of the proposed CISF project area. The New Mexico Environmental Department (NMED) informed the NRC staff of the presence of, what NMED identified as approximately 20 circular playas within or adjacent to the proposed CISF footprint. According to NMED, these playas are freshwater playas and are different from saline playas in both form and origin. NMED also stated that these waters may be protectable as surface

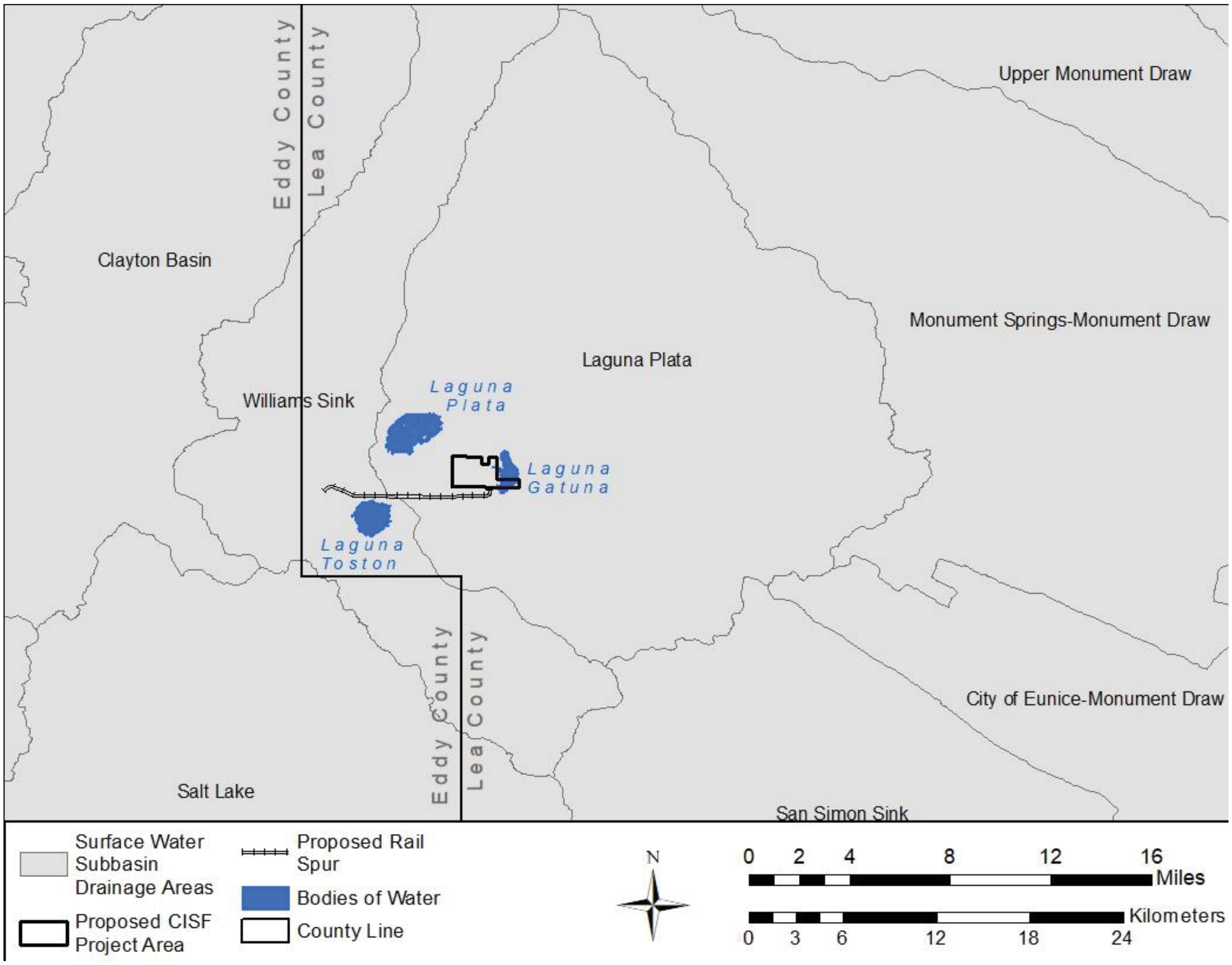

Figure 3.5-2 Map of Subbasin Drainage Areas in the Vicinity of the Proposed CISF Project Area (Source: NRCS, 2005)

waters of New Mexico. The NRC staff reviewed ecological surveys of the proposed project area and maps of probable playa lakes in Lea County, New Mexico (Holtec, 2020a; ELEA, 2007; Playa Lakes Joint Venture, 2019). Neither of the two ecological surveys of the proposed CISF project area, which are further described in EIS Section 3.6, identified any clusters of vegetation that NMED described as indicative of these playas, suggesting that they occur intermittently (Holtec, 2020a; ELEA, 2007).

Laguna Gatuna covers a surface area of 1.4 km^2 [0.54 mi^2], has an average depth of 3 m [10 ft], and has a total shoreline of 6.4 km [4 mi] (Holtec, 2020b). The playa lake drains a watershed that covers approximately 440 km^2 [170 mi^2].

Laguna Gatuna is generally dry. Water in the playa comes from surface water drainage after precipitation events. Precipitation events in this area are usually in the form of erratic, unpredictable, and sometimes violent thunderstorms, which can leave several centimeters [inches] of rainfall in Laguna Gatuna in a relatively short period of time (Holtec, 2020a). Historically, the months of July and August are the wettest of the year.

Between 1969 and 1992, Laguna Gatuna was used by multiple facilities for collection and discharge of brines produced from oil and gas wells in the area. During this time, facility permits authorized discharge of almost 1 million barrels of oilfield brine per month. As a result of these discharges, shallow groundwaters in the areas adjacent to the playa lake have become brines (Holtec, 2020b).

Laguna Plata is the largest of the playa lakes in the vicinity of the proposed CISF project area. The playa lake covers a surface area of 5.2 km^2 [2 mi^2], has an average depth of 4.3 m [14 ft], and has a total shoreline of 9.6 km [6 mi] (Holtec, 2020b). Laguna Plata is topographically the lowest point in the area and drains a watershed that covers approximately 658 km^2 [254 mi^2].

As with Laguna Gatuna, Laguna Plata is generally dry but retains drainage after precipitation events. Laguna Plata is also fed by one spring with very minimal flow, described as a "seep" (Holtec, 2020a). A brine spring was previously identified on the edge of Laguna Gatuna, and although there has been no evidence of spring flow in recent years, the brine spring might intermittently contribute some flow into Laguna Gatuna. For both playas, evaporation is the primary natural mechanism for water loss and typically occurs quickly, leaving behind a slurry of salt and other minerals (Holtec, 2020a). Infiltration can also occur in both playas, but due to the rapid rate of evaporation, is minimal.

In New Mexico, Surface Waters of the State are defined in New Mexico Administrative Code (NMAC) 20.6.4 as "all surface waters situated wholly or partly within or bordering upon the state, including lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, reservoirs or natural ponds." Both playa lakes are designated as "Surface Waters of the State" and as such have additional protections (Holtec, 2020a).

> Surface Waters of the State are protected by the State of New Mexico under NMAC 20.6.4. NMAC 20.6.4.8 lays out an antidegradation policy that protects the existing uses of the surface water. NMAC 20.6.4.11 discusses the applicability of the water quality standards contained within 20.6.4, which protects the water quality of Surface Waters of the State. These standards can include, but are not limited to, TDS, dissolved gases, turbidity, temperature, radioactivity, floating oil and grease, pathogens, and color.

3.5.1.2 Surface Water Use

Surface water is diverted from the Pecos River and its tributaries for storage in reservoirs for later release and use for agricultural irrigation. Flow in the Pecos River below Fort Sumner is regulated by storage in Sumner Lake, Brantley Reservoir, Lake Avalon, and several other small dams, such as Tansill Dam and Lower Tansill Dam in the City of Carlsbad. Surface water is also consumed by unmanaged riparian vegetation.

3.5.1.3 Surface Water Quality

Mineral dissolution from natural sources and from irrigation return flows has affected water quality in the Pecos River basin. Water quality is best in the upstream reaches and increases in salinity downstream, particularly south of Carlsbad. Near Roswell, large amounts of chlorides from Salt Creek and Bitter Creek enter the river. River inflow between Roswell and Artesia contribute increased amounts of calcium, magnesium, sulfate, and chloride. Below Brantley Lake near Carlsbad, springs have total dissolved solid (TDS) concentrations of 3,350 to 4,000 mg/L [3,350 to 4,000 ppm]. At Malaga Bend south of Carlsbad, brine is generated as the river contacts the Salado Formation, adding approximately 370 tons/day [407 short tons] of chloride to the Pecos River (Powers et al., 1978).

As described in EIS Section 3.5.1.1, historically, Laguna Gatuna received brine disposal from several adjacent oil pumping operations, impacting the water quality, soil, and shallow groundwaters in the area. Surface water that collects in the playa lakes surrounding the proposed CISF project area is lost primarily through evaporation, leaving high salinity conditions in waters and soils associated with the playas. These conditions are not favorable for the development of viable aquatic or riparian habitats. A surface water sample collected from Laguna Gatuna had a TDS concentration of 300,000 milligrams per liter (mg/L) [300,000 parts per million (ppm)] (ELEA, 2007). Another surface water sample collected from water impounded behind an earthen dike constructed to prevent nonaqueous phase liquids (floating oil) from entering Laguna Gatuna had a TDS concentration of 180,000 mg/L [180,000 ppm] (ELEA, 2007). TDS values greater than 10,000 mg/L [10,000 ppm] are considered brackish, and the EPA set a limit of 500 mg/L [500 ppm] for drinking water (New Mexico Bureau of Geology and Mineral Resources, 2019).

3.5.1.4 Floodplains

Holtec states that no floodplains (i.e., low-lying areas adjacent to stream systems) are located within or in the vicinity of the proposed CISF project area (Holtec, 2020b). The topography of the proposed CISF project area shows a high point located on the southern border of the project area and gentle slopes leading to the two drainages previously described: Laguna Plata and Laguna Gatuna (EIS Figure 3.4-5). Holtec states that both of these drainages would be able to accept runoff from a 24-hour/19 cm [7.5 inch] rain event with excess freeboard space, assuming the lagunas were dry prior to the start of the rain event (Holtec, 2020a).

3.5.1.5 Wetlands

The National Wetland Inventory identifies several surface water features within or in the immediate vicinity of the proposed CISF project area, including Laguna Gatuna and Laguna Plata, as wetlands (EIS Figure 3.5-3) (FWS, 2021a). However, Holtec sought and received a jurisdictional determination from the U.S. Army Corps of Engineers (USACE), which concluded that there are no Waters of the United States, including jurisdictional wetlands within or in the immediate vicinity of the proposed CISF project area (USACE, 2021). Conditions in the playa lakes that surround the proposed CISF project area are not favorable for the development of aquatic or riparian habitats, as described in EIS Section 3.6.3. However, smaller wetlands consisting of emergent herbaceous vegetation are present near water bodies to the west of the proposed CISF project area (EIS Figure 3.2-3). Most of these wetlands are located adjacent to holding ponds at the Intrepid North potash mine facilities located approximately 8 km [5 mi] west of the proposed CISF project area.

3.5.2 Groundwater Resources

In New Mexico, groundwater resources are protected by NMED. All groundwater resources with total dissolved solids (TDS) less than 10,000 mg/L [10,000 ppm] are under NMED jurisdiction, as described in NMAC 20.6.2.3103, and may be subject to groundwater quality standards.

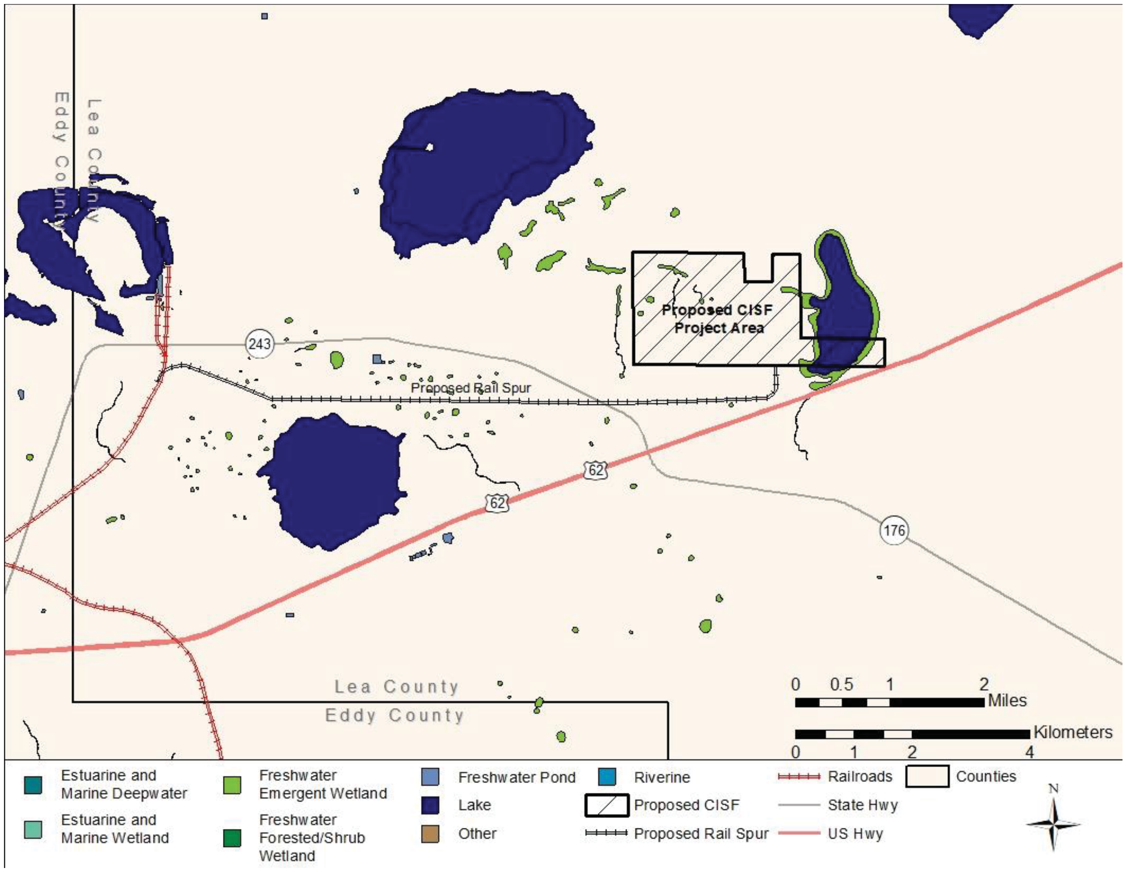

Figure 3.5-3 Wetlands Identified by U.S. Fish and Wildlife Services' National Wetlands Inventory (FWS, 2021a)

3.5.2.1 Regional Groundwater Resources

Major aquifers in southeastern New Mexico include the Capitan Aquifer (Capitan Reef), Rustler Formation, Dockum Group (Santa Rosa Formation), Ogallala Formation, and Quaternary alluvial deposits (Quaternary alluvium) (Nicholson and Clebsch, 1961; Richey et al., 1985). The stratigraphic position of these aquifers in the subsurface is shown in EIS Figure 3.4-4. These aquifers are described below.

Capitan Aquifer

The Capitan Aquifer (Capitan Reef) of Permian age is present along the margins of the Delaware Basin (EIS Figure 3.2-4). The Capitan Aquifer is composed of the Capitan and Goat Seep Limestones and consists of dolomite and limestone strata deposited as reef, fore-reef, and back-reef facies (Richey et al., 1985). The Capitan Aquifer ranges in thickness from 61 to 719 m [200 to 2,360 ft] in Eddy and Lea counties (Richey et al., 1985). The Capitan Aquifer in southeastern New Mexico is recharged by precipitation on its outcrop in the Guadalupe Mountains and Guadalupe Ridge along the New Mexico-Texas border. Recharge is by slow percolation of water through reef deposits and direct infiltration into cavernous zones. Surface water also flows directly into the Capitan through caverns in the area of outcrop adjacent to the reef escarpment (Bjorklund and Motts, 1959).

Rustler Formation

The Rustler Formation of Permian age underlies most of the Delaware Basin. The Rustler Formation is underlain by the Salado Formation and overlain by the Dewey Lake Redbeds (EIS Figure 3.4-4). In southeastern New Mexico, the Rustler Formation consists mainly of anhydrite or gypsum, dolomite beds (Magneta and Culebra Dolomite Members), minor salt, and a basal zone of sandstone, siltstone, and shale (Richey et al., 1985). The thickness of the Rustler ranges from 61 to 152 m [200 to 500 ft] in Eddy County and from 27 to 110 m [90 to 360 ft] in Lea County (Richey et al., 1985). Known water-bearing zones in the Rustler are at the Rustler-Salado contact and the Magneta and Culebra Dolomite Members (Mercer, 1983).

Recharge to the Rustler Formation is by precipitation, seepage from streams where the formation crops out, and by inflow from adjacent formations (Richey et al., 1985). Groundwater movement is generally downgradient from recharge areas in higher elevations to discharge areas along the Pecos River and its tributaries.

Santa Rosa Sandstone

The Santa Rosa Sandstone is part of the Dockum Group of Triassic age (EIS Section 3.4.1.2). In southeastern New Mexico, the Santa Rosa Sandstone crops out in north-trending scarps a few miles west of the Eddy-Lea County line and in south facing scarps in the southwestern corner of Lea County (Richey et al., 1985). The Santa Rosa Sandstone has been described as a coarse, angular, conglomeratic sandstone with thin to thick beds, which interfinger locally with shale (Bachman, 1980). The thickness of the Santa Rosa Sandstone ranges from 0 to 91 m [0 to 300 ft] in Eddy County and from 43 to 91 m [140 to over 300 ft] in Lea County (Richey et al., 1985).

The Santa Rosa Sandstone in Eddy and Lea Counties is recharged by precipitation on sand dunes that overlie the aquifer, precipitation and runoff directly on the outcrop, and migration of groundwater from the overlying Ogallala Formation and Quaternary alluvium (Richey et al., 1985).

Ogallala Formation

The Ogallala Aquifer, the primary source of water in Lea County, is the water-bearing portion of the Ogallala Formation (NMOSE, 2016). The Ogallala Formation of Tertiary age is composed of fluviatile sand, silt, clay, and gravel capped by caliche (Richey et al., 1985). In southern Lea County, the Ogallala Formation underlies the High Plains where it ranges in thickness from 30 to 76 m [100 to 250 ft] (Nicholson and Clebsch, 1961). The saturated thickness of the Ogallala Formation on the High Plains ranges from 7.6 to 53 m [25 to 175 ft] (Richey et al., 1985). Groundwater yields from the Ogallala Aquifer in the High Plains area of southern Lea County range from 113 to 2,650 liters per minute (Lpm) [30 to 700 gallons per minute (gpm)] with the highest yields from wells east of Jal.

As described in EIS Section 3.4.1.1, the Mescalero Ridge, a prominent topographic feature, marks the southwest limit of the High Plains in southeastern New Mexico. Southwest of the Mescalero Ridge in southern Lea County, where the proposed CISF site lies, the Ogallala Formation has been mostly stripped away, but remnants are present in some areas such as Antelope Ridge and Grama Ridge in thicknesses ranging from a few meters to over 30 m [a few feet to over 100 ft]. According to Nicholson and Clebsch (1961), the Ogallala is generally unsaturated in these areas, but in some places the basal few meters [feet] are saturated.

However, no wells are known that produce water from the basal Ogallala in these areas (Nicholson and Clebsch, 1961).

The recharge of the Ogallala Formation on the High Plains is due entirely to precipitation.

Quaternary Alluvium

Aquifers in Quaternary alluvium are present in the Delaware Basin area of southeastern New Mexico. The lithology of the alluvium is highly variable, consisting of clastics eroded from surrounding uplands, fluvial deposits, caliche, gypsite, conglomerates, terrace deposits, windblown sand, and playa deposits (Richey et al., 1985). The thickness of alluvium ranges from 0 to over 76 m [0 to over 250 ft] in Eddy County and from 0 to 122 m [0 to 400 ft] in Lea County (Richey et al., 1985). Aquifers in the Quaternary alluvium in southeastern New Mexico are generally considered as distinct units and are usually under water-table conditions, but artesian conditions may exist locally where clay layers act as confining beds (Richey et al., 1985).

The Quaternary alluvium is recharged generally by infiltration of surface water from surrounding uplands and along channels of ephemeral streams and the Pecos River. Due to the semiarid climate, recharge by infiltration from precipitation is significant only during intense rainfall events (storms) of long duration or frequent occurrence (Richey et al., 1985). Recharge may also occur by flow from adjacent formations. Near Carlsbad, the alluvium is partially recharged by flow from underlying Permian artesian limestone aquifers (Richey et al., 1985). Along the southwestern edge of the High Plains in southern Lea County, water leaves the Ogallala Formation of the High Plains and enters the Quaternary alluvium, which underlies the Laguna Valley area (Nicholson and Clebsch, 1961). The saturated thickness of the Quaternary alluvium of the Laguna Valley area ranges from 4.6 to 9.1 m [15 to 30 ft], and water levels are about 9.1 m [30 ft] below the land surface.

3.5.2.2 Local Groundwater Resources

The proposed CISF project area is located in the Capitan Underground Water Basin, which covers approximately 296,028 ha [731,500 ac] in south-central Lea County (EIS Figure 3.5-4). The Capitan Underground Water Basin is oriented northwest-southeast and follows the arc-shaped location of the Capitan Reef Complex in the subsurface along the northern and eastern margins of the Delaware Basin. In addition to the Capitan Aquifer, important sources of groundwater in the Capitan Underground Water Basin include the Rustler Formation, Dockum Group (Santa Rosa Sandstone and Chinle Formation), Ogallala Formation, and Quaternary alluvium.

In the vicinity of the proposed CISF project area, no wells producing from the Capitan Aquifer are known to exist. A stock well located 9.6 km [6 mi] southwest of the proposed CISF project area was reported to be completed in the Rustler Formation at a depth of 112 m [367 ft] (Kelly, 1979). This well produced water having a TDS concentration of 1,250 mg/L [1,250 ppm]. No other wells producing from the Rustler Formation are known to exist in the vicinity of the proposed CISF project area. The proposed CISF project area is underlain by several hundred meters [several hundred feet] of the Triassic Dockum Group consisting of the Santa Rosa

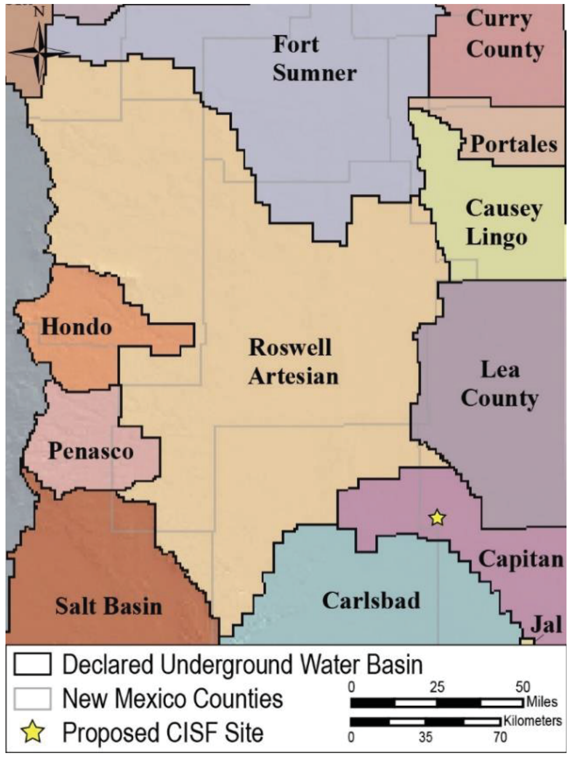

Figure 3.5-4 Declared Underground Water Basins in Southeastern New Mexico (Modified from NMOSE, 2005)

Sandstone and Chinle Formation (EIS Figure 3.4-7). The Dockum Group is exposed around the flanks of Laguna Gatuna, Laguna Plata, and along an outcrop belt 8 km [5 mi] west of the proposed CISF project area and south of U.S. Highway 62/180 (EIS Figure 3.4-6). Several wells are completed in the Dockum Group in the vicinity of the proposed CISF project area (EIS Figure 3.5-5). These wells have total depths ranging from 14.5 to 207 m [47.5 to 680 ft] and groundwater depth levels ranging from 10.8 to 99 m [35.42 to 325 ft]. Nicholson and Clebsch (1961) produced a potentiometric surface map for water in the Dockum Group in southern Lea County that showed saturation in the vicinity of the proposed CISF project area at depths of 76 to 126 m [250 to 415 ft] below ground surface and a groundwater flow direction to the southwest.

The Tertiary Ogallala Formation is not present beneath the proposed CISF project area (Holtec, 2020a). As described previously, in southern Lea County, the Ogallala Formation has been mostly stripped away, but remnants are present in some areas. A water well located about 5.6 km [3.5 mi] south of the proposed CISF project area is reported to be completed in the Tertiary Ogallala Formation at a total depth of 17 m [55 ft] (EIS Figure 3.5-5).

Groundwater in the Quaternary alluvium occurs where stream beds and playas have incised into the Dockum Group, and the resulting low area has been filled with aeolian (i.e., wind-blown) sand or pediment materials (ELEA, 2007). Recharge occurs by infiltration along stream channels or on the flanks of the playas. The total depth and groundwater level in wells completed in the Quaternary alluvium, based on available water well data in the vicinity of the proposed CISF project area, is shown in EIS Figure 3.5-5. The data in EIS Figure 3.5-5 indicate that groundwater in the alluvium is discontinuous and has saturated thicknesses that are typically less than 7.6 m [25 ft].

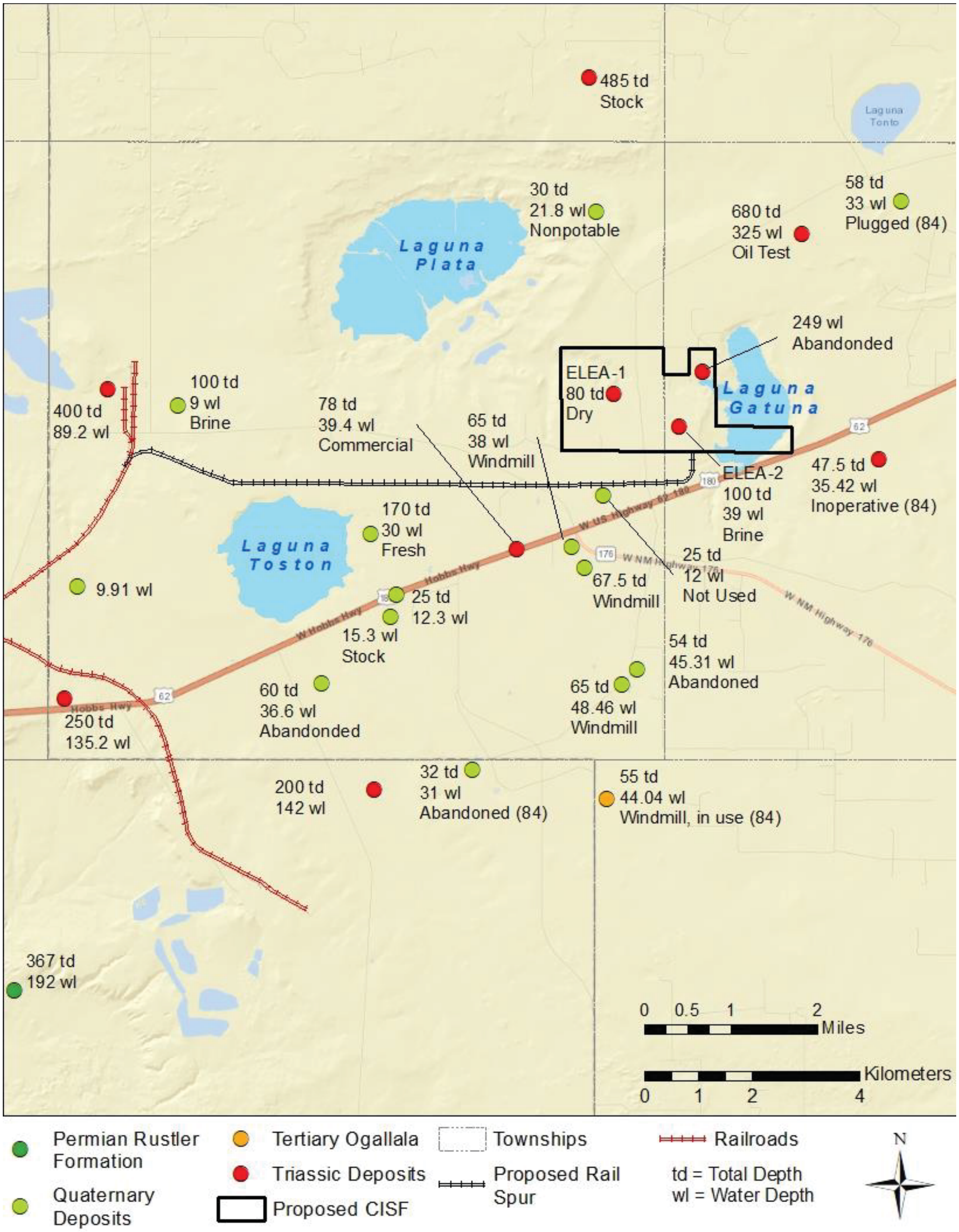

Figure 3.5-5 **Water Wells and Piezometer Locations Within and Surrounding the Proposed CISF Project Area (Holtec, 2020a)**

Well drilling was conducted at the proposed CISF project area in 2007 and 2017 to identify and characterize groundwater in the alluvium perched on the Dockum Group and deeper groundwater in the Chinle Formation and Santa Rosa Formation of the Dockum Group (ELEA, 2007; GEI Consultants, 2017). In 2007, wells ELEA–1 and ELEA–2 were drilled as part of the Global Nuclear Energy Partnership (GNEP) Eddy Lea Siting Study (ELEA, 2007). The locations of these wells are shown on EIS Figure 3.5-5.

Well ELEA–1 was drilled to a total depth of 24.4 m [80 ft]. During drilling, no groundwater saturation was encountered in either the alluvium or the Dockum Group. The well was plugged back to 15.2 m [50 ft] using hydrated bentonite and completed with a gravel pack and well screen from 6.1 to 15.2 m [20 to 50 ft] (ELEA, 2007). After plugging and completion, a small amount of water was detected in the well, but the water steadily declined to within a few inches of the bottom of the well (ELEA, 2007). This has been attributed to a small amount of bentonite hydration water that was placed in the well to seal the upper annulus during completion and is not indicative of the presence of groundwater (ELEA, 2007).

Well ELEA–2 was drilled to a total depth of 30 m [100 ft]. During drilling, drill cuttings were slightly moist in the upper 7.6 m [25 ft] of the Dockum Group and then appeared dry to the total depth of 30 m [100 ft]. The well was cased with a screen interval from 17.7 to 29.9 m [58 to 98 ft] and completed with a gravel pack. Over several days, water in Well ELEA–2 rose to a static depth of 10.4 m [34 ft] below ground surface. Lithologic characterization indicated that the water-bearing zone in the Dockum Group in this well consists of either fractures or sandy zones between the depths of 25.9 to 30 m [85 to 100 ft] (ELEA, 2007). Water in this zone is under artesian head of 12.2 m [50 ft].

In 2017, GEI Consultants drilled three monitoring wells to identify groundwater beneath the area proposed for the initial phase (Phase 1) of the proposed CISF (GEI Consultants, 2017). The three monitoring wells - B101(MW), B106(MW), and B107(MW) - were located at the southeast, northwest, and northeast corners of the proposed action (Phase 1) concrete pads. The presence of saturated zones could not be determined, because drilling of the monitoring wells used water for rock coring and the rock had low permeability. Two monitoring wells – B106(MW) and B107(MW) – were screened in the Chinle Formation of the Dockum Group at depths of 53.1 to 61.9 m [174.3 to 203 ft] and 25.1 to 32.8 m [82.4 to 107.5 ft], respectively (GEI Consultants, 2017). One monitoring well – B101(MW) – was screened in the Santa Rosa Formation of the Dockum Group at a depth of 115.1 to 126.3 m [377.7 to 414.4 ft] (GEI Consultants, 2017).

Depth to groundwater in the monitoring wells B101(MW), B106(MW), and B107(MW) was measured periodically over a 1-month period (from 10/15/2017 to 11/16/2017) (GEI Consultants, 2017). Groundwater was not observed in B106(MW), although it was observed in the shallower well, B170(MW), and in B101(MW) (GEI Consultants, 2017).

During 2017 site characterization activities, GEI Consultants measured depth to groundwater in well ELEA–2 on November 11 and 16, 2017 (GEI Consultants, 2017). Groundwater in well ELEA–2 was observed from a depth range of 11.46 to 11.49 m [37.6 to 37.7 ft] (GEI Consultants, 2017). This depth range is consistent with the GNEP study, which reported a static depth of groundwater in well ELEA–2 of 10.4 m [34 ft] below ground surface (ELEA, 2007).

GEI Consultants (2017) interpreted, and the NRC staff concur, that the deep groundwater level measured in B101(MW) is indicative of the primary groundwater aquifer in the Santa Rosa

Formation beneath the proposed CISF project area at about 77 to 80 m [253 to 263 ft] below ground surface. They interpreted the groundwater observed in B107(MW) and well ELEA–2 as indicating the presence of limited water in discontinuous aquifers above lower permeability zones in the Chinle Formation (GEI Consultants, 2017).

3.5.3 Groundwater Use

3.5.3.1 Regional Groundwater Use

In southeastern New Mexico, the Permian Capitan Aquifer is of primary importance to Eddy County, where it is the main source of domestic water for the cities of Carlsbad, Happy Valley (a suburb of Carlsbad), and Whites City (Richey et al., 1985). The Capitan Aquifer yields 1,135 to 3,785 Lpm [300 to 1,000 gpm] (Richey et al., 1985). The Capitan Aquifer is also used for irrigation near La Huerta, Happy Valley, and Carlsbad. In Lea County, the Capitan Aquifer is a source of highly mineralized water used for enhanced oil recovery (Richey et al., 1985).

Water in the Permian Rustler Formation is generally not suitable for domestic use and the quality ranges from slightly saline to brine. In Eddy and Lea counties, the Rustler yields about 38 to 378 Lpm [10 to 100 gpm] of slightly to moderately saline water, which supplies some stock, irrigation, industrial, and domestic wells. The only domestic use of water from the Rustler Formation is at Red Bluff in Eddy County (Richey et al., 1985).

The Santa Rosa Sandstone and other undifferentiated sandstones of the Triassic Dockum Group are the chief sources of groundwater in the eastern part of Eddy County in a belt 16 to 32 km [10 to 20 mi] wide along the Lea County border (Richey et al., 1985). The quality of water is generally sufficient for stock and domestic use and the depth of water is generally less than 122 m [400 ft] (Hendrickson and Jones, 1952). The Santa Rosa Sandstone in eastern and southeastern Eddy County yields some slightly saline water for stock purposes (Richey et al., 1985). The Santa Rosa Sandstone is the principal aquifer in the southwestern part of Lea County. Wells in Lea County yield as much as 378 Lpm [100 gpm] of fresh to slightly saline water (Richey et al., 1985).

The Tertiary Ogallala Formation is a source of groundwater on the High Plains in southern Lea County, where it is used for domestic, municipal, industrial, stock, and agricultural purposes (EIS Figure 3.4-1). As described previously, groundwater yields from the Ogallala in the High Plains area of southern Lea County range from 113 to 2,650 Lpm [30 to 700 gpm] with the highest yields from wells east of Jal (Richey et al., 1985). The City of Carlsbad owns and operates the Double Eagle Water System, which supplies groundwater pumped from wells completed in the Ogallala Formation in northwestern Lea County via pipeline to the City of Carlsbad (City of Carlsbad Water Department, 2018; Double Eagle Supply, 2021).

The Quaternary alluvium is a major source of groundwater for domestic water supplies, irrigation, industry, and livestock in southeastern New Mexico. In southern Eddy and Lea counties, the Quaternary alluvium is a principal domestic aquifer but usually yields less than 113 Lpm [30 gpm] (Richey et al., 1985).

3.5.3.2 Local Groundwater Use

Water suitable for human consumption is referred to as potable water. In 1969, two water samples taken near Halfway, New Mexico, approximately 3.2 km [2 mi] southwest of the proposed project area, were classified as potable by Pollution Control, Inc (Kelly, 1984). However, no potable groundwater is known to currently exist in the vicinity {i.e., within 10 km [6 mi]} of the proposed CISF project area (EIS Section 3.5.4.2) (Holtec, 2020a). Potable water for area domestic use in the vicinity of the proposed CISF project area is obtained from pipelines that convey water to area potash refineries from the Ogallala Formation on the High Plains area of eastern Lea County. Shallow groundwater in the Quaternary alluvium and Dockum Group is present in a number of wells in the surrounding area (EIS Figure 3.5-5). A few of these wells are used for stock watering, but water quality and quantity are marginal at best, and most, if not all, wells in the area have been either abandoned or are not currently in use (Holtec, 2020a).

3.5.4 Groundwater Quality

3.5.4.1 Regional Groundwater Quality

In southeastern New Mexico, water quality in the Permian Capitan Aquifer is highly variable. Bjorklund and Motts (1959) described three ranges of water quality in the Capitan Aquifer in southern Eddy County. The freshwater zone contains water with TDS concentrations of less than 700 mg/L [700 ppm] and extends from the southern part of Carlsbad southwestward toward the outcrop of the Capitan Reef in the Guadalupe Mountains. The potable mixed-water zone contains water with TDS concentrations ranging from 700 to 1,700 mg/L [700 to 1,700 ppm] and underlies the northern and western parts of Carlsbad. The non-potable water zone contains water with TDS concentrations greater than 1,700 mg/L [1,700 ppm] and is north of the potable mixed-water zone, extending northeastward into Lea County. In Lea County, the quality of water in the Capitan Aquifer is very poor with TDS concentrations ranging from 10,000 to 30,000 mg/L [10,000 to 30,000 ppm] (Richey et al., 1985).

As described previously, groundwater quality in the Permian Rustler Formation ranges from slightly saline to brine. At the WIPP site in Eddy County, the quality of water in the Rustler is variable, but is generally brine with TDS concentrations ranging from 10,347 to 325,800 mg/L [10,347 to 325,800 ppm] (Mercer and Orr, 1979; Mercer, 1983). Water from a well about one mile southwest of the WIPP site (Well 574) had a TDS concentration of 3,860 mg/L [3,860 ppm] (Richey et al., 1985).

Analyses of groundwater from the Santa Rosa Sandstone in southern Lea County showed TDS concentrations ranging from 426 to 1,950 mg/L [426 to 1,950 ppm], sodium concentrations from 131 to 563 mg/L [131 to 563 ppm], sulfate concentrations from 74 to 934 mg/L [74 to 934 ppm], and chloride concentrations ranging from 21 to 252 mg/L [21 to 252 ppm] (Nicholson and Clebsch, 1961). In Eddy County, Hendrickson and Jones (1952) reported analyses of groundwater with hardness ranging from 201 to 3,550 mg/L [201 to 3,550 ppm] and chloride concentrations from 17 to 785 mg/L [17 to 785 ppm].

The Ogallala Formation in southern Lea County generally yields freshwater. Nicholson and Clebsch (1961) reported analyses of groundwater from the Ogallala Formation collected from wells in southern Lea County. The TDS concentration is relatively low, typically less than 1,100 mg/L [1,100 ppm]. Groundwater from the Ogallala is high in silica {49 to 73 mg/L [49 to 73 ppm]}, contains moderate concentrations of calcium and magnesium, is low in sodium and chloride, and very low in sulfate (Nicholson and Clebsch, 1961).

Water quality in Quaternary alluvium aquifers of the Delaware Basin is highly variable because of the local presence of adjacent evaporite beds (gypsum and halite) (Bjorklund and Motts, 1959), recharge by highly mineralized irrigation and Pecos River water, and saline intrusion from extensive pumping. Richey et al. (1985) reported TDS concentrations ranging from 188 to 15,000 mg/L [188 to 15,000 ppm] with an average value of 2,319 mg/L [2,319 ppm], chloride concentrations ranging from 5 to 7,400 mg/L [5 to 7,400 ppm] with an average value of 627 mg/L [627 ppm], and fluoride concentrations ranging from 0.3 to 10 mg/L [0.3 to 10 ppm] with an average of 1.8 mg/L [1.8 ppm].

3.5.4.2 Local Groundwater Quality

TDS measurements were taken from groundwater wells within and in the vicinity of the proposed CISF project area (Kelly, 1979; ELEA, 2007) and are summarized in EIS Figure 3.5-6 and EIS Table 3.5-1. Groundwater collected from BLM Test Well 21.31.3.22, 8 km [5 mi] southwest of the proposed CISF project area, comes from the Triassic Dockum Group and had a TDS concentration of 424 mg/L [424 ppm]. BLM Test Wells 20.32.22.33, near Laguna Toston, and 20.32.17.13, near the Intrepid North Potash Mine, are completed in the Quaternary alluvium and had TDS concentrations of 3,136 and 172,828 mg/L [3,136 and 172,828 ppm], respectively. Groundwater from piezometer ELEA–2, within the proposed CISF project area, had a TDS concentration of 83,000 mg/L [83,000 ppm] and comes from the Triassic Dockum Group. Spring 1, a brine spring within the proposed CISF project area from the alluvium/Dockum Group deposit contact, had a TDS concentration of 120,000 mg/L [120,000 ppm]. Although there has been no evidence in recent years of the spring flowing, this spring might intermittently contribute to drainage entering Laguna Gatuna. In addition to the above TDS measurements, Kelly (1984) reported chemical analyses of water from wells at Halfway, New Mexico, which is located approximately 3.2 km [2 mi] southwest of the proposed project area. The chemical analyses were conducted in 1969 and the only constituents measured were chloride {362 mg/l [362 ppm]} and sulfate {309 mg/l [309 ppm]} (Kelly 1984, Appendix B).

Based on available groundwater quality data, brine discharges from potash refining or oil and gas production into local playas has directly or indirectly affected most of the shallow groundwater in the immediate vicinity of the proposed CISF project area (ELEA, 2007; Holtec, 2020a). For many years, potash mines discharged thousands of acre-feet of near-saturated potash refinery process brine to Laguna Plata and Laguna Toston. Discharges ceased in Laguna Plata in the mid-1980s and in Laguna Toston in 2001. As described previously, Laguna Gatuna received brine discharges from multiple facilities in the area between 1969 and 1992 (ELEA, 2007). As a result, saturations of shallow groundwater brine are present in shallow sediments having hydrogeologic connections with the playa lakes. Holtec has stated that highly mineralized groundwater in the Triassic Dockum Group at the proposed CISF project area, as detected in piezometer ELEA–2, is likely associated with brine in Laguna Gatuna (Holtec, 2020a).

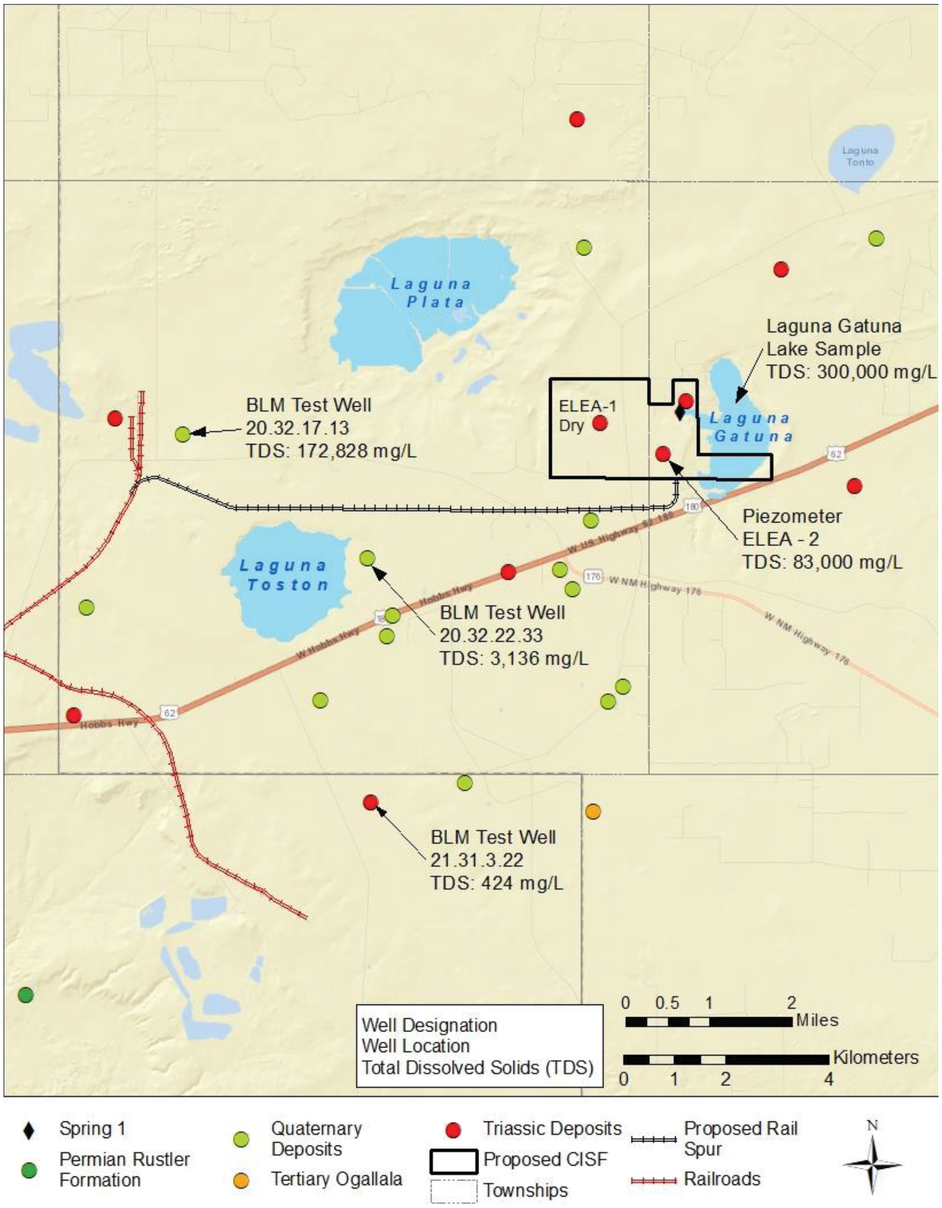

Figure 3.5-6 Groundwater Quality Within and in the Vicinity of the Proposed CISF Project Area (Modified from ELEA, 2007)

Table 3.5-1 Groundwater Quality Data Within and in the Vicinity of the Proposed CISF Project Area

Sample	Source Formation	TDS Concentration in mg/L*
BLM Test Well 20.32.17.13	Alluvium	172,828
BLM Test Well 20.32.22.33	Alluvium	3,136
BLM Text Well 21.31.3.22	Dockum Group	424
Spring 1	Alluvium/Dockum Group Interface	120,000
Piezometer ELEA-2	Dockum Group	83,000

*1 mg/L = 1 ppm
Sources: Kelly, 1979; ELEA, 2007

3.6 Ecology

This section describes the characteristics of terrestrial and aquatic plants and animals within the proposed CISF project boundary, as well as along the proposed rail spur and in the vicinity of the proposed CISF project. The section also discusses important plant and animal species that occur or have the potential to occur on the proposed CISF project area, and habitats that are important to those species.

Metric Corporation of Albuquerque, New Mexico, conducted an ecological survey in March 2007 as part of ELEA's GNEP application on approximately 407 ha [1,005 ac] of the 421 ha [1,040 ac] land parcel proposed for the CISF project (Holtec, 2020a; ELEA, 2007). The 2007 ecological survey included descriptions of aquatic and riparian communities, wetlands, and critical and important terrestrial habitats within a 9.6-km [6-mi] buffer around the proposed project area that the GNEP project may disturb. The Metric Corporation staff that conducted the 2007 ecological survey consulted with FWS staff, NMDGF staff, and staff at the BLM Carlsbad Field Office prior to initiating onsite surveys. Metric Corporation staff walked representative portions of the current 421 ha [1,040 ac] land parcel and reported plants and wildlife that were observed. Particular attention was given to rare plants and wildlife, including a Lesser prairie-chicken survey.

On October 14, 2016, Tetra Tech, Inc. performed an ecological survey of the 134 ha [330 ac] disturbed land area associated with the proposed CISF project. The survey included the access road and rail spur (Holtec, 2020a). The survey consisted of six vegetation sample points along eight transect lines, visual observations of wildlife, noxious weeds, and other notable features.

During both the 2007 and 2016 ecological surveys, no trap or capture-and-release surveys were conducted. Emphasis was placed on determining the habitats of candidate species that would occur within the proposed CISF project area. To describe the affected environment, specifically ecological resources at the proposed CISF, the NRC staff reviewed prior ecological surveys and information related to the ecology of the region, as referenced, and consulted with BLM and NMDGF.

3.6.1 Description of Ecoregions and Habitats Found in Eddy and Lea County

The proposed CISF project is located within the eastern boundary of the Chihuahuan Desert Grasslands ecoregion of New Mexico identified by the U.S. Environmental Protection Agency (EPA) (EPA, 2013). The Chihuahuan Desert ecoregion extends west of the Pecos River in New Mexico. The High Plains ecoregion is present within 3.2 km [2 mi] east of the proposed CISF project and extends eastward into Texas. The vegetation cover at the proposed CISF project is indicative of the Apacherian-Chihuahuan mesquite upland scrub ecological system. Furthermore, the proposed CISF project is located in a transitional zone between the short grass prairie of the High Plains habitat and the Chihuahuan Desert Scrub habitat (Holtec, 2020a; NMDGF, 2016; Elliott, 2014). During the last century, conversion of grasslands to scrublands has occurred within this transition zone in Lea and Eddy Counties as result of combinations of land use changes, drought, livestock overgrazing, and decreases in fire frequency (NMDGF, 2016). Examples of sensitive species that could occur within these habitats include the black-tailed prairie dog (*Cynomys ludovicianus*), burrowing owls (*Athene cunicularia*), Northern aplomado falcon (*Falco femoralis septentrionalis*), and Lesser prairie-chicken (*Tympanuchus pallidicinctus*) (NMDGF, 2016). In addition, many common animals such as the kangaroo rat (*Dipodomys sp.*), southern plains wood rat (*Neotoma micropus)*, desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), mule deer (*Odocoileus hemionus*), coyotes (*Canis latrans*), and hawks use both grassland and shrubs for foraging, nesting, and protection. However, birds are the dominant animal group (taxa) within the High Plains and Chihuahuan Desert Scrub habitats (NMDGF, 2016).

Southern New Mexico and the Texas High Plains are covered with numerous small depressions that create playa lakes. These playa lakes have a variety of ecosystem functions, depending on their particular qualities that affect the plants and animals that may use them. Shells from freshwater clams, brought from the nearby Pecos River, have been found on the edges of the saline playa lakes in the vicinity of the proposed CISF project (BLM, 2018a). Playa lakes are also prime hunting sites because animals use them as sources of water (BLM, 2018a). During seasonal migrations, migratory birds that use the Central Flyway, one of the four major North American bird migration corridors between northern nesting grounds and southern wintering grounds, are known to use the playa lakes in this region depending on the available food and water present (Holtec, 2020a).

The Endangered Species Act (ESA) provides for the conservation of “critical habitat,” the areas of land, water, and airspace that an endangered species needs for survival. These areas include sites with food and water, breeding areas, cover or shelter sites, and sufficient habitat to provide for normal population growth and behavior. One of the primary threats to endangered and threatened species is the destruction or modification of essential habitat areas by uncontrolled land and water development. No designated critical habitat for any Federal threatened or endangered plant or animal species occurs within Lea County (FWS, 2022a; FWS, 2021b,c). Two areas identified as critical habitat for Federally listed species are located in Eddy County, approximately 64 km [40 mi] from the proposed CISF project (FWS, 2021d). Species of greatest conservation need (SGCN) and threatened and endangered species that could occur within the proposed CISF project area are further discussed in Sections 3.6.4 and 3.6.5.

3.6.2 Vegetation of the Proposed Holtec CISF Project

According to the 2007 and 2016 vegetation surveys conducted within the 421 ha [1,040 ac] proposed CISF project area, the vegetative cover community over the majority of the proposed project CISF area is typically mesquite scrubland. The primary plant species at the proposed CISF project area generally consisted of shrubs dominated by honey mesquite (*Prosopis glandulosa*) and perennial broomweed or broom snakeweed (*Gutierrezia sarothrae*) (Holtec, 2020a). Over half of the proposed CISF project area consists of sandy and gravelly loams that allow woody plant roots to penetrate from 25.4 to 51 cm [10 to 20 in] below ground (Holtec, 2020a). As described in EIS Section 3.3.1.4, the proposed CISF project area is underlain with a layer of hardened caliche, which can significantly limit root growth of grasses and cacti and cause accelerated soil erosion (Holtec, 2020a; Idowu and Flynn, 2015). Vegetation at the proposed project area is in a climax successional stage (the last stage of an ecosystem) that has been established in western Lea County for an extended period. The presence of herbaceous flowering plants (forbs) within the CISF project area fluctuates greatly from season to season and year to year (BLM, 2017a).

Virtually no vegetation was observed on the portion of the shore of Laguna Gatuna that is included as part of the proposed CISF project area. A 2018 photo taken in the spring from the south-central portion of the ELEA property depicting the sparsely vegetated honey mesquite- and broom snakeweed-dominated land cover common within the proposed CISF project boundary is provided in EIS Figure 3.6-1. Several low-lying areas within the proposed CISF project area and along the proposed rail spur route showed evidence of a thicker vegetative

Figure 3.6-1 Photograph Taken in the South-Central Portion of the ELEA/Holtec Property Showing Typical Vegetation (Source: B. Werling)

cover dominated by Western peppergrass, suggesting areas where water is retained longer when water is present (*Lepidium montanum*) (Holtec, 2020a). A photograph of the white-flowered Western peppergrass is provided in EIS Figure 3.6-2.

Noxious weed infestations are reported to be the second leading cause of native plant and animal species being listed as threatened or endangered nationally (NMDGF, 2016). As of 1998, non-native species have been implicated in the decline of 42 percent of Federally listed species under the ESA (NMDGF, 2016). The New Mexico Department of Agriculture (NMDA) coordinates weed management among local, State, and Federal land managers as well as private landowners (NMDA, 2016). The proposed CISF project is surrounded by State- and BLM-managed lands, and the proposed rail spur is located on BLM-managed land (EIS Figure 3.2-1). The NMDA identifies invasive plant species across the State that, if present, should be managed to control infestation and stop further spread. The current noxious weeds that could be present in the BLM Carlsbad Field Office area, which includes Eddy and Lea County, are Malta Starthistle (*Centaurea melitensis*), African rue (*Peganum harmala*), Scotch Thistle (*Onopordum acanthium*), salt cedar (*Tamarix spp.*), and Rayless goldenrod (*Haplopappus heterophyllus*) (BLM, 2018a). No plants the NMDA or BLM classified as noxious or invasive species have been reported at the proposed CISF project area; however, Holtec has not conducted a vegetation survey along the proposed rail spur (Holtec, 2020a).

The two vegetation surveys that were conducted within the proposed CISF project area showed relatively low plant diversity (i.e., few plant species). The 2007 vegetation survey was conducted in October, which is not the spring growing season when more vegetation species

Figure 3.6-2 Photograph Taken Along the Proposed Rail Spur Showing Western Peppergrass (Source: A. Minor)

may be present. The 2016 vegetation survey was conducted within the 134 ha [330 ac] area that is proposed to be the total disturbed land area at full build-out. Neither survey was conducted over a period of more than one growing season. Therefore, some plants that could potentially be present within the proposed CISF project area may have not been observed during the two surveys. A list of plants observed during the 2007 and 2016 surveys is provided in EIS Table 3.6-1.

3.6.3 Habitats and Traits of Laguna Gatuna

A number of playa lakes in Lea and Eddy Counties have been used as water disposal locations for produced water from the potash mining industry and oil and gas extraction activities (EIS Section 3.2.4). Historically, Laguna Gatuna has received brine disposal from several adjacent oil pumping operations but did not receive direct potash waste disposal. According to Lang and Rogers (2002), "[t]hese practices have dramatically altered the hydrologic condition, water quality, and ecological balance of numerous playas as suitable wildlife habitat at all trophic levels of the food web." As described in EIS Section 3.5.1.1, the water present in Laguna Gatuna comes solely from surface water drainage after precipitation events.

As described previously in EIS Section 3.5.1.1, precipitation events in this area are usually in the form of unpredictable thunderstorms, which can leave several inches of rainfall in Laguna Gatuna in a relatively short period of time. EIS Section 3.5.1.1 also states that, for the playa, evaporation is the primary natural mechanism for water loss and typically occurs quickly, leaving behind a slurry of salt and other minerals (Holtec, 2020a). Infiltration can also occur in both playas, but due to the rapid rate of evaporation, is minimal. A saline lake is another term for a playa lake the environmental community uses to indicate a discharge wetland

Table 3.6-1 List of Plants Observed Within the Proposed CISF Project Area	
Common Name	**Scientific Name**
Trees and Woody Shrubs	
Dwarf desert holly	*Acourtia nana*
Honey mesquite	*Prosopis glandulosa*
Joint fir	*Ephedra sp.*
Lotebush	*Condalia (Microrhamnus) ericoides*
Prairie verbena	*Glandularia bipinnatifida*
Prickly pear cactus	*Opuntia engelmannii*
Small soapweed	*Yucca glauca*
Wooly croton	*Croton capitatus*
Subshrubs and Herbs	
Bladderpod	*Lesquerella sp.*
Broom (perennial) snakeweed	*Gutierrezia sarothrea*
Buffalobur	*Solanum rostratum*
Cowpen daisy	*Verbesina encelioides*
Fourwing saltbush	*Atriplex canescens*
Glovemallow	*Sphaeralcea sp.*
James' nailwort	*Paronychia jamesii*
Milkvetch	*Astragalus sp.*
Mock vervain	*Glandularia sp.*
Ragweed	*Ambrosia sp.*
Scarlet globemallow	*Sphaeralcea coccinea*
Silver nightshade	*Solanum elaeagnifolium*
Spiny dogweed	*Thymophylla acerosa*
Pott's leatherweed	*Croton pottsii*
Western peppergrass	*Lepidium montanum*
Grasses	
Alkali sacaton	*Sporobolus arioides*
Black grama	*Bouteloua eriopoda*
Blue grama	*Bouteloua gracilis*
Bristlegrass	*Setaria leucopila*
Burrograss	*Scleropogon brevifolius*
Muhly	*Muhlenbergia sp.*
Panicgrass	*Panicum sp.*
Plains bristlegrass	*Setaria leucopila*
Tabosa grass	*Pleuraphis (Hilaria) mutica*
Threeawn	*Aristida sp.*
Vine mesquite	*Panicum obtusum*
Source: Holtec, 2020a; ELEA, 2007	

(McLachlan et al., 2014). For the purposes of this EIS, the term playa lakes is used for consistency with the description in EIS Section 3.5.1.

In the early- to mid-1990s, in response to significant bird deaths consistently observed at Laguna Toston, Laguna Gatuna (within the proposed CISF project area), and Laguna Quatro, the Nash Draw saline playa complex in Eddy and Lea counties was the subject of several biotic surveys. The biotic surveys performed at Laguna Gatuna included water quality and contaminants investigations, and biological analyses of phytoplankton, diatoms, and macroinvertebrates (Davis and Hopkins, 1993; Dein et al., 1997; Bristol, 1999). Because of the results of these studies, Lang and Rogers (2002) included the Nash Draw saline playa complex in a survey of large branchiopod crustaceans. The Lang and Rogers (2002) branchiopod survey revealed that no aquatic macroinvertebrates were observed or collected from Laguna Toston, Laguna Plata, and Laguna Gatuna. This finding is consistent with the observations of Davis and Hopkins (1993).

A picture taken of Laguna Gatuna in the spring of 2018 during the NRC staff's site visit of the proposed CISF project area is provided in EIS Figure 3.6-3. At the time of the NRC site visit in spring 2018, no standing water was present, but a white layer of salt deposits covered the surface of the playa. A few unidentified birds were observed flying over Laguna Gatuna. Very little vegetation was present on the western edge of Laguna Gatuna. Laguna Toston is located approximately 0.4 km [0.25 mi] south of the proposed rail spur depicted in EIS Figure 3.6-4.

3.6.4 Wildlife that Could Occur at the Proposed Holtec CISF Project

This section describes the wildlife that could be present at the proposed CISF project and provides information on important animal species that have been observed at the proposed CISF project and Laguna Gatuna (EIS Table 3.6-2). Information about wildlife at Laguna Gatuna is provided in this section because approximately 9 percent of the eastern part of proposed CISF property overlaps a small portion of the southern end of Laguna Gatuna (Holtec, 2020a). As previously stated, the proposed CISF project is located within the Central Flyway migratory bird path, and migratory shorebirds such as sandhill cranes and waterfowl use playa lakes in this region (EIS Section 3.6.1). Eagles and other raptors such as those listed in EIS Table 3.6-2 are known to feed on shorebirds and waterfowl that may be present at Laguna Gatuna or other nearby playa lakes (Mitchusson, 2003). During winter migrations, many bird species rely on cultivated grains and invertebrates such as grubs and grasshoppers found in agricultural fields (Mitchusson, 2003). Virtually no vegetation was observed on the portion of the shore of Laguna Gatuna that is included as part of the proposed CISF project area (EIS Section 3.6.2), and there is no commercial agriculture within 10 km [6 mi] of the proposed CISF project area (EIS Section 3.2.2). Based on recent ecological analysis BLM conducted within 3.2 km [2 mi] of the proposed project area, many species of songbirds are known to nest within 3.2 km [2 mi] of the proposed CISF project area, but many more use the habitats in the area during migration and for non-nesting activities (BLM, 2018b). According to the BLM, common birds of prey within 3.2 km [2 mi] of the proposed CISF project area include Northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and Chihuahuan raven (*Corvus cryptoleucus*) (BLM, 2018b). The majority of Laguna Gatuna is located on BLM-managed land, and a small area of Laguna Gatuna is located on ELEA-owned land in the southeastern portion of the proposed CISF project area. The proposed CISF project area is surrounded by BLM-managed land that is under consideration as an area of critical environmental concern (ACEC), called Salt Playas ACEC, due to the importance that salt playas are to local plant and animal communities (BLM, 2018a). ACECs are public land areas where special management attention is needed to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and provide safety from natural hazards. The Laguna Plata playa lake is located approximately 1.6 km [1 mi] northwest of the northwest corner of the proposed CISF project property boundary. Laguna Plata is also nominated as an ACEC (Laguna Plata ACEC) by the BLM Carlsbad Field Office because of its use by migratory birds. The BLM indicates there is known Western snowy plover (*Charadrius alexandrines nivosus*) winter nesting habitat at Laguna Plata (BLM, 2018a). Western snowy plover is a

Figure 3.6-3 **Western Edge of Laguna Gatuna in Spring 2018 Showing Salt Deposits at the Surface (Source: B. Werling)**

Figure 3.6-4 **Photograph of a Laguna Toston Located South of the Proposed Rail Spur (Source: A. Minor)**

Table 3.6-2 Mammals and Birds Observed at the Proposed CISF Project Area and Laguna Gatuna		
Common Name	**Scientific Name**	**Preferred Season or Habitat**
Birds		**Seasonal Preference**
Cassin's sparrow	*Aimophila cassinii*	Spring and summer
Green-winged teal	*Anas crecca**	Spring and fall migrant
Blue-winged teal	*Anas discors**	Spring and fall migrant
Canvasback	*Aythya valisineria*	Spring and fall migrant
Red-tailed hawk	*Buteo jamaicensis*	Winter
Ferruginous hawk	*Buteo regalis*	Winter
Lark bunting	*Calamospiza melanocorys*	Spring and summer
Least sandpiper	*Calidris fuscicollis*	Spring and fall migrant
Scaled quail	*Callipepla squamata*	Year round
Cactus wren	*Campylorhynchus brunneicapillus*	Year round
Western snowy plover	*Charadrius alexandrines nivosus*	Winter
Killdeer	*Charadrius vociferus*	Spring and summer
Northern harrier	*Circus cyaneus*	Winter
Horned lark	*Eremophila alpestris*	Year round
American coot	*Fulica americana*	Spring and fall migrant
Loggerhead shrike	*Lanius ludovicianus*	Spring and fall
Long-billed curlew	*Numenius americanus*	Summer
Ruddy duck	*Oxyura jamaicensis**	Spring and fall migrant
Savannah sparrow	*Passerculus sandwichensis*	Winter
Ladder-backed woodpecker	*Picoides scalaris*	Year round
Pied-billed grebe	*Podilymbus podiceps**	Spring and fall migrant
American avocet	*Recurvirostra americana**	Year round
Northern shoveler	*Spatula clypeata**	Spring and fall migrant
Eurasian collared dove	*Streptopelia decaocto*	Year round
Western meadowlark	*Sturnella neglecta*	Year round
Crissal thrasher	*Toxostoma crissale*	Year round
Greater yellowlegs	*Tringa melanoleuca*	Winter
Mourning dove	*Zenaida macroura*	Year round
White-winged dove	*Zenaida asiatica*	Year round
White-crowned sparrow	*Zonotrichia leucophrys*	Winter and migrant

Table 3.6-2	**Mammals and Birds Observed at the Proposed CISF Project Area and Laguna Gatuna**	
Common Name	**Scientific Name**	**Preferred Season or Habitat**
Mammals		**Preferred Habitat**
Coyote	*Canis latrans*	Open space, grasslands, and brush country
Black-tailed jackrabbit	*Lepus californicus*	Grasslands and open areas
Southern plains wood rat	*Neotoma micropus*	Grasslands, prairies, and mixed vegetation
Mearn's grasshopper mouse	*Onychomys arenicola*	Desert shrubs and grasslands
Desert cottontail	*Sylvilagus audubonii*	Brushy areas and valleys in arid lowlands
*Species observed dead in Laguna Gatuna in March 1992 Source: Holtec, 2020a; Davis and Hopkins, 1993		

SGCN identified by the NMDGF and a Special Status Species identified by BLM, as discussed further in EIS Section 3.6.5 (NMDGF, 2016; BLM, 2018a). Few migratory bird surveys have been conducted for either Laguna Gatuna or Laguna Plata; however, several birds have been observed at Laguna Gatuna in the past [EIS Table 3.6-2, and, according to the NMDGF, ephemeral saline lakes provide habitat for some birds, especially when holding water after rain events (NMDGF, 2018a)]. The NRC staff considered that other saline lakes in the region may also provide a refuge for bird species that could potentially use Laguna Gatuna and Laguna Plata regularly; however, the NRC staff did not find comparable playa lakes with similar intermittent water availability or salinity in the region with well-documented bird surveys. For example, Bitter Lake National Wildlife Refuge (NWR) is located approximately 117.5 km [73 mi] north-northwest of the proposed CISF project area within the Pecos River drainage basin and received its name because of its brackish water and provides habitat for over 300 bird species (FWS, 2001). The FWS has managed lake water levels and plant species at the refuge in part to reduce the amount of salinity in the water and concentrate forage for migratory birds. By comparing total dissolved solids at Laguna Gatuna and Laguna Plata to the salinity at Bitter Lake, the estimated salinity in Laguna Gatuna and Laguna Plata (330,000 mg/l) is more than 100 times higher than the salinity in Bitter Lake (32,500 mg/l) (Davis and Hopkins, 1993; FWS, 2001; New Mexico Energy and Minerals Department, 1985).

In addition, surface water is present all year at the Bitter Lake NWR, whereas Laguna Gatuna and Laguna Plata are usually dry. Many NWRs and fresh water lakes are located within 161 km [100 mi] of the proposed CISF project area that are managed to conserve wetlands and other habitat vital to migratory birds (e.g., Muleshoe NWR, Grulla NWR, Salt Creek Wilderness, Bottomless Lakes State Park, Brantley State Park, and Red Bluff Reservoir). Because of differences in water and habitat availability and water quality between Laguna Gatuna and Laguna Plata and other surface water sources within 161 km [100 mi], the NRC staff anticipates that the diversity and frequency of birds that would rely on Laguna Gatuna and Laguna Plata are significantly limited compared to bird populations found at many of the other water basins in the region.

In March 2021, the FWS identified three migratory bird species of conservation concern that could be present in the proposed CISF project area: burrowing owl (*Athene cunicularia*), Cassin's sparrow (*Aimophila cassinii*), and lark bunting (*Calamospiza melanocorys*) (FWS, 2021b). FWS updates provided in September 2021 and May 2022 identified only the

Cassin's sparrow as a migratory bird species of conservation concern that could be present in the proposed CISF project area (FWS, 2022a; FWS, 2021c). As shown in EIS Table 3.6-2, Cassin's sparrow and lark bunting have been observed within the proposed CISF project area. Although burrowing owls were not observed during biological surveys conducted as part of the proposed Holtec license application, burrowing owls have been observed within 3.2 km [2 mi] of the proposed CISF project area (Holtec, 2020a; BLM, 2018b; BLM, 2017a).

Deer [i.e., mule deer and white-tailed deer (*Odocoileus virginianus*)] and pronghorn antelope (*Antilocapra americana*) are economically important large mammal species in New Mexico (NMDGF, 2016). To better manage deer populations, NMDGF has assigned land areas as game management units (GMUs). Lea County lies within NMDGF's GMU 31 (NMDGF, 2017). During the 2017–2018 hunting season, an estimated 777 mule deer (*Odocoileus hemionus*) and white-tailed deer combined were harvested in GMU 31 (NMDGF, 2018a). Pronghorn antelope are much less prevalent than deer in southeast New Mexico, but the State still hunts and manages them. NMDGF estimates that 102 antelope were harvested during the 2017–2018 hunting season (NMDGF, 2018b).

Reptiles and amphibians (i.e., herpetofauna) that could occur in the proposed CISF project area include but are not limited to the Texas horned lizard (*Phrynosoma cornutum*), greater earless lizard (*Cophosaurus texanus*), dunes sagebrush lizard (*Sceloporus arenicolus*), several species of spiny and whip tail lizards, and several species of venomous and non-venomous snakes (NMDGF, 2019a; Holtec, 2020a; BLM, 2018b). No reptiles or amphibians were observed during either the 2007 or 2016 ecological surveys conducted within the proposed CISF project area. Additional information on the dunes sagebrush lizard (DSL) is provided in EIS Section 3.6.5.

Medium-sized carnivorous mammals that are likely to occur in the proposed CISF project area include coyote, bobcat, badger, striped skunk, and swift fox (BLM, 2018b). Several small mammals, including desert cottontail rabbits, blacktailed jackrabbit, and numerous rodent species, are common residents of the proposed CISF project area and were all observed within the proposed CISF project area (BLM, 2018b). Habitat within the proposed CISF project area is marginally suitable foraging diurnal roosting habitat for a number of bat species based on the patchy shrubs and grasses and sparsely spaced trees and structures. The cave myotis (*Myotis velifer*) and Yuma myotis (*Myotis yumanensis*) are the most likely bat species that would occur at the proposed project (BLM, 2018b; NMDGF, 2019a). Bat species occurring in the proposed CISF project area are likely to forage for aerial insects above the shrublands, but foraging activities would be expected to be more common near surface water bodies, where flying insects would be more abundant. Bats have not been the subject of surveys conducted at the proposed CISF project area.

As described in EIS Section 3.5.1 and based on the results of ecological surveys conducted at the proposed CISF project area, there are no permanent surface water features within the proposed CISF project area. Ephemeral surface water features in the immediate vicinity of the proposed project area include Laguna Gatuna. There is no evidence of riparian habitat or sufficiently deep-water habitat or extensive water sources, including Laguna Gatuna, that would support the presence of fish or shellfish within the proposed CISF project area (Holtec, 2020a; Davis and Hopkins, 1993; Dein et al., 1997; Bristol, 1999). The aquatic traits of Laguna Gatuna are further discussed in EIS Section 3.6.3.

3.6.5 Protected Species and Species of Concern

The NRC has an obligation under Section 7 of the ESA to determine whether the proposed CISF project may affect Federally listed or species proposed to be listed under the ESA. The NRC staff obtained an official species list from the FWS Information Planning and Conservation (IPaC) website in March and September 2021 and May 2022 (FWS, 2022a; FWS, 2021b,c). FWS staff identified one candidate species, the monarch butterfly (*Danaus plexippus*), that could occur at the proposed CISF project (FWS, 2022a; FWS, 2021c), and another species, the Northern aplomado falcon, which could occur at the proposed CISF project (FWS, 2022a; FWS, 2021b,c). The Northern aplomado falcon is identified by FWS as a non-essential experimental population (NEP) in all of New Mexico (FWS, 2014). According to the FWS, for Section 7 consultation purposes, NEPs are treated as if they are proposed under the ESA unless located on National Park Service lands or National Wildlife Refuges, in which case they are treated as threatened (Forest Service, 2016). The occurrence of the falcon in the U.S. declined in the early 1900s, was uncommonly observed by the 1930s, and was last reported to nest in 1952 in Luna County, New Mexico, until FWS reintroduction programs were initiated along the eastern Texas coast in the late 1970s (FWS, 2014). The first reintroduction effort in New Mexico occurred at a private ranch west of the White Sands Missile Range in 2006; however, despite several attempts to reintroduce the bird into New Mexico, all the birds that FWS tracked were determined to be deceased by January 2013. There are no records of this species occurring within Lea County or within the southeastern quadrant of New Mexico (BLM, 2018b; FWS, 2014). However, the FWS identifies the very southern edges of Lea and Eddy Counties as part of the species' historical habitat range, but not within its current habitat range (FWS, 2014). The FWS also identifies the proposed CISF project area as providing low to moderate suitable habitat for the Northern aplomado falcon (FWS, 2014). There is no FWS-designated critical habitat for this species (FWS, 2014).

The FWS identified the monarch butterfly as a candidate species. The FWS found that listing the species as an endangered or threatened species is warranted but precluded by higher priority actions (85 FR 81813). The eastern and western North American migratory populations have been generally declining over the last 20 years (85 FR 81813). Conservation efforts are addressing some of the threats from loss of milkweed and nectar resources across eastern and western North America and management at overwintering sites in California. The FWS will develop a proposed rule to list the monarch butterfly as priorities allow. The FWS publishes a Candidate Notice of Review in the *Federal Register* that provides an updated list of plants and animals in the United States that are regarded as candidates for possible listing (FWS, 2017). According to the FWS, candidate species receive no statutory protection under the ESA (85 FR 81813; FWS, 2017). There is no FWS-designated critical habitat for this species (85 FR 81813). This species is not a New Mexico SGCN (NMDGF, 2019a,b). Monarchs are solely dependent on milkweed during the caterpillar stage, and require ample sources of nectar from flowering plants to fuel their migrations (85 FR 81813). Neither this species nor milkweed were reported at the proposed CISF project area during the 2007 and 2016 surveys. The FWS identified no other Federally listed threatened or endangered plant or animal species or proposed species that are known to potentially occur at or that the proposed CISF project may affect (FWS, 2022a; FWS, 2021b,c).

In April 2019, the NRC staff accessed the NMDGF Environmental Review Tool website and generated a site-specific report that contains an initial list of NMDGF recommendations regarding potential impacts to SGCN wildlife or wildlife habitats from the proposed CISF project (NMDGF, 2019b). The NMDGF report identified 17 State-designated SGCN that could occur at or within 1.6 km [1 mi] of the proposed CISF project. Of the 17 SGCNs, 7 identified in the

NMDGF report are the State of New Mexico listed as threatened or endangered, and 9 BLM designated as special status species, including the yellow-billed cuckoo (*Coccyzus americanus occidentalis*), which the FWS also designated as a Federally listed, threatened species under the ESA, but is not identified by FWS as potentially occurring in the proposed CISF project area (FWS, 2022a; FWS, 2021b,c). A list of the 17 New Mexico SGCN and their respective Federal status is provided in EIS Table 3.6-3. Previous ecological surveys conducted at the proposed CISF project area or at Laguna Gatuna that NRC reviewed and described in the introductory portion of EIS Sections 3.6 and also EIS Section 3.6.3 did not identify any of the species listed in EIS Table 3.6-3 at or near the proposed CISF project.

No New Mexico State plant species designated as threatened or endangered species have been reported during ecological surveys conducted on the proposed CISF project area, and none are expected to occur in Lea County (NMEMNRD, 2022; New Mexico Rare Plant Technical Council, 2020). There are no important plant areas (IPAs) that occur in Lea County; the nearest IPA is approximately 29 km [18 mi] southwest of the proposed CISF project (NMEMNRD, 2017). IPAs are places that support either a high diversity of sensitive plant species or are the last remaining locations of New Mexico's most endangered plants. According to the BLM's environmental review for a pipeline project located less than 3.2 km [2 mi] from the proposed CISF, there are no BLM-listed sensitive plant species known to occur in the general region (BLM, 2018b). In addition, there are no Federally threatened, endangered, or critical habitats that the proposed CISF project could affect, according to FWS staff (FWS, 2021c).

The yellow-billed cuckoo is designated as a Federally listed threatened species under the ESA with a current habitat identified by FWS west of the Pecos River in Eddy County and Culberson County, Texas (FWS, 2021e). This species' preferred habitat is dense understory vegetation (i.e., a layer of vegetation beneath the main canopy) in riparian zones along major drainages, which has experienced significant declines in recent decades, particularly in the western United States, and is not present within the proposed CISF project area (FWS, 2021d; Holtec, 2020a). The yellow-billed cuckoo is vulnerable to loss, fragmentation, and degradation of riparian habitat, and to broad-scale clearing of exotic vegetation such as salt cedar (i.e., tamarisk) along the Pecos River where the species often nests (78 FR 61622; NMDGF, 2016). As discussed previously, almost no vegetation exists around the edges of Laguna Gatuna where riparian habitat would be expected. This species is identified by NMDGF as potentially occurring within 0.6 km [1 mi] of the proposed CISF project area and has been reported at locations greater than 16 km [10 mi] from the proposed CISF project area, roughly between Lovington and Carlsbad (Travis, 2005). However, this species has not been observed within the proposed CISF project area and is not known to occur in Lea County (FWS, 2021e; Holtec, 2020a; NMDGF, 2019a). As previously noted, FWS has not identified this species as potentially occurring in the proposed CISF project area (FWS, 2021e).

Although the dunes sagebrush lizard is not a Federally listed or candidate species under the ESA, it is a New Mexico endangered species and SGCN (EIS Table 3.6-3). In July 2020, the FWS announced a 12-month plan to initiate a review of the status of the dunes sagebrush lizard to determine whether listing the species under the ESA is warranted (85 FR 43203). A determination was anticipated to be announced in July 2021, at which time, if the FWS had determined that listing the species was warranted, the FWS would have published a proposed rule in the *Federal Register* to list the species (FWS, 2016). The FWS determination has been postponed to September 2022 (Office of Information and Regulatory Affairs, 2022). After the FWS proposes a species for listing, a 60-day comment period begins, and hearings are held, if requested, before the proposed rule is either issued or withdrawn (FWS, 2016). During the review period, the dunes sagebrush lizard is not afforded ESA protections (FWS, 2021b,c).

Table 3.6-3 Special Status Animal Species That Could Occur Within 0.6 km [1 mi] of the Proposed CISF Project Area According to the New Mexico Game and Fish Department				
Common Name	**Scientific Name**	**US Fish and Wildlife Management Status**	**Bureau of Land Management Status**	**New Mexico Management Status**
Sprague's pipit	*Anthus spragueii*	BMC	SSS	SGCN
American bittern	*Botaurus lentiginosus*	BMC		SGCN
Yellow-billed cuckoo	*Coccyzus americanus*	T, BMC	SSS	SGCN
Black-tailed prairie dog	*Cynomys ludovicianus*		SSS	SGCN
(Northern) aplomado falcon	*Falco femoralis septentrionalis**	BMC	SSS	E, SGCN
Peregrine falcon	*Falco peregrinus*	BMC		T, SGCN
Bald eagle	*Haliaeetus leucocephalus*	BMC	SSS	T, SGCN
Loggerhead shrike	*Lanius ludovicianus*	BMC		SGCN
Lewis's Woodpecker	*Melanerpes lewis*	BMC		SGCN
Varied bunting	*Passerina versicolor*	BMC		T, SGCN
Eared grebe	*Podiceps nigricollis*	BMC		SGCN
Bank swallow	*Riparia riparia*			SGCN
Dunes sagebrush lizard	*Sceloporus arenicolus*		SSS	E, SGCN
Pygmy nuthatch	*Sitta pygmaea*			SGCN
Lesser prairie-chicken	*Tympanuchus pallidicinctus*	BMC	SSS	SGCN
Bell's vireo	*Vireo bellii*	BMC	SSS	T, SGCN
Gray vireo	*Vireo vicinior*	BMC	SSS	T, SGCN

T = Threatened, E = Endangered, SSS = Special Status Species, SGCN = Species of Greatest Conservation Need, BMC = Bird of Management Concern
* This species may be referred to as both aplomado falcon and Northern aplomado falcon in literature.
Source: NMDGF, 2019b; BLM, 2018b; FWS, 2011

According to the NMDGF, suitable habitat for the dunes sagebrush lizard is not present within the proposed CISF project area (NMDGF, 2018c). Based on available habitat mapping models for the dunes sagebrush lizard, the nearest suitable dunes sagebrush lizard habitat from the proposed CISF project is located approximately 4.8 km [3 mi] to the east and approximately 3.2 km [2 mi] north of the proposed CISF project boundary where sandy shinnery shrubland vegetation type is present (BLM, 2018a). New Mexico, along with other states and the FWS, have established multi-state efforts to conserve this species in the Western United States through a combined Candidate Conservation Agreement (CCA) for Federally administered land, and CCA with Assurances (CCAA) for privately-owned land for the dunes sagebrush lizard (FWS, 2021e). The CCAA for the dunes sagebrush lizard in New Mexico is valid until 2028 (FWS, 2008; FWS, 2021,f). The monitoring and reporting of the land enrolled in these programs in New Mexico is conducted and administered by the Center for Excellence in Hazardous Materials Management (CEHMM) (FWS, 2021,f).

Research about and monitoring of the Lesser prairie-chicken has occurred in the region for concerns about impacts to this species caused by habitat loss and fragmentation. Impacts to this species include historical habitat loss and fragmentation and ongoing and probable future habitat loss and fragmentation because of conversion of grasslands to agricultural uses, encroachment by invasive woody plants, wind and petroleum energy development, and presence of roads and man-made vertical structures in the region (Wolfe et al., 2019). On June 1, 2021, the FWS proposed to list two distinct population segments of the Lesser prairie-chicken under the ESA (86 FR 29432). The FWS expects to make a final determination on the proposed listing by June 1, 2022 (FWS, 2022b).). The Western Association of Fish and Wildlife Agencies maintains the Southern Great Plains Crucial Habitat Assessment Tool (SGP CHAT), which is a spatial model that designates Lesser prairie-chicken habitat and prioritizes conservation activities (WAFWA, 2021). The tool classifies crucial Lesser prairie-chicken habitat and important connectivity areas. The SGP CHAT identifies the proposed CISF project area located within the Lesser prairie-chicken's estimated occupied range, but not located within a designated focal area or connectivity zone, which are areas of the greatest importance to the Lesser prairie-chicken (Wolfe et al., 2019). According to the NMDGF, suitable habitat for the Lesser prairie-chicken is not present within the proposed CISF project area (NMDGF, 2018c). The nearest active Lesser prairie-chicken lek, (i.e., the area where males gather to compete for females) is approximately 18.5 km [11.5 mi] north of the proposed CISF project area (EIS Figure 3.6-5).

The BLM identifies the proposed CISF project area as being located within an isolated population area for Lesser prairie-chicken (BLM, 2018a). The BLM Carlsbad Field Office has proposed timing and development restrictions (i.e., timing limitation stipulations) on land leased from the BLM as a management strategy for portions of the Lesser prairie-chicken habitat. The proposed CISF project area is located within the boundary of BLM's Lesser prairie-chicken timing limitation stipulation; however, the rail spur is not (EIS Figure 3.6-5). Because the proposed CISF is on private property, the BLM timing limitation stipulations would not apply.

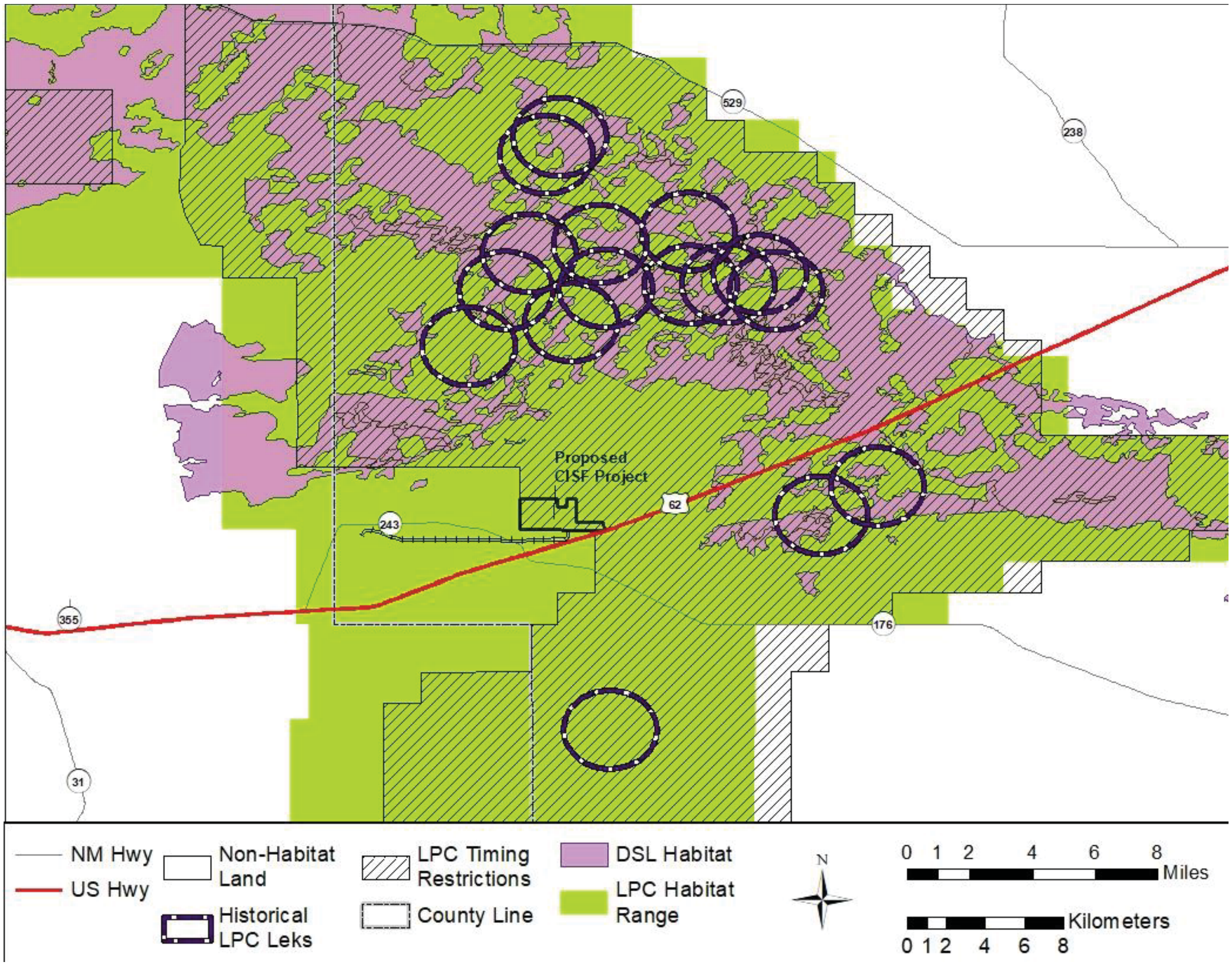

Figure 3.6-5 BLM Timing Limitation Stipulation Area for the Lesser Prairie-Chicken (LPC) and Dunes Sagebrush Lizard (DSL)

3.7 Meteorology and Air Quality

3.7.1 Meteorology

3.7.1.1 Climate

The proposed CISF project area has a semi-arid climate characterized by low precipitation, abundant sunshine, low relative humidity, and a relatively large annual and diurnal temperature range. In New Mexico, elevation rather than latitude is a greater factor in determining the temperature of specific locations. During the summer, the preponderance of clear skies and low relative humidity often permit rapid cooling, resulting in lower temperatures at night. Annual precipitation totals for semi-arid regions such as the proposed CISF project area can vary over the years. Winter precipitation is normally attributed to moisture from the Pacific Ocean as it moves across the country from west to east. Summer rains usually occur during brief but frequently intense thunderstorms caused by moisture from the Gulf of Mexico. These thunderstorms can cause local flash floods. When the occasional tornado occurs, it is usually in the summertime (NOAA, 2018a).

Currently there is no onsite weather station at the proposed CISF project area. Meteorological data from Lea County Regional airport, located about 48.3 km [30 mi] east of the proposed CISF project area, was used because onsite data is not currently available. EIS Table 3.7-1 contains temperature and precipitation data collected from 1941 to 2016. The monthly mean daily temperatures range from 5.5 Celsius (°C) [41.9 Fahrenheit (°F)] in January to 26.8°C [80.2°F] in July (Holtec, 2020a). The annual mean daily temperature was 16.2°C [61.2°F] (Holtec, 2020a). The monthly mean rainfall totals range from 0.61 cm [0.24 in] in March to 4.57 cm [1.80 in] in September (Holtec, 2020a). The annual mean rainfall was 25.81 cm [10.16 in] (Holtec, 2020a). EIS Figure 3.7-1 contains a wind rose for data collected from 1972 to 2017. Winds are predominantly from the south and the average annual wind speed is 20.3 kilometers/hour (km/hr) [12.6 miles/hour (mi/hr)] (Holtec, 2020a).

Lea and Eddy counties experience a variety of severe weather events. As documented in the National Centers of Environmental Information storm event database, EIS Table 3.7-2 describes the types and number of severe weather events occurring in these two counties from 1950 to 2017. Of the 150 tornados in the two-county area over the 77-year time period, 111 were included in the lowest severity category on the Fujita or Enhanced Fujita Tornado Damage Scale (the Enhanced Fujita scale replaced the old Fujita scale in 2007). Larger Fujita Tornado Damage Scale numbers represent greater tornado severity. Tornados with Fujita or Enhanced Fujita values from F2 to F5 are considered strong to violent. The most severe tornado was an F3 that occurred in Lea County in 1954 (NOAA, 2018b).

3.7.1.2 Climate Change

Temperature and precipitation are two parameters that can be used to characterize climate change. Average annual temperatures increased by 1.0°C [1.8°F] for the contiguous United States over the time period 1901 to 2016, and temperatures are expected to continue to rise (GCRP, 2017). From 1986 to 2016, the average temperature in the region where the proposed CISF project is located increased by approximately 0.83°C [1.5°F] compared to the 1901 to 1960 baseline (GCRP, 2017). The average temperature in New Mexico is projected to increase between 2.22 and 4.44°C [4 and 8°F] by mid-century (2036–2065) compared to the 1976 to 2005 baseline (GCRP, 2017).

Average U.S. precipitation has increased by 4 percent since 1901; however, some regions experienced increases greater than the national average, while other regions experienced decreased precipitation levels (GCRP, 2017). From 1986 to 2015, the annual precipitation totals in the region where the proposed CISF project is located increased between 0 and 10 percent compared to the 1901 to 1960 baseline (GCRP, 2017). By the latter part of the 21st century, U.S. Global Change Research Program forecasts that precipitation levels in the region of New Mexico where the proposed CISF project is located will decrease between 0 to 10 percent during the summer and fall and decrease between 10 to 20 percent during the winter and spring (GCRP, 2017).

- An increase in drought intensity.
- An increase in the number of extremely hot days, most prominently in the eastern plains of New Mexico.
- An increase in the frequency and severity of wildfires.
- No increase or upward trend in the frequency of extreme precipitation events, which is in contrast to many areas of the United States.

Table 3.7-1 Temperature and Precipitation Data Collected from 1941 to 2016 at the Lea County Regional Airport									
	Temperature (°C)*			Precipitation (cm)†					
				Rain			Snow		
Month	Mean Daily	Mean Daily Min	Mean Daily Max	Average Total	Minimum Total	Maximum Total	Average Total	Maximum Total
January	5.5	−2.4	13.5	0.79	0.00	5.31	2.69	22.86
February	7.7	−0.7	16.2	0.81	0.00	2.59	4.67	53.85
March	10.8	2.0	19.6	0.61	0.00	3.58	2.46	33.02
April	15.4	6.8	23.9	1.65	0.00	5.74	0.13	2.03
May	20.5	12.1	28.9	3.63	0.00	12.75	0.00	0.00
June	25.7	17.6	33.8	1.90	0.00	8.10	0.00	0.00
July	26.8	19.3	34.2	2.97	0.00	8.86	0.00	0.00
August	26.1	18.6	33.6	3.35	0.10	10.36	0.00	0.00
September	22.4	14.6	30.3	4.57	0.13	14.83	0.00	0.00
October	16.5	8.8	24.3	3.86	0.00	9.68	0.00	0.00
November	9.6	1.2	18.0	0.66	0.00	2.72	1.12	17.78
December	6.6	−1.8	15.0	1.42	0.00	15.77	1.55	21.08
Annual	16.2	8.0	24.5	25.81	7.18	47.40	13.03	73.66

*To convert Celsius (°C) to Fahrenheit (°F), multiply by 1.8 and add 32.
†To convert centimeters (cm) to inches (in), multiply by 0.3937
Source: Modified from Holtec (2020a)

The following list identifies additional climate change projections for the State of New Mexico as the National Ocean and Atmospheric Administration identified (NOAA, 2017).

3.7.2 Air Quality

3.7.2.1 Non-Greenhouse Gases

The EPA has set National Ambient Air Quality Standards (NAAQS) in the *Code of Federal Regulations* (40 CFR Part 50), which specifies maximum ambient (outdoor air) concentration levels for the following six criteria pollutants: sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and particulate matter (both PM_{10} and $PM_{2.5}$). Particulate matter PM_{10} refers to particles that are 10 micrometers [3.9×10^{-4} inches] in diameter or smaller, and $PM_{2.5}$ refers to particles that are 2.5 micrometers [9.8×10^{-5} inches] in diameter or smaller. Primary NAAQS are established to protect health, and secondary NAAQS are established to protect welfare by safeguarding against environmental and property damage. States may develop standards that are stricter or supplement the NAAQS. New Mexico has promulgated both stricter and supplemental ambient air standards. EIS Table 3.7-3 contains the Federal and New Mexico ambient air standards.

EPA requires States to monitor ambient air quality and evaluate compliance with the NAAQS. Based on the results of these evaluations, EPA assigns areas to various NAAQS compliance classifications (e.g., attainment, nonattainment, or maintenance) for each of the six criteria air pollutants. An attainment area is defined as a geographic region that EPA designates that meets the NAAQS for a pollutant. A nonattainment area is defined as a geographic region that EPA designates does not meet the NAAQS for a pollutant or that contributes to the ambient pollutant levels in a nearby area that does not meet the NAAQS. A maintenance area is defined as any geographic region previously designated nonattainment and subsequently redesignated by EPA to attainment. These EPA classifications characterize the air quality within a defined area, which can range in size from portions of cities to large Air Quality Control Regions (AQCR) comprising many counties. An AQCR is a Federally designated area for air quality management purposes.

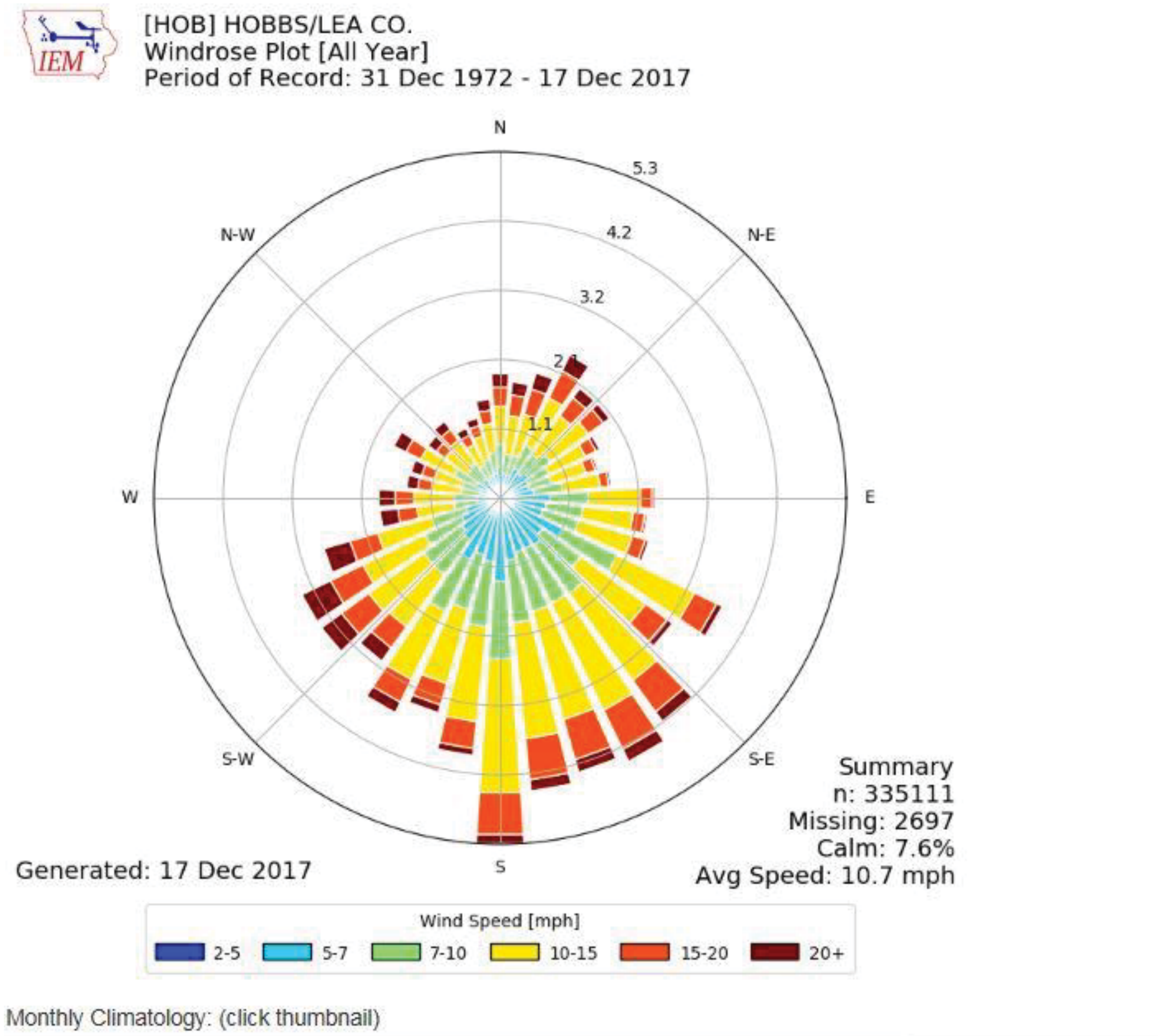

Figure 3.7-1 Wind Rose from the Lea County Regional Airport for Data Collected from 1972 to 2017 (Iowa State University, 2017)
***To convert miles per hour to kilometers per hour, multiple by 1.609**

Table 3.7-2	**Severe Weather Event Data for Lea and Eddy Counties from 1950 through 2017**		
	Number of Events*		
Type of Event	**Lea County**	**Eddy County**	**Description of Event†**
Drought	14	30	A protracted period of deficient precipitation that results in adverse impacts on people, animals, or vegetation over a sizeable area

Table 3.7-2 Severe Weather Event Data for Lea and Eddy Counties from 1950 through 2017			
Type of Event	Number of Events* Lea County	Number of Events* Eddy County	Description of Event†
Flash Flood	81	181	A rapid and extreme flow of high water into a normally dry area or a rapid water level rise in a stream or creek above a predetermined flood level
Hail	416	481	Hail 1.9 cm [¾ in] or larger or hail accumulations of smaller size which cause property and/or crop damage or casualties
Heavy Snow	21	38	Snow accumulation meeting or exceeding locally/regionally defined 12 and/or 24 hour warning criteria.
High Wind	55	170	Sustained non-convective winds of 35 knots [40 mph] or greater lasting for 1 hour or longer, or gusts of 50 knots [58 mph] or greater for any duration (or otherwise locally/regionally defined).
Thunderstorm Wind	200	178	Winds, arising from convection (occurring within 30 minutes of lightning being observed or detected), with speeds of at least 50 knots (58 mph), or winds of any speed producing a fatality, injury, or damage
Tornado	93	57	A violently rotating column of air, extending to or from a cumuliform cloud or underneath a cumuliform cloud, to the ground, and often (but not always) visible as a condensation funnel.

*Severe weather events are included in Table 3.7-2 if one of the counties experienced a particular event a minimum 25 times from 1950 through 2017
†Description of the event as defined in National Weather Service Instruction 10-1065
Source: National Oceanic and Atmospheric Administration (NOAA, 2018b) | Storm Events Database – New Mexico

Table 3.7-3 National (NAAQS) and Applicable* State (NMAAQS) Ambient Air Quality Standards for the Proposed CISF*			
Pollutant	Averaging Time	Standards† National (NAAQS)‡	Standards† New Mexico (NMAAQS)§
Carbon Monoxide	1 hour	35 ppm	13.1 ppm
	8 hours	9 ppm	8.7 ppm
Hydrogen Sulfide	½ hour	na	0.100 ppm
Nitrogen Dioxide	1 hour	100 ppb	same
	24 hours	na	0.10 ppm
	Annual	53 ppb	50 ppb
Ozone	8 hours	0.070 ppm	same
Particulate Matter $PM_{2.5}$	24 hours	35 μg/m^3	same
	Annual	12 μg/m^3	same
Particulate Matter PM_{10}	24 hours	150 μg/m^3	same
Sulfur Dioxide	1 hour	75 ppb	same
	3 hours‖	0.5 ppm	same
	24 hours	na	0.10 ppm

Table 3.7-3 National (NAAQS) and Applicable* State (NMAAQS) Ambient Air Quality Standards for the Proposed CISF*			
Pollutant	Averaging Time	Standards†	
		National (NAAQS)‡	New Mexico (NMAAQS)§
	Annual	na	0.02 ppm
Total Reduced Sulfur	½ hour	na	0.010 ppm

*State standards for hydrogen sulfide (1 hour), sulfur dioxide (24 hour and annual), and total reduced sulfur (½ hour) vary depending on the location within the State. The State standards in this table apply to the location of the proposed CISF.

†ppm means parts per million, ppb means parts per billion, and to convert $\mu g/m^3$ to oz/yd^3 multiply by 2.7×10^{-8}

‡na stands for not applicable meaning the State has a supplemental standard without a national standard counterpart

§same means there is no difference between the State and national standards

‖The sulfur dioxide 3-hour standard is a secondary standard (safeguard the environment and property damage) whereas the other standards in this table are primary standards (protect public health).

Sources: EPA (2016a) for NAAQS; 20 New Mexico Administrative Code, Chapter 2, Section 3 for NMAAQS

The proposed CISF project area is located in the Pecos-Permian Basin Intrastate Air Quality Control Region, which comprises the following seven counties in New Mexico: Chaves, Curry, De Baca, Eddy, Lea, Quay, and Roosevelt (40 CFR 81.242). This AQCR is classified as an attainment area for each criteria pollutant (40 CFR 81.332). Based on this attainment classification, the air quality at the proposed CISF project area is considered good. The nearest nonattainment area is El Paso County in Texas, located about 225.3 km [140 mi] southwest of the proposed CISF project area. A portion of that county is in nonattainment for particulate matter PM_{10} (40 CFR 81.344). The only nonattainment area in New Mexico is Dona Ana County located about 247.8 km [154 mi] west of the proposed CISF project area (Dona Ana County in New Mexico and El Paso County in Texas share a border). A portion of that county is nonattainment for both particulate matter PM_{10} and ozone (40 CFR 81.332 and 83 FR 25776).

New Mexico contains several maintenance areas; however, none are located in the Pecos-Permian Basin Intrastate Air Quality Control Region (EPA, 2018a). EIS Table 3.7-4 contains air pollutant emission levels for Lea and Eddy Counties as documented in EPA's National Emission Inventory. The emissions in EIS Table 3.7-4 include both stationary and mobile sources. EIS Table 3.7-4 provides pollutant levels that characterize the existing ambient air conditions.

EIS Figure 3.7-2 shows the proximity of various receptors to the proposed CISF project area as well as the proposed rail spur. The nearest resident to the proposed CISF project area is the Salt Lake Ranch located about 2.4 km [1.5 mi] to the north; however, U.S. Highway 62 would be located closer to the proposed CISF project area than the nearest resident. U.S. Highway 64 would be adjacent to the southeast corner of the proposed CISF project area; however, this highway would be about 0.7 km [0.43 mi] from the proposed concrete batch plant, which would be the nearest air emission source within the proposed CISF project area (EIS Figure 2.2-2). The nearest residence to the proposed rail spur would be located about 2.92 km [1.81 mi] to the south; however, another facility would be located closer to the proposed rail spur than the nearest residence. The Intrepid Potash North offices would be located about 0.7 km [0.43 mi] from the western end of the proposed rail spur and would be the nearest facility the NRC staff consider regularly occupied. U.S. Highway 62 would pass within about 0.18 km [0.11 mi] from

Table 3.7-4 Annual Air Pollutant Emissions in Metric Tons* from the U.S. Environmental Protection Agency's 2014 National Emission Inventory for Eddy and Lea Counties							
	Pollutant						
County	Carbon Monoxide	Hazardous Air Pollutants	Nitrogen Oxides	Particulate Matter PM_{10}	Particulate Matter $PM_{2.5}$	Sulfur Dioxide	Volatile Organic Compounds
Lea	27,698	10,959	15,626	13,104	2,029	5,037	88,614
Eddy	31,213	13,558	9,767	14,832	2,446	1,631	111,389
Both	58,911	24,517	25,393	27,936	4,475	6,668	200,003

*To convert metric tons to short tons, multiply by 1.10231
Sources: EPA (2018a) and SwRI (2019)

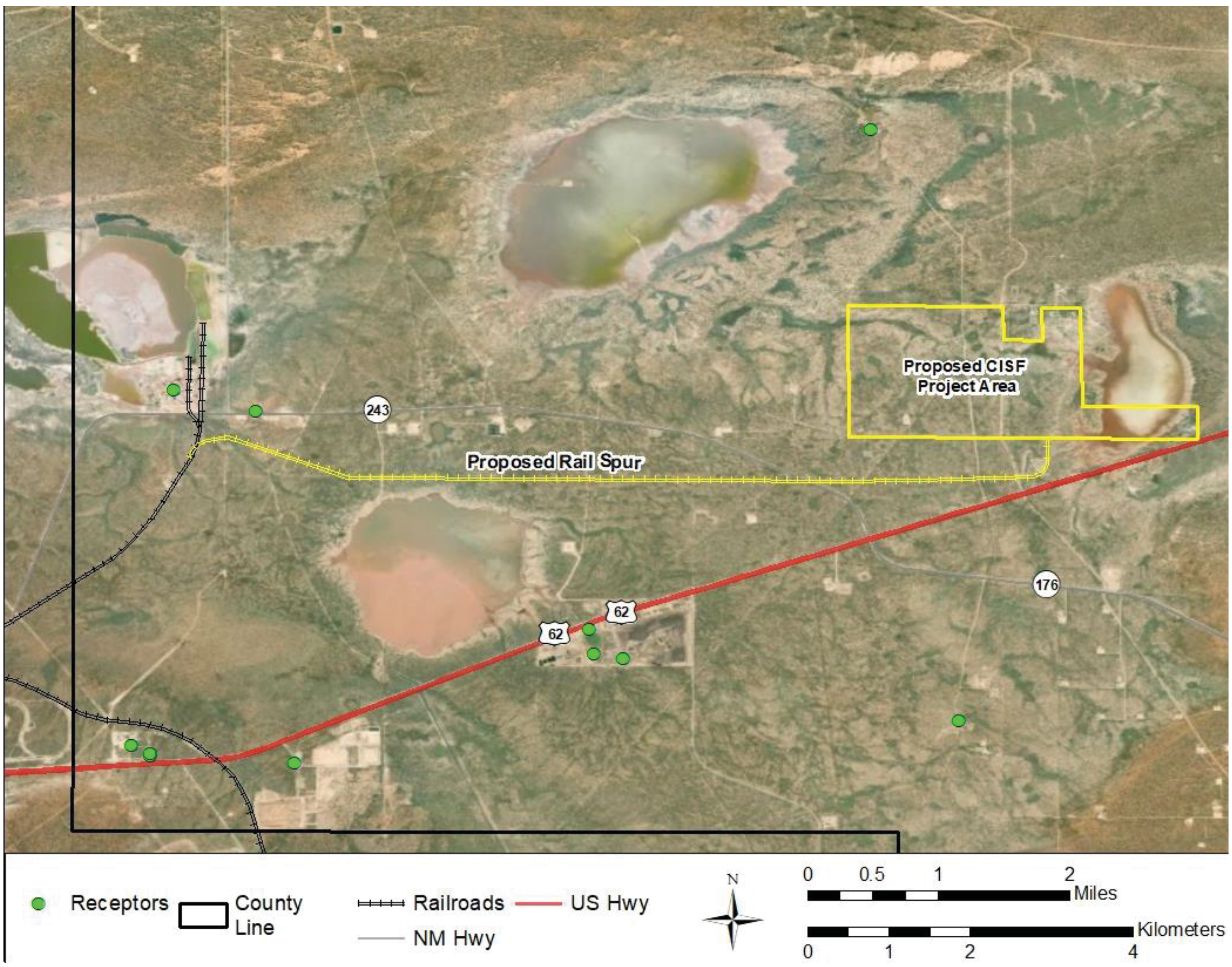

Figure 3.7-2 Figure Showing Residences and Other Receptors Around the Proposed CISF Project Area and Rail Spur (Source: Holtec, 2020a)

the eastern end of the proposed rail spur, and New Mexico State Road 243 actually crossed the proposed rail spur near the southwest corner of the proposed CISF project. EPA also established Prevention of Significant Deterioration (PSD) standards that set maximum allowable concentration increases for particulate matter, sulfur dioxide, and nitrogen dioxide pollutants above baseline conditions in attainment areas. In part, the purpose of this requirement is to ensure that air quality in attainment areas remains good. The PSD program designated three different classes or groups of areas with different standards or levels of protection established for each class. Class I areas have the most stringent requirements.

Federally designated Class I areas include national parks, wilderness areas, and monuments, as specified in 40 CFR Part 81. Areas not designated as Class I are, by default, classified as Class II areas because EPA has not designated any Class III areas in the U.S. The proposed CISF project area is located in a Class II area. The closest Class I area near the proposed CISF project area is Carlsbad Caverns National Park, located in Eddy County, approximately 75.0 km [46.6 mi] to the southwest. The only other Class I site in the Pecos-Permian Basin Intrastate Air Quality Control Region is the Salt Creek Wilderness, located in Chaves County, approximately 126.5 km [78.6 mi] to the northwest of the proposed CISF project area.

In addition to PSD standards, potential impacts to Class I areas also consider air quality related values such as visibility. Impact to visibility occurs when the pollution in the air either scatters or absorbs the light. Both natural and man-made sources contribute to air pollution, which may impair visibility. Natural sources include windblown dust and smoke from fires, while man-made sources include electric utilities (i.e., power plants), oil and gas development, and motor vehicles (NMED, 2014).

3.7.2.2 Greenhouse Gases

Greenhouse gases (GHGs), which can trap heat in the atmosphere, are produced by numerous activities, including the burning of fossil fuels and agricultural and industrial processes. GHGs include carbon dioxide, methane, nitrous oxide, and certain fluorinated gases. These gases vary in their ability to trap heat and in their atmospheric longevity. GHG emission levels are expressed as carbon dioxide equivalents (CO_2e), which is an aggregate measure of total GHG global warming potential described in terms of carbon dioxide and accounts for the heat-trapping capacity of different gases. Present-day carbon dioxide concentrations in the atmosphere are around 400 parts per million, and by the end of the century, these levels are estimated to range somewhere between 450 and 936 parts per million (GCRP, 2017).

In 2010, EPA promulgated the Tailoring Rule to address GHG emissions under the Clean Air Act permitting programs. As initially constituted, the Tailoring Rule specified that new sources, as well as existing sources with the potential to emit 90,718 metric tons [100,000 short tons] per year of CO_2e, were subject to EPA PSD and Title V requirements. Modifications at existing facilities that increase GHG emissions by at least 68,039 metric tons [75,000 short tons] per year of CO_2e were also subject to Title V requirements. Revisions to the rule have not resulted in different numerical values associated with greenhouse gas emission evaluations (EPA, 2016b).

3.8 <u>Noise</u>

Noise associated with the proposed action is considered because it may interfere with people and wildlife present in the surrounding area. This section provides a description of existing noise sources within the proposed CISF project area and surrounding area and other resources that noise generated from the proposed CISF project could affect. The definition of noise is “unwanted or disturbing sound.” Sound measurements are described in terms of frequencies and intensities. The decibel [(dB(A)] is used to describe the sound pressure level. The A-scale on a sound level meter best approximates the audible frequency response of the human ear and is commonly used in noise measurements. Sound pressure levels measured on the A-scale of a sound meter are abbreviated dB(A). In noise measurements, sound pressure levels are typically averaged over a given length of time because instantaneous levels can vary widely. The intensity of sound decreases with increasing distance from the source. Typically, sound levels for a point source will decrease by 6 dB(A) for each doubling of distance. This may vary depending on the terrain, topographical features, and frequency of the noise source. Generally, sound level changes of 3 dB(A) are barely perceptible, while a change of 5 dB(A) is readily noticeable by most people. A 10 dB(A) increase is usually perceived as a doubling of loudness. Sound levels can vary for indoor and outdoor noise sources. For example, a jet flying overhead at 0.3 km [1,000 ft] will produce a sound level of 100 dB(A), the same as an inside subway train. A typical outdoor commercial area is equivalent to a normal speech conversation indoors, at 65 dB(A), and a quiet rural nighttime environment will mimic an empty concert hall, at 25 dB(A). A list of typical community sound levels and noise levels of common sources is shown in EIS Table 3.8-1.

Because of the rural location of the proposed CISF project, the most significant ambient noise (i.e., background noise) is from traffic on U.S. Highway 62 and State Highway 243 (EIS Figure 3.2-4) and from operating oil pump jacks located in the surrounding area (Holtec, 2020a). The location of the proposed CISF storage pad that would be constructed within the property boundary is approximately 0.8 km [0.5 mi] from State Highway 62. The nearest residents to the proposed CISF project area are located 2.4 km [1.5 mi] from the proposed CISF project (Holtec, 2020a). The nearest receptor to noise from the potential rail spur is located 0.70 km [0.43 mi] away.

Although abundant recreational opportunities exist in the area, recreational activities at the proposed CISF project area are limited because the land is privately owned and would require permission from the landowner. Laguna Plata, a playa lake located 1.6 km [1 mi] northwest of the proposed CISF project area, is on BLM-owned land and is the closest potential recreational area to the proposed CISF project area with the potential to be sensitive to noise impacts.

Noise level standards are established by Federal agencies, including the U.S. Department of Housing and Urban Development (HUD) (24 CFR Part 51), the EPA (EPA, 1974), Federal Highway Administration (23 CFR Part 772), and the Occupational Safety and Health Administration (OSHA) (29 CFR Part 1910). There are no Federally recognized Native American lands within 153 km [95 mi] of the proposed CISF project area (Holtec, 2020a). Neither Lea County nor New Mexico have ordinances or regulations governing noise, although a majority of the proposed project is within a BLM Isolated Population Area and Timing and Noise Restriction Zone (Holtec, 2020a). Therefore, the facility is not subject to State, Tribal, or local noise ordinances other than BLM restrictions that limit the timing of certain activities to between 3:00 AM and 9:00 AM from March 1 to June 15 on land in BLM jurisdiction. The EPA has defined a goal of 55 dB(A) for average day-night sound levels in outdoor spaces (EPA, 1974).

Table 3.8-1 Noise Abatement Criteria: 1-Hour, A-Weighted Sound Levels in Decibels (dBA)

Activity Category	L_{eq}(h)*	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purposes.

Table 3.8-1	Noise Abatement Criteria: 1-Hour, A-Weighted Sound Levels in Decibels (dBA)	
Activity Category	**L_{eq}(h)***	**Description of Activity Category**
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

*Leq(h) is an energy-averaged, 1-hour, A-weighted sound level in decibels.
Source: 23 CFR Part 772

3.9 Historic and Cultural Resources

Historic property means any prehistoric or historic district, site, building, structure, or object included on, or eligible for inclusion on, the National Register of Historic Places (NRHP), including artifacts, records, and material remains relating to the district, site, building, structure, or object. The criteria for eligibility are listed in 36 CFR 60.4 and include (a) association with events that have made a significant contribution to our broad patterns of history; (b) association with the lives of persons significant in our past; (c) embodiment of distinctive characteristics of type, period, or methods of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or (d) resources that have yielded or are likely to yield information important in prehistory or history [Advisory Council on Historic Preservation (ACHP), 2012]. The National Park Service also requires that a property has integrity, or the ability of a property to convey its significance, to be listed in the NRHP (National Park Service, 2014).

The historic preservation review process, NHPA Section 106, is outlined in regulations the ACHP issued in 36 CFR Part 800. As allowed under 36 CFR 800.8, the NRC staff conducted the Section 106 review process in coordination with the NEPA review for this proposed CISF project. The NRC staff consulted with the NM SHPO, interested Tribes, BLM, and Holtec when making preliminary determinations on the identification of historic properties and effects to those properties by the proposed CISF project. Under the assumption that the draft EIS would be issued in 2020, and because most historic properties that are less than 50 years old are not considered eligible for the NRHP, anticipating a maximum of 5 years until project construction, cultural resources that will be 45 years or older by 2020 were evaluated for listing in the NRHP as part of the identification of historic properties. Additional information on the NHPA Section 106 activities can be found in EIS Section 3.9.3.

Cultural resources investigations for the proposed CISF project included a review of available archaeological literature, a search and evaluation of archaeological records and collections maintained by the NM SHPO and BLM, archaeological field investigations, and Tribal consultation. Based on these reviews and through the Section 106 consultation process, this EIS section provides a description of historic and cultural resources within and surrounding the proposed CISF project area, considering the direct and indirect area of potential effects (APE), described in EIS Section 3.9.2, that could be affected by earthmoving activities, visual effects, and noise generated from the proposed CISF project.

3.9.1 Cultural History

The proposed CISF project would be located in Lea County, New Mexico. This location falls near the boundary of the High Plains (also referred to as the Llano Estacado or Staked Plains) and Pecos Valley within the Great Plains physiographic province in southeastern New Mexico. The physiographic subregion is the Mescalero Plain of the Chihuahuan Desert. The Chihuahuan Desert, which has formed in this region over the last 8,000 years and consists of desert scrub plants such as mesquite, creosote bush, and ocotillo, is the major landform of this area and has impacted human settlement of the area. Prior to the formation of the Chihuahuan Desert, the region was somewhat wetter, cooler, and covered mainly in semi-desert and plains grasslands with forests on the highest elevations (Ballou, 2018).

The earliest identifiable cultural period in the Mescalero Plain is the Paleoindian [11,500 to 8,000 years before present (BP)] (Murrell et al., 2016). The earliest distinctive tool type of this period is the large fluted Clovis spearpoint. This culture-defining projectile point is named after the town of Clovis, New Mexico, where fluted points were documented in associated extinct Pleistocene megafauna at the Blackwater Draw site in the early 20th century. Clovis tools either evolved into or were supplanted by the smaller fluted Folsom point, presumably a dart point used with the atlatl (i.e., handled long spear). Both tool traditions included large prismatic blades and fluted, lanceolate spear points made from high quality cryptocrystalline silicates, while the late Paleoindian period favored unfluted lanceolate forms (Collins, 1999; Green, 1963; Hester, 1972; Stanford, 1991; Turner and Hester, 1993). Paleoindian groups were highly mobile, as demonstrated by the use of both non-local and local sources for lithic tool manufacture (Condon, 2006). The economy of the Paleoindian period arguably focused on hunting late Pleistocene megafauna but also surely incorporated hunting smaller mammals and gathering other plant and animal resources (Boyd et al., 1989; Godwin et al., 2001). Though bison hunting was still prominent during the late Paleoindian period, evidence suggests that subsistence patterns gradually shifted to a more generalized resource strategy.

By the Archaic period (8,000 to 1,800 BP), populations in southeastern New Mexico adapted to a changing climate that created drier and warmer conditions and the modern desert grassland and scrub environment. The changing climate resulted in a shift to a larger and more generalized resource base for subsistence. Late Pleistocene megafauna were extinct, and hunting necessarily focused on smaller game, such as bison; however, bison herds would have likely been fewer, smaller, and more mobile than those in the central and northern plains. Two features that are commonly associated with Archaic occupations in the region are caliche hearths and arroyo bed wells, both are which have been extensively reported at sites firmly dated to the Archaic period (Evans, 1951; Main, 1992; Meltzer and Collins, 1987; Railey and Whitehead, 2017; Smith et al., 1966). A wider variety of dart points has been dated to the Archaic period, suggesting the development of distinct cultural groups, and there is evidence of greater use of traps and nets. Archaic populations in southeast New Mexico continued to be highly mobile, with a shift to a more expedient core/flake lithic technology (Vierra, 2005; Parry and Kelly, 1987; Railey, 2016).

The Archaic period gave way to the Formative or Ceramic Period (1,800 BP to 650 BP) and is generally marked by the appearance of ceramic vessels and lithic points associated with the bow and arrow in the material record. Some local phase sequences, each associated with specific ceramic assemblages, lithic tool kits, and structure types, have also been developed for southeastern New Mexico, these are of limited applicability to the project area, but include the Late Hueco Phase, the Querecho Phase, the Maljamar Phase, and the Ochoa Phase (Murrell et al., 2016.) During the earlier Formative subperiods, populations in southeast

New Mexico developed a ceramic material culture while continuing to practice Archaic methods of subsistence and settlement. The mid-to-late Formative subperiods saw an increase in the introduction of exotic ceramics across southern New Mexico and northern Chihuahua (Haskell, 1977; Speth, 2004). Late Prehistoric groups generally continued in the mold of a hunting and gathering way of life (Boyd et al., 1989; Godwin et al., 2001), though there is evidence for the introduction of corn horticulture in the region at some sites after 1,000 BP, particularly at sites associated with playa lakes (Brown et al., 2010a; Laumbach et al, 1979; Main, 1992).

The mobility of local populations over large areas continued throughout the Formative period, as the recovery of undecorated ceramics made from non-local clays in the sand hills of southeast New Mexico demonstrated (Hill, 2014). During the last Formative subperiod, many local populations shifted back to a subsistence strategy based around bison hunting, supplemented by corn-based horticulture. Though they were adapting a highly mobile subsistence strategy, late Formative populations were consolidating at some locations, as shown by the construction of pueblo-style structures and crop irrigation features at some sites, particularly the Merchant site (Speth, 2004; Miller et al., 2016).

The Protohistoric period (700/650 BP-300 BP) is not well documented or defined in the southwest region (Baugh and Sechrist, 2001). Occupation sites are much more ephemeral than those of preceding periods, and in the case of post-Spanish contact sites, the indigenous population likely deliberately hid camps and other occupations (Wilson, 1984). This period saw a decrease in overall population, and the abandonment of horticulture practices for a subsistence strategy based solely around hunting and gathering. Most researchers have attributed this shift to deteriorating environmental conditions that required a shift away from agricultural practices and more permanent settlements (Speth and Perry, 1978, 1980). The lithic assemblages from this period are similar in type to those of Archaic Period sites, but also include artifact types from the Formative period, making dating Protohistoric sites difficult and necessitating a reliance on absolute dating methods (Seymour, 2004; Seymour et al., 2002). The most common feature associated with this period are circles of rocks, sometimes referred to as “tipi rings,” which are generally correlated with the presence of the Mescalero Apache. This group moved into the region during the late Formative and early Protohistoric periods and may have absorbed or displaced earlier cultural groups. By the end of the Protohistoric, the Apache dominated the indigenous population of the region (Brown et al., 2010b).

The boundary between the Protohistoric and Historic periods in southern New Mexico is not sharply delineated. The Historic period (circa 450 BP) began with Spanish explorations of the region as early as 1535, when de Vaca’s shipwrecked expedition crossed through in route to Mexico. The explorer Coronado traveled through the Plains region in 1541; his ventures into this region were limited. Other explorers, such as Antonio de Espejo in 1583 and those sent by Gaspar Castano de Soa in 1590 traveled along the Pecos River, but they failed to encounter any indigenous groups, despite their presence in the region (Hammond, 1929; Schroeder and Matson, 1965; Pratt et al., 1989). That the Spanish did not encounter Apaches may have been because of a seasonal exploitation strategy that was focused on non-riverine resources during the timeframe of the various expeditions, or because of the Apache deliberately avoiding the Spanish. Evidence that the Apache still occupied the area is demonstrated by ephemeral occupation sites with both tipi rings and historic-period Pueblo ceramics (Stuart et al., 1986). Military expeditions conducted between 1650 and 1800 focused on both commercial trading pursuits and slave raids on the local groups, and historic records from that period describe encounters with the indigenous populations (Pratt et al., 1989).

In 1850, Captain Henry B. Judd traveled and mapped the length of the Pecos River, following a similar route to the previous Spanish expeditions. Prior to his survey, there had been little development in the region by non-Native groups, though Euromerican sheepherders had occupied some of the Middle Pecos drainage basin (Jelinek, 1967). A cattle trail was created along the Pecos River in 1866 by Charlie Goodnight and Oliver Loving. This trail, which extended from Texas to Fort Sumner and Santa Fe, remained in use for approximately twenty years, when horseback cattle drives were largely replaced by the shipment of livestock on the newly built railroad lines (Sebastian and Levine, 1989). Settlers attracted by available grazing land migrated into southeastern New Mexico and had established livestock ranches in the area by the mid-nineteenth century. Under the Homestead Act of 1862, a quarter section of land was guaranteed to citizens if it was settled and improved. In 1909, the allowable acreage was increased to 320 acres, and again increased to 640 acres in 1916.

By the 1880s, the Eddy brothers and Joseph S. Stevens had established the Pecos Irrigation and Investment Company to irrigate the Pecos River valley in order to supply water for farming in the area. In 1891, a rail line was established, running from what was then called the town of Eddy to Pecos. The residents of Eddy voted to change the name of their town to Carlsbad in 1899, with the hopes of attracting tourists to local hot springs. Potash mining became a prominent industry in the area during the 1920s and continues into the present day. The Carlsbad area became the focus of oil and gas development with the establishment of the El Paso Natural Gas Company in 1928, and an emphasis on mining activities has remained a mainstay of the local economy for almost a century. Historic archaeology conducted in the region has been limited and has primarily focused on individual homestead sites, with less attention paid to military sites or other site types than in other regions, with the exception of Fort Sumner (Pangburn and Therriault, 2019a).

3.9.2 Area of Potential Effect

As defined in the NHPA Section 106-implementing regulations (36 CFR 800.16), the area of potential effects refers to the areas of an undertaking that may directly or indirectly cause adverse effects to historic properties. Therefore, the NRC has defined APEs for both direct and indirect effects. The indirect APE for the proposed CISF project would consist of visual effects and noise sources arising from the project. The direct APE would coincide with the footprint of ground disturbance for the construction stage (e.g., cask transfer building, storage pads, access roads, rail spur) with the potential for additional ground disturbance to occur during decommissioning activities. The NRC staff anticipates that because of construction activities, the largest area would be disturbed during the construction stages of Phases 1-20. Therefore, the land disturbed during the construction stage represents the upper bound of potential effects to the direct APE.

The fenced, secured area totals 116.78 ha [288.56 ac]. The direct APE also includes a proposed access road east of the proposed CISF, which is a total of 60.9 m [200 ft] wide for 2.57 km [1.6 mi], totaling 15.62 ha [38.59 ac] of additional disturbed land. The APE for direct effects also includes a proposed rail spur connecting the proposed CISF with existing lines approximately 7.24 km [4.5 mi] to the west. The APE for the railroad spur includes a 60.9-m [200-ft] wide corridor for 11.38 km [7.07 mi], totaling an area of 69.11 ha [170.78 ac]. The total combined APE for direct effects is 201.51 ha [497.93 ac].

Due to the low profile of the proposed project, the extent of the visual APE (indirect APE) includes areas within a 1.6-km [1-mi] radius extending from the proposed project boundary, including from the rail spur. The proposed CISF project would alter the natural state of the landscape, and the cask transfer building would be the tallest building constructed at the proposed CISF project location at approximately 18 m [60 ft] high. The APE for indirect effects includes an area of 4589.14 ha [11,340 acres]. As described below, multiple historic and cultural resources investigations have covered all the area in the direct and indirect APEs.

Historic and Cultural Resources Investigations

The NRC staff reviewed three cultural resources investigations prepared on behalf of Holtec for the proposed CISF project. Multiple investigations occurred because the project design was altered after the initial study, resulting in the need to survey new areas. A review of archival data (Class I cultural resource inventory) was conducted on behalf of Holtec by Statistical Research, Inc. (SRI), under contract with Tetra Tech, Inc. The Class I inventory also included a review of the environmental setting, prehistoric and historic contexts, and BLM General Land Office (GLO) survey plats. A records search of both the direct and indirect APEs was conducted on November 30, 2016, by SRI using the New Mexico Cultural Resources Information System (NMCRIS), a digital repository of the Archaeological Records Management Sections (ARMS) of the New Mexico Historic Preservation Division (NMHPD). The area for this search was determined from the proposed layout documentation Holtec provided at the time (2016) and consisted of the 117 ha [290 ac] that includes the proposed CISF, rail spur, and access road. The 2016 records search also added a 1.6-km [1-mi] buffer around the proposed project footprint, totaling 4,407 ha [10,891 ac]. Additional record searches of BLM files at the Carlsbad Field Office (BLM-CFO), and online GLO and ARMS data were performed on February 5, 2019 and April 18, 2019 by archaeological consulting firm APAC, under contract with the Center of Excellence for Hazardous Materials Management, as part of the two more recent cultural resource surveys to cover additional survey areas that are now included in the final APE.

A total of 97 previous cultural investigations had taken place within the areas of the combined record searches in 2016 and 2019 (Murrell et al. 2016; Pangburn and Therriault, 2019a,b). SRI found that a total of 42 previously identified cultural resources had been identified within the areas of the 2016 records search, of which two were located within the assumed area of direct effects at the time: Site LA 89676 and HCPI 42196 (Site LA 149299) (Murrell et al., 2016). During the 2019 records searches, APAC identified eight sites that were located within 0.4 km [0.25 mi] of the proposed project area. Of these, Site LA 149299 (Pangburn and Therriault, 2019a,b) was the only site located within the final direct APE being considered in this EIS (EIS Table 3.9-1).

Site LA 89676 is a diffuse prehistoric artifact scatter, consisting of a few flaked artifacts and thermally altered caliche, covering an area of approximately 41,892 m^2 [450,922 ft^2]. The site was identified in 1992 by James Hunt, who recommended that the site had the potential to yield buried cultural materials and was therefore eligible for listing in the NRHP (Hunt 1992), and that recommendation was maintained by Murrell et al. (2016). Site LA 149299 was recorded as a historic period site consisting of a segment of railroad line with four distinct surface features. This site was originally identified in 2005 by Marron and Associates, at which time the NRHP eligibility of the Site LA 149299 was left undetermined as a result of an agreement between the NM SHPO and BLM (Murrell et al., 2016). In their report, Murrell et al. (2016) recommend Site LA 149299, now recorded as historic resource HCPI 42196, as not eligible for the NRHP.

Table 3.9-1	**Cultural Resources Documented Within the Direct APE During Class III Surveys**				
Site No.	**Temporal Affiliation**	**Site Type**	**Recorded By**	**NRHP Eligibility**	**Note**
LA 89676	Prehistoric Unknown	Artifact Scatter	Hunt, 1992; Murrell et al., 2016; Pangburn and Therriault, 2019a	Recommended Eligible	No longer within direct APE
LA 187010	Prehistoric unknown	Artifact scatter	Murrell et al., 2016	Recommended Not Eligible	Recommended Not Eligible as a result of the Section 106 site visit
HCPI 42195	1920s-1950s	2-track road	Murrell et al., 2016	Recommended Not Eligible	
HCPI 42196	1956+	Railroad Line	Marron and Associates, 2005; Murrell et al., 2016	Recommended Not Eligible	Includes former sites LA 149299 and 170340

Three Class III cultural resources surveys, which are intensive-level systematic field investigations, have been conducted within varying portions of the APE of the proposed CISF (Murrell et al., 2016; Pangburn and Therriault, 2019a,b). A Class III cultural resources survey was conducted between December 6 and 9, 2016, by SRI of a 117.40 ha [290.11 ac] survey area, covering both BLM and privately owned lands. Two additional pedestrian surveys were conducted on March 8, 2019, and April 22, 2019, by APAC (Pangburn and Therriault, 2019a,b). These surveys were conducted to align with alterations made to the CISF project and cover the entirety of the final APE.

The Class III survey SRI conducted in 2016 featured a pedestrian survey using transects spaced at 15-m [49-ft] intervals and maintained through the use of a Trimble GeoXH Global Positioning System (GPS) unit. Subsurface testing methods were applied during site investigations, where appropriate. SRI excavated three shovel tests measuring 50 × 50 cm [19.6 × 19.6 in] within the boundaries of each identified site or historic property to determine the site's stratigraphy, geomorphic context, level of integrity, and potential for intact buried cultural materials (Murrell et al., 2016).

The 2016 cultural resource survey SRI conducted resulted in identifying or resurveying the location of twenty cultural resources. These resources include: one previously recorded archaeological site (Site LA 89676), one newly recorded archaeological site (Site LA 187010), one previously documented historical period site (Site LA 149299), one newly documented historic cultural property (HCPI 42195), and 16 isolated occurrences (IOs) also labeled as isolated manifestations (IMs) by the BLM (Murrell et al., 2016). As defined by BLM guidelines, an IM is distinguished from an archaeological site by containing fewer than 10 artifacts or one undatable feature. IOs should not be related to other nearby resources and are typically redeposited materials lacking significant context.

Per updates to the State of New Mexico standards and the BLM-CFO (2012c) guidelines, historical period linear resources such as roads and rail lines are formally designated as parts of the historical-period built environment; as such, SRI documented such properties using the New Mexico State Historic Preservation Division's Historic Cultural Property Inventory (HCPI) forms and requested HCPI designations rather than continuing to use archaeological site numbers for historic railroad resources. The HCPI forms have replaced the older Historic Building Inventory forms, expanding the range and variety of documentation of the built environment in the State. Based on the updated guidelines, Site LA 149299 was re-recorded using HCPI documentation and was assigned a new HCPI number (HCPI 42196). Two additional pedestrian surveys were conducted on March 8, 2019, and April 22, 2019, by APAC (Pangburn and Therriault, 2019a,b).

The March 2019 survey covered alterations to the 2016 CISF footprint of the proposed rail spur, access road, and fence locations, including an area located between the double fences on the north side of the facility, and covered 71.58 ha [176.9 ac] of BLM and privately owned lands, with transects spaced at 15 m [49 ft] intervals. This survey resulted in the recording of one previously recorded site (Site LA 149299/HCPI 42196) and three IOs. The three IOs consist of a prehistoric lithic flake and two historic isolated artifacts (Pangburn and Therriault, 2019a).

The April 2019 survey covered the northern portion of the secure area of the Holtec site that had not been included in the 2016 survey, an area of 18.39 ha [45.45 ac]. Nine IOs and no archaeological sites or HCPI properties were identified as a result of this survey. The nine IOs include six isolated non-diagnostic historic artifacts, two single-episode modern trash dumps, and one scatter of non-diagnostic aqua glass (Pangburn and Therriault, 2019b).

Historic Resources

Two historic resources have been identified during the surveys within the APEs. These resources are HCPI 42196 (first recorded as Site LA 149299) and HCPI 42195. HCPI 42196 consists of a segment of railroad line dating between 1935 and 1960. The line runs north-south, and portions of it are still in use for the Intrepid Potash Mine North operations. SRI noted that the active portion of the line had been recently repaired or replaced, while the spur line was in poor condition and deemed the overall site to be 51-75 percent intact. As SRI recorded, the site consists of four features: the mainline track, the earthworks for the non-functional spur line, a repaired trestle, and a section of siding paralleling the main line. The spur line rails and ties had been removed, along with portions of the embankment. No artifacts were observed in association with the features. SRI recommended that HCPI 42196 was not eligible under any of the four NRHP criteria and therefore recommended it as ineligible for listing in the NRHP (Murrell et al., 2016).

During APAC's March 2019 survey, it was determined that Site LA 149299 (HCPI 42196) extended into the new survey area under the previously recorded Site LA 170340, but that both sites are components of the same railroad spur line. APAC therefore suggested that the two sites be combined as one site, under the first assigned number of Site LA 149299. As modified, Site LA 149299 now extends along the existing railroad main line to the Intrepid Potash Mine North facility and encompasses all of the formerly designated Site LA 170340 portion of the line (approximately three total miles). That segment of the line was identified in June 2011 by Escondia Research Group, LLC (ERG). Based on archival research, ERG determined that this rail line, the National Main Spur was constructed in 1956 to provide access from the main branch of the Atchison, Topeka, and Santa Fe (AT&SF) railroad to the National Potash Company's milling operations. APAC's 2019 assessment of the site found it to be in the same general condition as previous surveys and still receiving routine maintenance as an active line. APAC recommended that Site LA 170340 (now Site LA 149299) was not eligible for the NRHP, based on the previous recommendation made by ERG and BLM's concurrence. ERG's recommendation was based on the research potential of the site being exhausted, as additional archaeological or archival investigations would not yield new or additional knowledge concerning the region's mining operations and railroad development (Pangburn and Therriault, 2019a).

HCPI 42195 consists of a segment of earthen and caliche gravel, 2-track road identified during the SRI survey in 2016. The road dates between 1920 and 1954, and crosses southwest-northeast through the project area north of Hydra Lane and west of County Road 28. Though it is still in active use by oilfield workers and ranchers, the road remains between 51–75 percent intact, with a few diversions due to seasonal flooding. The road consists of two features, the 2-track, which is sometimes underlain by a man-made, prism-shaped earthen roadbed, and a concrete box culvert. A former utility line associated with the road is no longer extant. The artifacts located near the road were generally recorded as IOs and included bottle glass, car parts, insulator fragments, metal cans, tobacco tins, metal fragments, and a 1954 New Mexico license plate. Though SRI excavated three shovel tests along the 2-track, no buried artifacts or cultural deposits were discovered in association with this historic property before the excavators encountered sterile hardpan. As early-to-mid-20th century 2-track roads such as HCPI 42195 are commonly found within this region, and as this individual road segment does not satisfy any of the four criteria for eligibility under the NRHP, SRI recommended that it was not eligible for listing in the NRHP (Murrell et al., 2016).

Prehistoric Archaeological Resources

Two prehistoric sites (Site LA 89676 and Site LA 187010) and 28 IOs have been identified during the field investigations of the three surveys conducted for the proposed CISF and associated facilities. The IOs include 21 historic and seven prehistoric manifestations. Site LA 89676, first recorded by James Hunt in 1992, consists of a diffuse surface lithic scatter consisting of thermally altered (burned) caliche and a few lithic flaked materials covering an area of 30,000 m^2 [322,917 ft^2] at the time of initial identification. Located within a series of terrace-line landforms descending to the west side of Laguna Gatuna, the site is covered by desert scrubland vegetation but has high (76-99 percent) ground visibility. During the revisit, SRI observed that the site has been heavily impacted by grazing and sheetwash erosion events and retains less than 26 percent of its originally estimated integrity. The resurvey of the area resulted in the expansion of the site boundaries to cover 42,264 m^2 [454,926 ft^2]. SRI observed no recognizable surface features but noted that approximately 500 pieces of disarticulated, burned caliche are present, with the densest concentrations found on the eastern edges. The lithic assemblage included seven flaked lithic debitage (four chert and three quartzite core flakes), one chalcedony core, and one chert scraper, with the lithic materials reflecting a focus on lithic reduction activities. SRI excavated three shovel tests across the site and encountered numerous caliche nodules in one shovel test, burned caliche between 10 and 20 centimeters below surface (cmbs) [3.9 and 7.8 inches below surface (inbs)] in one shovel test, and eight pieces of burned caliche and one chert flake between 20 and 30 cmbs [7.9 and 12 inbs] in the third shovel test. SRI interpreted the site as a temporary camp dating to an unknown prehistoric period. Though it lacked diagnostic materials and has been subjected to heavy surficial erosion and artifact migration, SRI found that the site had good potential to contain additional buried deposits with datable materials that could provide answers to several current research questions on prehistoric activities in this area of New Mexico. Therefore, SRI agreed with the previous recommendation, and recommended Site LA 89676 as eligible for listing in the NRHP under Criterion D (Murrell et al., 2016). Because of changes to the proposed rail spur design between the 2016 and 2019 surveys, Site LA 89676 is no longer within the direct APE.

Site LA 187010, as described by the 2016 SRI survey, consists of a small prehistoric camp dating to an unknown temporal period. The site covers an area of 1,312 m^2 [14,122 ft^2] and consists of one feature (a burned caliche concentration) and a diffuse artifact scatter. Located within a series of terrace-line landforms descending to the west side of Laguna Gatuna, the site is covered by desert scrubland vegetation but has high (76-99 percent) ground visibility. The site has been impacted by fence construction, utility line installation, and livestock grazing, and its integrity as of 2016 is estimated to be 51–75 percent. The artifact scatter consisted of approximately 100 pieces of burned caliche, two lithic artifacts, a quartzite tested cobble, and a chert core flake. The 50 × 100-cm [19.6 × 39.9-in] caliche concentration extended to a depth of 10 cmbs [3.9 inbs], and was considered to be relatively intact below surface, though it was highly disturbed at the surface. SRI excavated three shovel tests but observed no artifacts or buried deposits in any of the tests, which terminated around 15 cmbs [5.9 inbs] at a calcrete substrate. SRI interpreted the site as a temporary camp focused on resource procurement activities around Playa Gatuna. Though the site has been disturbed at the surface and currently lacks temporally diagnostic artifacts, SRI noted that the feature contained intact, datable ash deposits, and as such could provide answers to several current research questions on prehistoric activities in this area of New Mexico. Therefore, SRI recommended Site LA 187010 as eligible for listing in the NRHP under Criterion D (Murrell et al., 2016). However, on February 4, 2020, the NRC staff, the NRC's archeological expert, a Tribal representative, and Holtec's archeological contractor visited the proposed project area to inspect and assess the sites identified in the Class III survey (ADAMS Accession No. ML20055E102). During the site visit, the NRC and Holtec staffs and a Navajo Nation Tribal representative noted that Site LA 187010 consisted only of two surface finds and a presumed thermal feature, most likely a hearth. The only evidence of the thermal feature that could be identified during the site visit were approximately six pieces of thermally altered stone. No sign of burned caliche or ash was visible. The involved staffs and Tribal representative noted that such a light scatter of artifacts, without an associated datable feature, would not meet BLM criteria for definition as an archaeological site, and could be more accurately recorded as an IM. Therefore, the consensus among all parties in attendance at the visit was that Site LA 187010 should not be recommended eligible for listing on the NRHP. The NRC staff requested that Holtec conduct additional fieldwork to document the current condition of Site LA 187010 and amend the Class III report and site files to note the site recommendation change of Site LA 187010. The updated Class III report, along with the NRC staff recommendations, was submitted to the NM SHPO for concurrence on November 30, 2020. The NRC staff received NM SHPO concurrence, as documented in a letter dated December 15, 2020. A full listing of correspondence can be found in Appendix A of this EIS.

Isolated Occurrences (Manifestations)

The 16 IOs, or IMs as labeled by BLM, identified by SRI (numbered as 1001–1008 and 1010–1017) include both historic and prehistoric artifacts. The six prehistoric isolates include two chert core flakes and four clusters of burned caliche fragments. The 10 historic IOs include one 1954 New Mexico license plate, one insulator fragment, one tobacco tin, two bottle breaks with multiple glass fragments each, and five episodes of dumping of multiple historic materials that included glass, metal cans, metal fragments, bridge ties, metal wire, and car parts from a single car (Murrell et al., 2016).

The three IOs (numbered as 1–3) APAC identified during the March 2019 survey include one prehistoric IO and two historic IOs. The prehistoric IO consists of one quartzite core reduction flake with cortex. The two historic IOs consist of two USGS brass cap markers, both dating to 1943, with one marking a quarter section and the other marking a section (Pangburn and Therriault, 2019a). The nine IOs (numbered as 1–9) recorded during APAC's April 2019 survey all date to the historic period. These IOs include one beer bottle, one 55-gallon metal drum, one toy pistol, one dark purple glass fragment, one soda bottle glass fragment, multiple glass fragments from a single source, and two single episode modern trash dumps containing multiple historic artifacts each (Pangburn and Therriault, 2019b). Isolated occurrences are not considered significant enough to warrant eligibility in the NRHP and therefore are not considered under the four NRHP criteria.

Paleontology

No paleontological finds have been identified in the proposed project area. However, east of the proposed project area is a geologic unit categorized by BLM as a potential fossil yield classification 4 (PFYC 4) that in other locations within New Mexico has contained fossils.

3.9.3 Tribal Consultation

Cultural resources that are considered sensitive and potentially sacred to modern Indian Tribes include burials, rock art, rock features and alignments (such as cairns, medicine wheels, and stone circles), American Indian trails, and certain religiously significant natural landscapes and features. Some of these resources may be formally designated as Traditional Cultural Property (TCPs) or sites of religious or cultural significance to Indian Tribes. A TCP is a site that is eligible for inclusion on the NRHP because of its association with cultural practices or beliefs of a living community, which are (i) rooted in that community's history and (ii) important in maintaining the continuing cultural identity of the community and meets the other criteria in 36 CFR 60.4.

The NRC staff identified 11 Tribes that may attach religious and cultural significance to historic properties in the area of potential effects and invited them to be consulting parties. The NRC staff sent letters to each Tribal representative on April 2, 2018 (EIS Appendix A). The letters included a brief description of the proposed undertaking, a site location map, an invitation for the Tribe to participate as a consulting party, and a response form. Four Tribes responded with interest to continue the consultation process, including Kiowa Tribe on August 20, 2018, and the Navajo Nation on September 14, 2018. The Ysleta del Sur Pueblo responded on August 21, 2018, that while they did not have any comments and that the project would not affect traditional, religious or culturally significant sites to their Pueblo, they requested consultation should any human remains or artifacts unearthed during this project be determined to fall under the Native American Graves Protection and Repatriation Act (NAGPRA) guidelines. Information regarding prior surveys of the proposed project area was sent on August 29, 2019 (ADAMS Accession No. ML19003A176) to interested Tribes: the Hopi Tribe, the Kiowa Tribe of Oklahoma, the Navajo Nation, and the Pueblo of Tesuque. The Hopi Cultural Preservation Office responded to NRC in a letter dated September 16, 2019. The letter identified two sites of cultural significance to the Tribe – Site LA 187010 and Site LA 89676 (described in EIS Section 3.9.2) – that could be potentially affected if the proposed CISF is licensed and constructed, and the identified sites were not avoided.

The NRC staff continued consultation efforts by a letter dated December 12, 2019, proposing to define the APE for both direct and indirect effects and invited the Hopi Tribe, the Kiowa Tribe of Oklahoma, the Navajo Nation, and the Pueblo of Tesuque to a site visit (NRC, 2019c). On February 4, 2020, the Navajo Nation Tribal Historic Preservation Officer attended a site visit with the NRC staff and a professional archaeologist.

By letter dated March 11, 2020, the NRC staff again reached out to the eleven potentially interested Tribes with a notice of availability of the draft EIS for the Holtec CISF project. The letter explained that the NRC made a preliminary determination that the construction and operation of the CISF would not adversely affect historic properties near the site and requested comments on the draft EIS and preliminary conclusions. On August 26, 2020, the NRC staff provided the Hopi Tribe, the Kiowa Tribe of Oklahoma, the Navajo Nation, and the Pueblo of Tesuque with a copy of NRC's draft Class III report on the identification of historic properties and its proposed eligibility recommendations, and the NRC staff requested that the Tribes review and comment on the report. The NRC staff received one response—the Hopi Tribe provided concurrence for the eligibility recommendations, as documented in a letter dated September 7, 2020. On December 15, 2020, the NRC staff received the NM SHPO's concurrence on its eligibility determination, thereby concluding NRC's Section 106 activities. A full listing of correspondence can be found in Appendix A of this EIS.

3.10 Visual and Scenic

The proposed CISF project is located in the Querecho Plains of southeastern New Mexico. The landscape is characterized by flat topography with vast areas of both stabilized and drifting dune sand. The ground surface in this area of barren land is characterized by a whitened caliche. Natural features visible from the proposed CISF project area include some incised runoff gullies and Laguna Gatuna to the east (Holtec, 2020a). Man-made structures currently located on the land surrounding the proposed CISF project area include a communications tower in the southwest corner of the proposed CISF project area, a producing well located near the communications tower, a small livestock water drinker, an aqueduct running along the northern half of the property, an abandoned oil recovery facility (including tanks and associated hardware) in the northeast corner, and another oil recovery facility (including tanks and associated hardware) in the far southeast corner (Holtec, 2020a).

Visual resources consist of landscape or visual character and visual sensitivity and exposure. The Visual Resource Management (VRM) Manual 8410 that BLM produced provides a means for determining visual values (BLM, 1986). The evaluation consists of three determinations: (i) scenic quality, (ii) sensitivity-level analysis, and (iii) delineation of distance zones. Based on these categories, the BLM places land into one of four visual resource inventory classes (i.e., Class I – IV). Additionally, four management objectives have been established based on scenic quality, visual sensitivity, and distance from key observation points for each of the classes. These management objectives for the classes describe the different degrees of modification allowed in the basic elements of the landscape. Classes I and II are the most valued, Class III is of moderate value, and Class IV is of least value.

BLM has determined visual resource management objectives for all public lands in the Carlsbad Resource Area (BLM, 1986). These management objectives were derived from previous land use planning and visual resource inventories for lands west of the Pecos River. The proposed CISF project area has been determined to be in the range of a Class IV (BLM, 1986), which means that the amount of change allowable to the characteristic landscape can be high, and that these changes may dominate the view and be the major focus of viewer attention.

Scenic quality is a measure of the visual appeal of a tract of land. In the visual resource inventory process, lands are given an A, B, or C rating based upon the apparent scenic quality, which is determined using seven factors. These factors include landform, vegetation, water resource features, color, adjacent scenery, scarcity, and cultural modifications (that either add to or detract from visual quality) (BLM, 1986). Based upon the BLM criteria, the proposed CISF project area received the lowest scenic quality rating. This rating means that the level of change to the characteristic landscape can be high and allows for the greatest level of landscape modification (ELEA, 2007).

Sensitivity levels are a measure of public concern for scenic quality. Public lands (which surround the proposed CISF project area) are assigned high, medium, or low sensitivity levels by analyzing the various indicators of public concern. Indicators of public concern include type of users, amount of use, public interest, adjacent land use, special areas, and other factors specific to the location. As described in EIS Section 3.2 (Land Use), because the proposed CISF project area and surrounding area are located in a sparsely populated area that is inclined to be used for cattle grazing or oil and gas exploration and production, the sensitivity level analysis for this location was determined to be low (ELEA, 2007).

Landscapes are subdivided into three distance zones, based on relative visibility from travel routes or observation points. These three zones are foreground, middleground, background, and seldom seen. The proposed CISF project area is not visible from any city, township, borough, or identifiable population center, and the property boundary is located 0.8 km [0.5 mi] north of U.S. Highway 62/180. Half of the proposed CISF project area lies within the foreground-middleground because of a slight crest or rise in the center of the proposed CISF project area. The remaining half of the proposed CISF project area lies in the seldom-seen zone on the opposite side of the crest from the highway (Holtec, 2020a).

3.11 Socioeconomics

This section describes the context of the proposed CISF project and the socioeconomic resources that have the potential to be directly or indirectly affected as a result of the proposed action. The following subsections summarize the affected socioeconomic environment for five primary topic areas: (i) demography (i.e., population characteristics), (ii) employment structure and personal income, (iii) housing availability and affordability, (iv) tax structure and distribution, and (v) community services. These subsections include discussions of spatial (e.g., regional, vicinity, and proposed CISF project area) and temporal considerations, where appropriate.

The NRC staff collected and analyzed regional socioeconomic data the U.S. Census Bureau (USCB) provided, including 5-year estimates that the USCB collects for commuting workers. The NRC staff considered the points of origin and destination of commuting workers within the 10 counties that fully or partially fell within an 80-km [50-mi] radius of the proposed CISF project as an influencing factor for determining the appropriate socioeconomic region of influence (ROI). Of the 10 counties, 3 are in New Mexico (Chaves, Eddy County, and Lea County), and 7 counties are in Texas (Andrews, Culberson, Gaines, Loving, Reeves, Winkler, and Yoakum). Four of the 10 counties have a large population of workers that could commute to Lea County, and those counties are: Lea and Eddy counties in New Mexico, and Andrews and Gaines counties in Texas. The socioeconomic ROI is larger than for some other resource areas because of the potential for commuting workers, jobs, and social resources to be impacted in nearby communities that are further from the proposed project location.

The NRC staff reviewed the most recent commuting worker flow data available from USCB, which is for the years 2011 through 2015 (USCB, 2015). The Census Bureau produces county-level commuting flow tables every 5 years. Commuting patterns of working residents 16 years old and older in Lea County demonstrate a preference for a work site in Lea and Eddy counties. Approximately 94 percent of Lea County commuting workers (approximately 27,650 individuals) worked in Lea County. Approximately 1,800 Lea County commuting workers work in other counties. The highest percentage of Lea County commuting workers that work outside of the county travel to Eddy County (about 27 percent). The existing National Enrichment Facility (NEF) and WIPP facilities are located within 64 km [40 mi] of the proposed CISF project area in Lea and Eddy counties, respectively. Also, the largest population centers within 80 km [50 mi] of the proposed CISF are the cities of Hobbs and Carlsbad, located in Lea and Eddy counties, respectively. The WCS facility is in Andrews County, Texas, which is within 80 km [50 mi] of the proposed CISF project area. Based on the 2011–2015 worker commute estimates the USCB provided (2015), approximately 15 percent of the residents from Andrews County, Texas, that work outside of Andrews County, and approximately 20 percent of the residents from Gaines County, Texas, that work outside of Gaines County, commuted to Lea County. The NRC staff anticipates that because of these statistics and preferences, some residents with the appropriate skill set for the proposed action may commute from Eddy, Andrews, and Gaines counties to the proposed CISF for work. Thus, it is reasonable to assume that most of the direct workforce and induced population would reside in Lea or Eddy County in New Mexico, or Andrews or Gaines County in Texas. Therefore, those four counties are considered the socioeconomic ROI for the proposed CISF.

3.11.1 Demography

3.11.1.1 Population Distribution in the Socioeconomic ROI

The proposed CISF project would be located in unincorporated Lea County, approximately halfway between the cities of Hobbs and Carlsbad. The average 2019 population density of the four counties within the socioeconomic ROI (Lea and Eddy counties in New Mexico, and Andrews and Gaines counties in Texas) is between 4.8 and 6.2 persons per km^2 [12.5 and 16.2 persons per mi^2]. The average State population density of New Mexico and Texas as of July 1, 2019, was about 6.7 and 42.9 persons per km^2 [17.3 and 111 persons per mi^2], respectively (USCB, 2019a,b).

The major communities and transportation routes within the 4-county ROI are depicted in EIS Figure 3.11-1. Estimated populations for counties and communities in the ROI, as determined by the USCB 2015–2019 5-year American Community Survey (ACS), are provided in EIS Table 3.11-1. The USCB 2015–2019 population estimates indicate that 166,751 people live in the ROI. Slightly more than half of Lea County's population resided in Hobbs, the largest municipality in the county (USCB, 2019b). Hobbs is the largest city in southeastern New Mexico and serves as a commercial center for the population within the 80-km [50-mi] radius of the proposed CISF project. The population estimates for Eddy County show that approximately half the county residents lived in Carlsbad during the 2015-2019 period, the county seat and the largest city in the county (EIS Table 3.11-1). The largest populated area in Andrews County is the city of Andrews, and the largest populated area in Gaines County is the city of Seminole, which are both located just outside the 80-km [50-mi] radius surrounding the proposed CISF project considered in this EIS. The majority of the population in Gaines County live in the cities of Seagraves and Seminole.

In addition to the population that resides in the ROI, approximately 7,000 people visit the Carlsbad market area each year. As described in EIS Section 3.11.2 (employment and income), some workers in the ROI, particularly in the oil and gas industry, may not reside in the ROI. Based on the U.S. census records and data collected from the New Mexico Environment Department's Drinking Water Bureau and New Mexico State Engineer Records, the City of Carlsbad estimates that the estimated daily population for the area including the City of Carlsbad and an approximately 32-km [20-mi] radius is as high as 74,279 people (Consensus Planning, 2020).

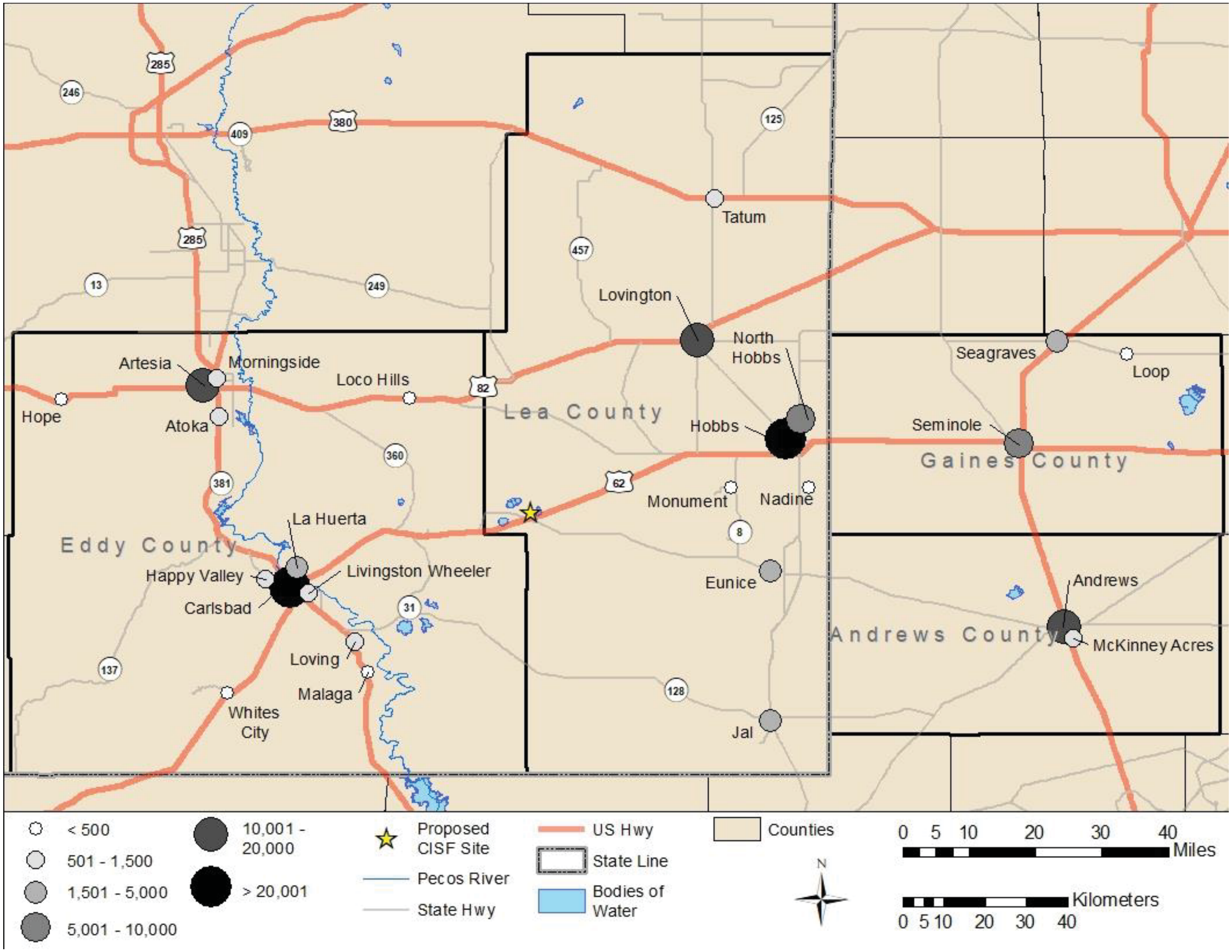

Figure 3.11-1 USCB Designated Places Within the Socioeconomic Region of Influence (Source: USCB, 2019b)

Table 3.11-1 USCB Designated Places in the Socioeconomic Region of Influence	
Geographic Areas	**2015–2019 Population Estimate**
Lea County, New Mexico	70,277
Eunice	3,037
Hobbs	38,375
Jal	1,896
Lovington	11,491
Monument	134
Nadine	294
North Hobbs	6,301
Tatum	726
Eddy County, New Mexico	57,732
Atoka	1,193
Artesia	12,262
Carlsbad	29,158
Happy Valley	774
Hope	110
La Huerta	11,608
Livingston Wheeler	706
Loco Hills	24
Loving	1,241
Malaga	114
Morningside	787
Whites City	85
Andrews County, Texas	18,036
Andrews	13,653
McKinney Acres	1,143
Gaines County, Texas	20,706
Loop	349
Seagraves	2,836
Seminole	7,586
Source: USCB, 2019b	

Because of the rapid rise and fall of populations in response to the oil and gas industry boom and bust cycles since the 1920s (Rhatigan, 2015), population centers have expanded to accommodate greater populations. The annual population growth rates of the four counties between 2010 and 2019 were between 1.2 percent (Eddy County) and 3.6 percent (Andrews County) (USCB, 2019b). The percent of population change between 2010 and 2019 in each of the four counties is provided in EIS Figure 3.11-2.

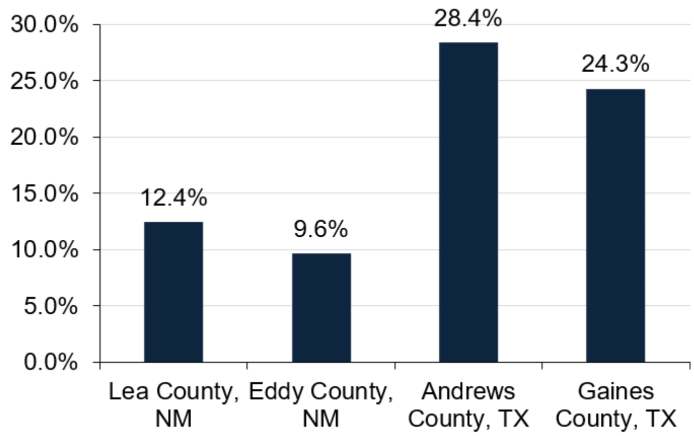

Figure 3.11-2 Percent of Total Population Change by County Between 2010 and 2019 in the Socioeconomic Region of Influence (Source: Modified from Economic Profile System, 2020a)

This population trend is also anticipated to occur in other communities within the ROI and may continue through the term of the license of the proposed CISF project. For these reasons, population growth experienced in the socioeconomic ROI cannot be reasonably predicted, because of the oil and gas boom and bust cycles. Therefore, NRC staff does not provide population projections for the socioeconomic ROI for the proposed license term of the project in this EIS.

Localized Population Distribution

Several small communities of 500 people or less are present within the ROI (EIS Figure 3.11-1). In addition, about 21,000 people in the ROI live outside of USCB designated populated areas. Therefore, the NRC staff also looked at 13 Census County Divisions (CCDs) within the socioeconomic ROI to analyze population characteristics on a smaller scale than the county level, but that also includes people who do not live within a USCB-designated area (EIS Figure 3.11-3). A CCD is an area within a county established by the USCB and local and State officials that provide a useful set of information that can be analyzed for planning purposes (USCB, 1994). Select information for the CCDs is provided in this section of the EIS as a comparison to other geographic areas, such as counties.

The community of Monument is the closest USCB-designated place to the proposed CISF project area (Figure 3.11-1). The cities of Hobbs and Carlsbad are the closest commercial centers to the CISF project area and will supply the majority of retail and housing needs during the license term of the proposed project. Hobbs is located in the Hobbs CCD, and Carlsbad is located within the Carlsbad CCD. The population within these two CCDs represent approximately 67 percent of all people living in Eddy and Lea counties (EIS Figure 3.11-3 and EIS Table 3.11-1).

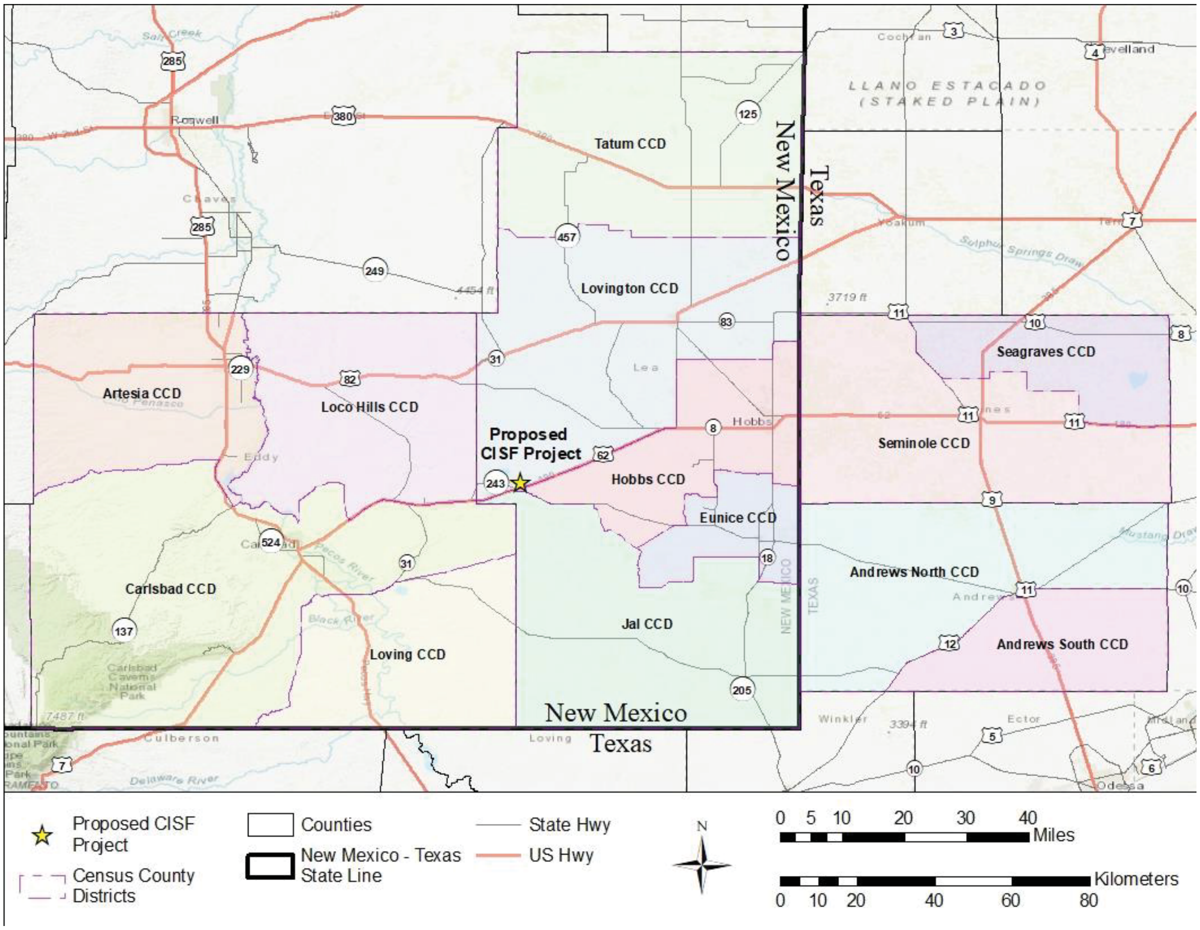

Figure 3.11-3 Census County Districts in the Socioeconomic Region of Influence (Source: Modified from USCB, 2019b)

3.11.1.2 Select Population Characteristics in the Socioeconomic ROI

EIS Table 3.11-2 lists selected population characteristics of the counties in the socioeconomic ROI and in, for comparison, New Mexico and Texas. EIS Table 3.11-3 lists selected population characteristics of the CCDs in the ROI. Population characteristics, including race and ethnicity, of the counties in the ROI broadly reflect those same characteristics in New Mexico and Texas.

Race and ethnicity characteristics of the CCDs generally reflect the same range of characteristics compared to their respective counties and States, with a couple exceptions. The percentage of African Americans in the Hobbs CCD is higher than Lea County and New Mexico. The percentage of individuals of Hispanic ethnicity in the Jal, Loving, and Lovington CCDs is higher than in both Eddy and Lea Counties, and New Mexico. The percentage of individuals of Hispanic ethnicity in the Seagraves CCD is the highest of all the CCDs and higher than that of Gaines County and Texas. The average of all populations with Hispanic ethnicity that reside in the 13 CCDs is 53 percent.

Table 3.11-2 Select Population Characteristics of Counties Within the ROI and the States of New Mexico and Texas							
State/County	**African American (%)**	**American Indian and Alaskan Native (%)**	**Asian (%)**	**Native Hawaiian or Other Pacific Islander (%)**	**Some Other Race (%)**	**Two or More Races (%)**	**Hispanic Ethnicity (%)**
New Mexico (State)	1.8	8.7	1.5	0.1	0.2	1.6	48.8
Eddy County	1.4	1.4	0.5	0.0	0.0	0.7	49.1
Lea County	3.4	0.8	0.6	0.0	0.2	0.9	58.7
Texas (State)	11.8	0.3	4.7	0.1	0.2	1.7	39.3
Andrews	1.5	0.0	0.4	0.2	0.0	2.3	56.3
Gaines	2.2	0.3	0.5	0.0	0.0	0.0	41.5
Source: USCB, 2019b							

Table 3.11-3 Select Population Characteristics of Census County Districts Within the ROI							
Census County District	**African American (%)**	**American Indian and Alaskan Native (%)**	**Asian (%)**	**Native Hawaiian or Other Pacific Islander (%)**	**Some Other Race (%)**	**Two or More Races (%)**	**Hispanic Ethnicity (%)**
Artesia CCD, Eddy County, New Mexico	1.1	1.7	0.0	0.0	0.0	0.5	51.6
Carlsbad CCD, Eddy County, New Mexico	1.7	1.0	0.7	0.0	0.1	0.9	7.2
Loco Hills CCD, Eddy County, New Mexico	0.0	0.0	0.0	0.0	0.0	0.0	49.0
Loving CCD, Eddy County, New Mexico	0.0	6.1	0.0	0.0	0.0	0.3	63.3
Eunice CCD, Lea County, New Mexico	0.0	3.7	0.0	0.0	0.0	0.0	49.5
Hobbs CCD, Lea County, New Mexico	4.3	0.9	0.8	0.0	0.2	1.2	57.0
Jal CCD, Lea County, New Mexico	1.0	0.6	0.0	0.0	0.0	0.0	59.2

Table 3.11-3	Select Population Characteristics of Census County Districts Within the ROI						
Lovington CCD, Lea County, New Mexico	1.8	0.1	0.0	0.0	0.2	0.3	67.5
Tatum CCD, Lea County, New Mexico	0.5	0.2	0.0	0.0	0.0	0.3	40.0
Andrews North CCD, Andrews County, Texas	0.8	0.0	0.4	0.2	0.0	2.9	58.4
Andrews South CCD, Andrews County, Texas	0.0	0.0	0.0	0.0	0.0	0.0	47.1
Seagraves CCD, Gaines County, Texas	2.8	0.0	0.0	0.0	0.0	0.0	73.8
Seminole CCD, Gaines County, Texas	0.0	0.3	0.6	0.1	0.0	0.0	33.6
Source: USBC, 2019							

3.11.1.3 Environmental Justice: Minority and Low-Income Populations

Methodology

A minority or low-income community may be considered as either a population of individuals living in geographic proximity to one another or a dispersed/transient population of individuals (e.g., migrant workers) where either type of group experiences common conditions of environmental exposure (NRC, 2003). NUREG–1748 defines minority categories as: American Indian (not of Hispanic or Latino origin) or Alaskan Native, Asian, Native Hawaiian or other Pacific Islander, African American, some other race, and Hispanic or Latino ethnicity (of any race) (NRC, 2003). The 2000 Census introduced a multiracial category. Anyone who identifies themselves as white and a minority is counted as that minority group. Individuals that identify themselves as more than one minority are counted in a “two or more races” group (NRC, 2003). Low income is defined as being below the poverty level, as the USCB defined (NRC, 2003). The NRC recommended area for evaluating census data is the census block group, which is delineated by the USCB and is the smallest area unit for which race and poverty data are available (NRC, 2003). The NRC staff used ESRI ArcGIS® online and the USCB website to identify block groups within 80 km [50 mi] of the proposed CISF project area. This radius was selected to be inclusive of (i) locations where people could live and work in the vicinity of the proposed project and (ii) of other sources of radiation or chemical exposure. The NRC staff included a block group if any part of the block group was within 80 km [50 mi] of the proposed CISF project area; 115 block groups were identified as being within, or partially within, the 80-km [50-mi] radius. The NRC guidance in NUREG–1748 (NRC, 2003) indicates that a potentially affected environmental justice population exists if at least one of these conditions exists: either the minority or low-income population of the block group is more than 50 percent of the entire block group population; or the minority or low-income population percentage of the block group is significantly, or meaningfully, greater (typically by at least 20 percentage points) than the minority or low-income population percentage in the geographic areas chosen for comparative analysis.

Minority Populations

Using the USCB annual surveys conducted during 2015–2019 that represent characteristics during this period (American Community Survey 5-year estimates), the NRC staff calculated (i) the percentage of each block group's population represented by each minority category for each of the 115 block groups within the 80-km [50-mi] radius, (ii) the percentage that each minority category represented of the entire populations of New Mexico and Texas, and (iii) the percentage that each minority category represented for each of the counties that has some land within the 80-km [50-mi] radius of the proposed CISF project area. If the percentage of a block group meets one of the above-stated criteria, then that block group was identified as a potentially affected environmental justice population. If a block group met one or both of the criterion for either the State or the county, it was not double-counted. The CEQ recommends that Federal agencies follow this approach to identify minority populations (CEQ, 1997), and therefore the NRC staff implemented this conservative approach to identify environmental justice populations. In light of high minority populations in New Mexico and to better meet the spirit of the NRC guidance to identify minority populations, the NRC staff included census block groups with a percentage of Hispanics or Latinos at least as great as the statewide average if that average is lower than the respective county. According to the USCB, the percent of people who self-identify as Hispanic or Latino in the 2015–2019 period in Texas is 39.3 percent, and 48.8 percent in New Mexico.

Out of the 115 block groups located completely or partly within 80 km [50 mi] of the proposed CISF project area, there are 67 block groups that meet at least one of the two NRC guidance criteria previously described in this section, or the more inclusive definition applied to this analysis (i.e., including census block groups with a percentage of Hispanics or Latinos at least as great as the statewide average). All of the 67 block groups have Hispanic populations that exceed one of these criteria. Two of the 67 block groups, located in Lea County, also have black populations that exceed one of these criteria. One of the block groups located in Eddy County also has American Indian and Alaska Native populations that exceed one of these criteria. EIS Figure 3.11-4 provides a graphical representation of the block groups with potentially affected minority populations. Appendix B provides additional detail about the minority populations in the 115 block groups.

Low-Income Populations

The NRC guidance defines low-income households based on statistical poverty thresholds (NRC, 2003), which is consistent with the Council on Environmental Quality's (CEQ) recommendation for Federal agencies in assessing environmental justice (CEQ, 1997). The NRC staff applied the 50 percent or greater than 20 percent standard in NUREG–1748 Appendix C to compare the low-income population in the block groups to the statewide and county percentages.

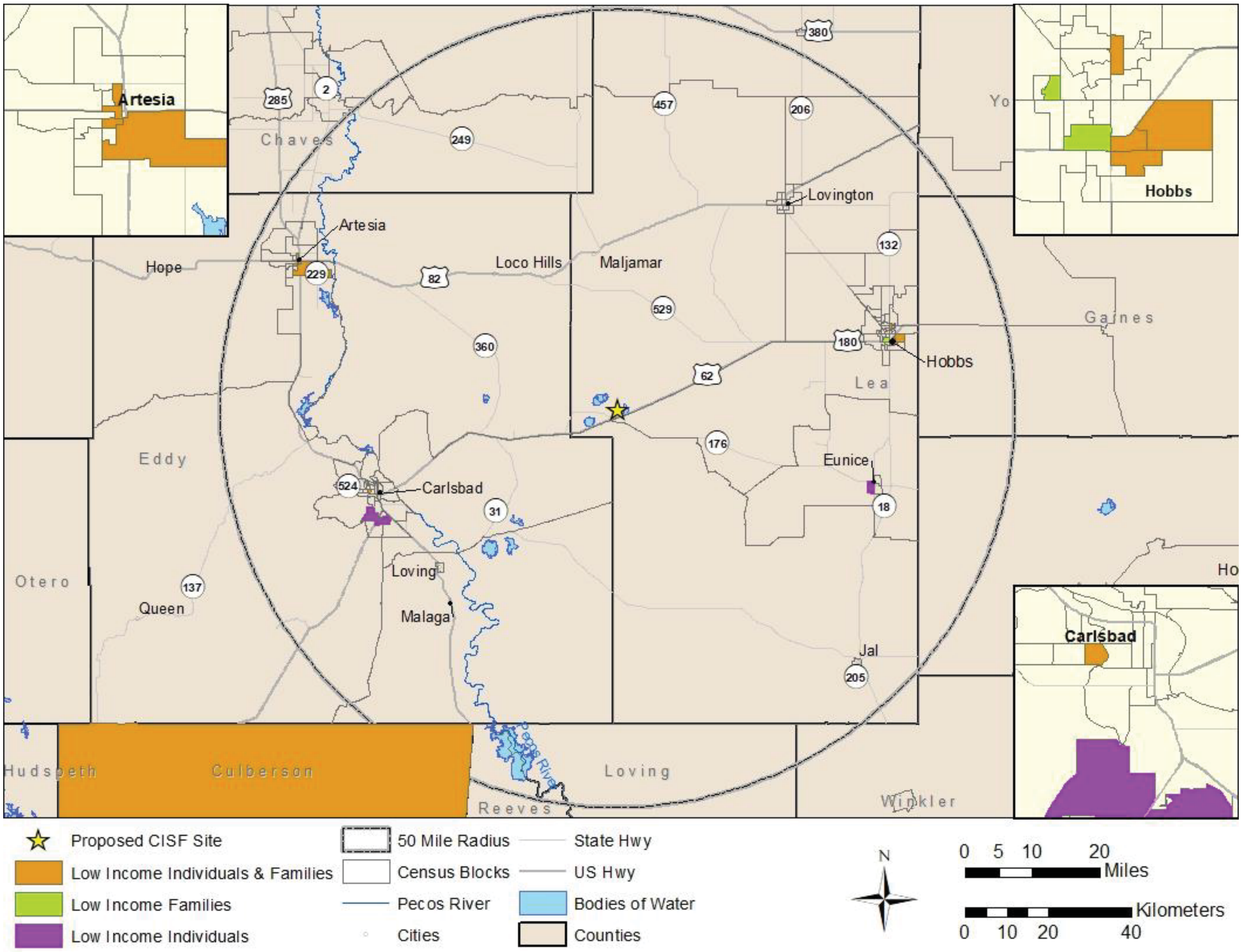

Figure 3.11-4 Block Groups with Potentially Affected Minority Populations Within 80 km [50 mi] of the Proposed CISF Project Area (Source: Modified Using ArcGIS and Data Collected from USCB, 2019b)

Of the 115 block groups located completely or partly within 80 km [50 mi] of the proposed CISF project area, there are 12 block groups with low-income families that meet one of the previously described criteria used in this EIS to identify potentially affected environmental justice populations. There are also 12 block groups with low-income individuals in the region that meet one of the criteria. Although New Mexico and Texas are both above the national average for percentage of low-income individuals, 102 of the 115 of the block groups within the 80-km [50-mi] region are within 20 percentage points of the national average of 13.4 percent, and 3 of those 102 block groups have over 50 percent of low-income individuals (USCB, 2019b). EIS Figure 3.11-5 provides a graphical representation of the block groups with potentially affected low-income populations.

The estimated percentages of New Mexico families and individuals that live below the poverty level (i.e., the poverty rate) in the period between 2015 and 2019 are 14.5 percent and 19.1 percent, respectively. The estimated poverty rates in Texas for families and individuals are 11.3 percent and 14.7 percent, respectively (USCB, 2019b). EIS Figure 3.11-6 provides a comparison of low-income families and individuals by county. The described poverty rates of

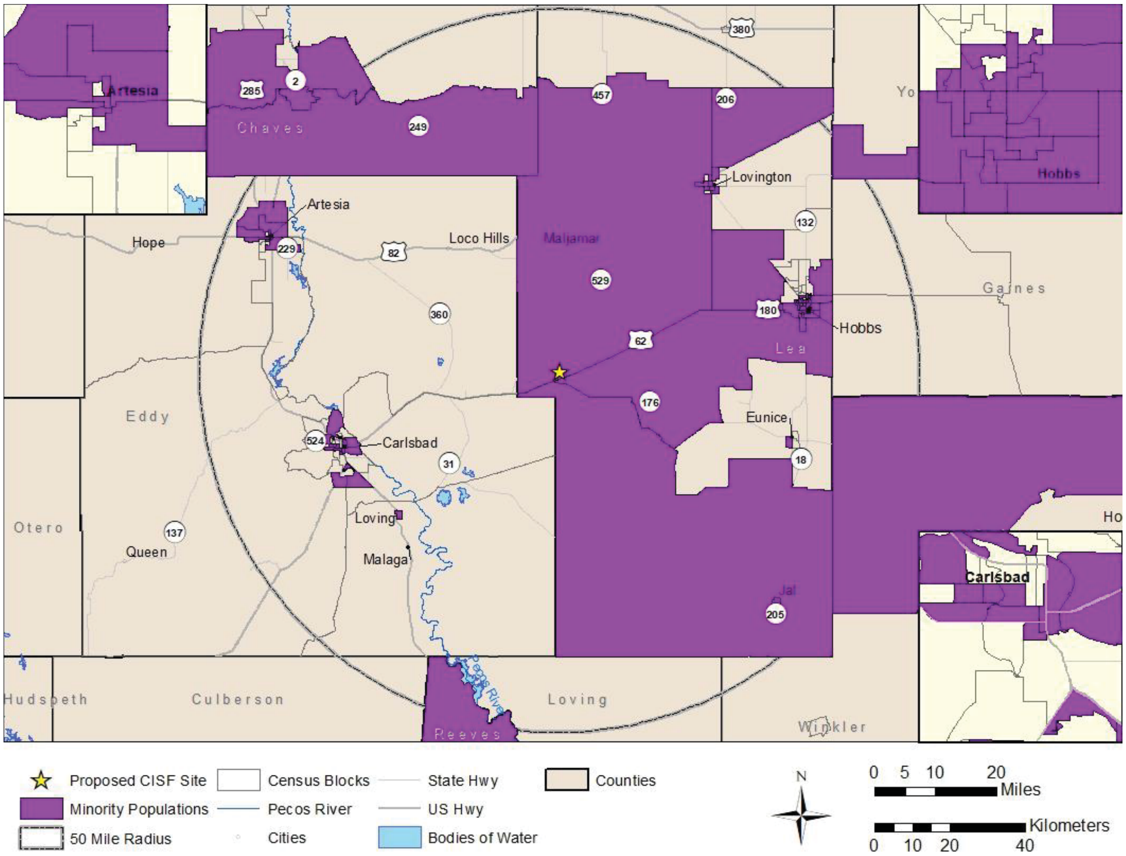

Figure 3.11-5 Block Groups with Potentially Affected Low-Income Populations Within 80 km [50 mi] of the Proposed Holtec CISF (Source: Modified using ArcGIS and data collected from USCB, 2019)

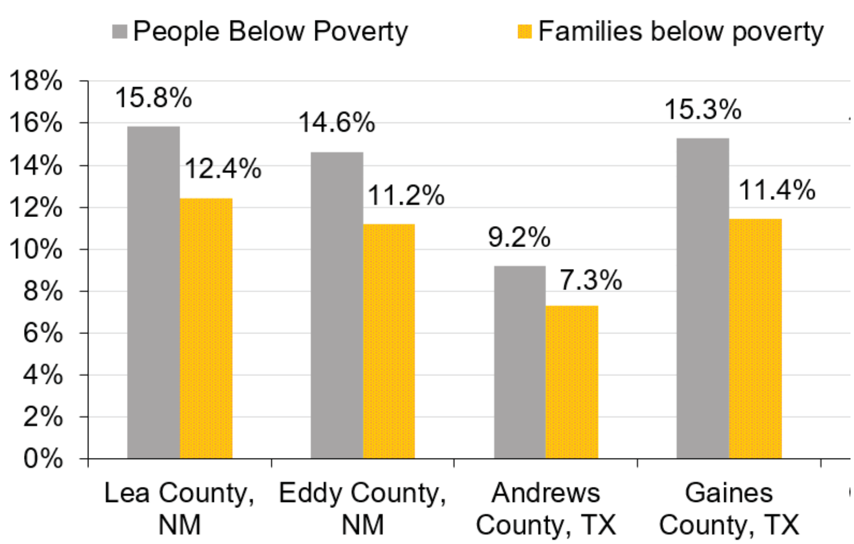

Figure 3.11-6 Percent of Individuals and Families Below Poverty Level by County (Source: Modified from Economic Profile System, 2021a)

Lea and Eddy County, New Mexico, and Andrews County, Texas are below their respective State poverty rates. The estimated poverty rate of families in Gaines County, Texas, is 0.1 percent higher than the poverty rate of families in Texas. The estimated poverty of individuals in Gaines County, Texas, is 0.6 percent higher than the poverty rate of individuals in Texas. Appendix B provides additional detail about the low-income populations in the 115 block groups.

3.11.2 Employment and Income

Employment

Employment by economic sector in the socioeconomic ROI over the 18-year period between 2001 and 2019 is provided in EIS Table 3.11-4. The total number of jobs in the ROI has increased approximately 59.6 percent. As demonstrated in EIS Table 3.11-4, the mining industry provides more jobs and has experienced the largest growth (over 8,500 jobs) than any other source of employment in the ROI over the same 18-year period (Economic Profile System, 2021b). In response to the NRC staff's request for supplemental information, Holtec contacted all employers within 8 km [5 mi] of the proposed CISF project area and reported that about 303 people are employed within 8 km [5 mi] of the proposed CISF project area. No transient workers were reported (Holtec, 2017, 2019a).

The 2019 average wage estimates for the industries listed in EIS Table 3.11-5 ranges from approximately $21,000 (leisure and hospitality) to $90,600 (Federal government). The estimated 2019 average wage in the mining industry in the ROI is $85,209. Median income is the amount that divides the income distribution into two equal groups, half having income above that amount, and half having income below that amount. The estimated median worker income between 2015 and 2019 for the four counties within in the socioeconomic ROI ranges from approximately $32,534 to $40,940. The median worker income in New Mexico for the same time period was $29,308, and $33,501 in Texas (USCB, 2019b).

The average annual unemployment rate for the four counties within the socioeconomic ROI between 2015 and 2019 ranged from 3.2 percent (2019) to 6.9 percent (2016) (Economic Profile System, 2021b). For comparison, the average annual unemployment rate between 2015 and 2019 for the 13 CCDs within the ROI ranged from 0 percent in Loco Hills CCD to 9.4 percent in Tatum CCD (USCB, 2019b). The estimated unemployment rate between 2015 and 2019 was 6.7 percent in New Mexico and 5.1 percent in Texas.

According to the information provided in EIS Table 3.11-4, the farm, forestry, fishing, and agriculture industries employed approximately 4,200 workers in the ROI, which is about 3.9 percent of workers in the ROI, in 2019. According to the most recent agricultural census the United States Department of Agriculture (USDA, 2019) conducted in 2017, the majority of farms in New Mexico are located in the western half of the State, while the majority of Texas farms are located in the eastern half of the State (USDA, 2019). The USDA produces an agricultural census every 5 years. Approximately 4 percent of all farms in New Mexico are located in Eddy and Lea Counties, and approximately 0.3 percent of all farms in Texas are located in Andrews and Gaines Counties. Some of the agricultural products from this region include sorghum, cotton, pecan, and dairy (USDA, 2018, 2019).

Table 3.11-4 Employment by Industry in ROI in 2001, 2010, and 2019 (Source: Modified from Economic Profile System, 2021b)

	2001	2010	2019	Change 2010-2019
Total Employment (number of jobs)	68,146	80,746	108,770	28,024
Non-services related	~21,887	~28,080	~44,343	~16,263
Farm	3,674	2,554	2,545	-9
Forestry, fishing, & ag. services	~1,282	~1,151	~1,657	~506
Mining (including fossil fuels)	10,332	15,265	23,810	8,545
Construction	4,721	6,810	13,405	6,595
Manufacturing	1,878	2,300	2,926	626
Services related	~34,251	~41,987	~54,261	~12,274
Utilities	515	662	788	126
Wholesale trade	2,259	2,289	2,867	578
Retail trade	7,441	7,201	9,131	1,930
Transportation and warehousing	2,445	2,968	6,258	3,290
Information	696	~738	695	-~43
Finance and insurance	1,804	2,478	2,499	21
Real estate and rental and leasing	1,568	2,057	2,955	898
Professional and technical services	~1,637	~2,291	3,497	~1,206
Management of companies	~174	~305	488	~183
Administrative and waste services	~3,365	~4,086	4,444	~358
Educational services	~283	~697	~656	-~41
Health care and social assistance	~3,380	~6,259	~6,531	~272
Arts, entertainment, and recreation	~470	~772	~752	-~20
Accommodation and food services	~3,873	~4,882	~7,356	~2,474
Other services, except public admin.	4,341	4,302	5,344	1,042
Government	9,785	10,667	10,903	236

All employment data are reported by *place of work*. Estimates for data that were not disclosed are indicated with tildes (~).

Table 3.11-5 Average Wages by Industry in the ROI (Source: Modified from Economic Profile System, 2021b)

Employment and Wages in 2019	Avg. Annual Wages (2019 $s)
Total	$60,826
Private	$62,210
Non-Services Related	$77,400
Natural Resources and Mining	$82,050
Agriculture, forestry, fishing & hunting	$43,720
Mining (incl. fossil fuels)	$85,209
Construction	$67,886
Manufacturing (Incl. forest products)	$74,677
Services Related	$49,337
Trade, Transportation, and Utilities	$55,685
Information	$54,358
Financial Activities	$61,674
Professional and Business Services	$64,830
Education and Health Services	$45,443
Leisure and Hospitality	$20,990
Other Services	$47,959
Unclassified	$47,360
Government	$51,291
Federal Government	$90,631
State Government	$48,699
Local Government	$47,890

3.11.3 Housing

A comparison of the USCB 2015–2019 estimates for occupied and vacant housing for Lea County, Eddy County, Gaines County, and Andrews County is provided in EIS Figure 3.11-7. During the 2015–2019 period, Lea County had the highest estimated percent of vacant housing (15.4 percent), and Gaines County had the lowest (10.6 percent). The median monthly costs for owner-occupied mortgages and rent during the same period are provided in EIS Figure 3.11-8. In the 2015–2019 period, Andrews County had the highest estimated monthly mortgage costs and monthly rent in the ROI, Lea County had the lowest monthly mortgage costs, and Gaines County had the lowest estimated monthly rent.

As previously described, because of the current upswing in oil and gas production, population surges have occurred in the ROI. According to the CDD's 2015 housing report (CDD, 2015), residential occupancy rates and hotel and housing prices increased because of the need for more housing in the Carlsbad area. The housing report indicated that the existing housing did not adequately meet the needs of households where (i) the primary wage earner makes $10 per hour or less, (ii) the general workforce earns between $10 and $16 an hour, and (iii) households who can afford the market area prices cannot find housing suitable to rent or buy. The report also indicates that to meet the demand of the temporary oil and gas industry workforce, many workers live in motels, RV parks, or impromptu camper settlements during the week and return to homes outside of Eddy County on the weekends because they cannot relocate their families because of the lack of housing or cannot afford the increased housing costs. Monthly building activity reports for the City of Carlsbad indicate that construction permits for a variety of housing arrangements are issued on a regular basis (City of Carlsbad, 2018). Lea County has experienced similar housing constraints since oil prices began to increase in 2013 (Rhatigan, 2015; State of New Mexico Interstate Stream Commission Office of the State Engineer, 2016).

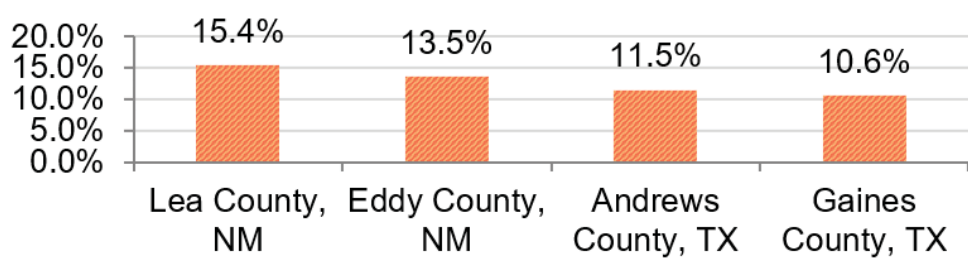

Figure 3.11-7 Estimated Percent of Vacant Housing in the 2015-2019 Period (Source: Modified from Economic Profile System, 2021a)

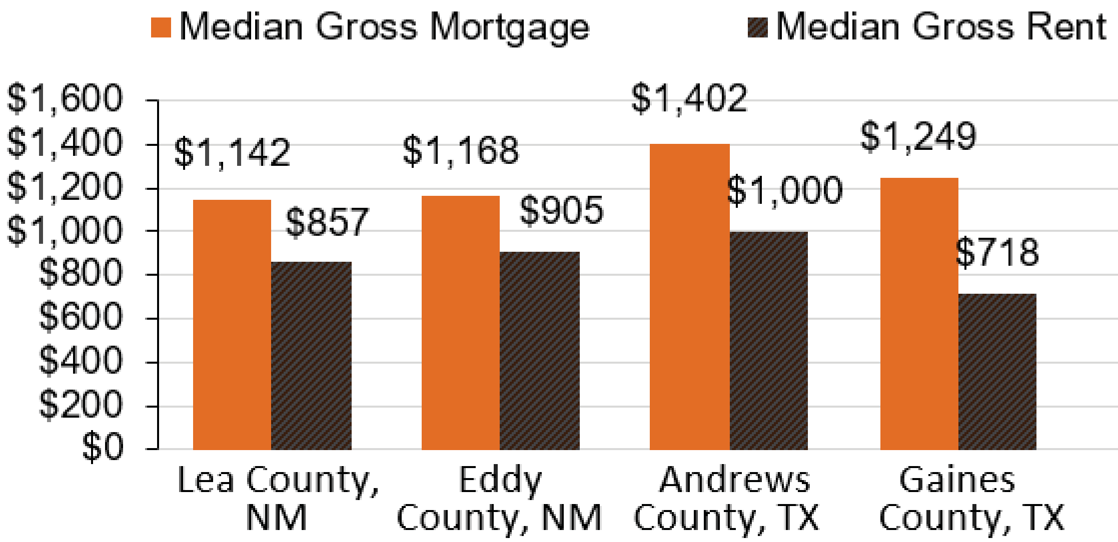

Figure 3.11-8 Median Monthly Mortgage Costs and Gross Rent in the 2015-2019 Period (Source: Modified from Economic Profile System, 2021a)

The City of Andrews, Texas, has experienced growth since 2003 and completed a comprehensive plan in 2013 to guide the city's growth and development (City of Andrews, 2019). A statewide Texas housing analysis conducted in 2011 and 2012 evaluated housing in rural counties, including Andrews and Gaines Counties (Bowen National Research, 2012). The report indicated that in the West Texas region, including Andrews and Gaines Counties, the housing stock was old and substandard, and the greatest demand was for affordable one- through three-bedroom, single-family homes or apartments.

The cost of building housing is very high, particularly in rural areas, and developers worry about the "boom and bust" nature of the oil and gas industry; however, new residential projects are being planned by Lea and Eddy Counties and the Cities of Carlsbad and Hobbs that would increase housing capacity to meet the demands of the population growth (Consensus Planning, 2020; State of New Mexico Interstate Stream Commission Office of the State Engineer, 2016).

According to the HUD, families who pay more than 30 percent of their income for housing are considered cost burdened (HUD, 2018). In the 2015–2019 period, between 15.6 and 27.4 percent of homeowners in the ROI spent more than 30 percent of their income on housing, and between 21.1 and 31.7 percent of renters spent more than 30 percent of their income on housing. The percent of owners and renters that spent more than 30 percent of their income on housing by each county in the ROI is provided in EIS Figure 3.11-9. For comparison, in the 2015–2019 period, approximately 29.6 percent of homeowner-occupied units in New Mexico and 26.5 percent in Texas cost more than 30 percent of occupant income on housing, and approximately 48.4 percent of renters in New Mexico and 47.8 percent of renters in Texas spent more than 30 percent of their income on housing (USCB, 2019b).

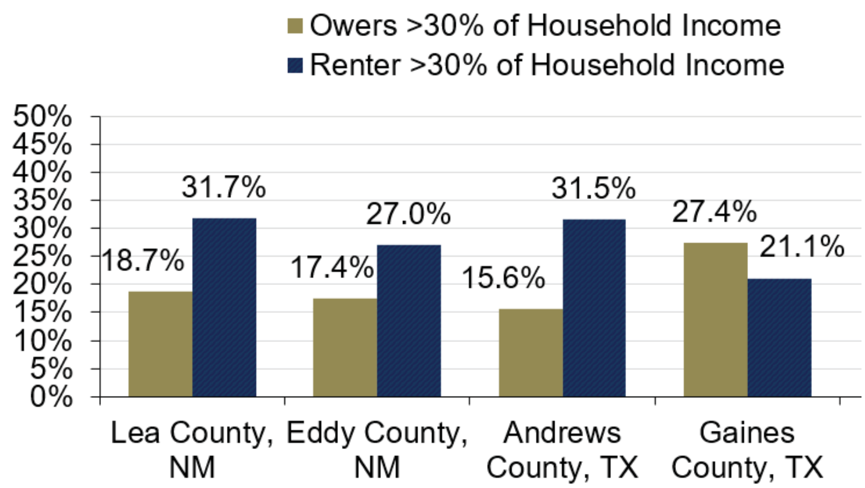

Figure 3.11-9 Housing Costs as a Percent of Household Income in the 2015-2019 Period (Source: Modified from Economic Profile System, 2021a)

3.11.4 Local Finance

Corporate Income Taxes

According to the New Mexico Taxation and Revenue Department (NMTRD), New Mexico imposes a corporate income tax on the total net income (including New Mexico and non-New Mexico income) of every domestic and foreign corporation doing business in or from the State, or which has income from property or employment within the State. The percentage of New Mexico income is then applied to the gross tax. For the taxable years beginning on or after January 1, 2020, corporations with a total net income exceeding $500,000 annually, corporate income tax is $24,000 plus 5.9 percent of net income over $500,000. Corporations with a total net income below $500,000 are taxed at 4.8 percent of net income. New Mexico also levies a corporate franchise tax of $50 per year. (NMTRD, 2020a).

Individual Income Taxes

New Mexico imposes an individual income tax on the net income of every resident and nonresident employed or engaged in business in or from the State or deriving any income from any property or employment within the State. The rates vary depending upon filing status and income. The top tax bracket is 4.9 percent (NMTRD, 2020b). Texas does not impose an individual income tax.

Sales and Gross Receipts Tax

New Mexico has a gross receipts tax structure instead of a sales tax structure. This tax is mostly passed onto the consumer through the increases in the cost of goods. The governmental gross receipts tax rate through June 2021 is 5 percent. The gross receipt and compensation tax rate per person varies throughout the State from 5.125 percent to 9.4375 percent, depending on the location of the business. It varies because the total rate combines rates imposed by the State, counties, and, if applicable, municipalities where the businesses are located. The business pays the total gross receipts tax to the State, which then distributes the counties' and municipalities' portions to them (NMTRD, 2020c). The total gross receipts tax is paid to the State. The State keeps its portion and distributes the counties' and municipalities' portions to them. The State's portion of the gross receipts tax, which is also the largest portion of the tax, is determined by State law. Changes to the State rate occur no more than once a year, usually in July. The gross receipts taxes effective between January 2021 and June 2021 for communities in Lea County range from 5.5 to 7.4375 percent, and gross receipts taxes for communities in Eddy Counties range from 5.9583 to 7.8958 percent (NMTRD, 2021).

According to the Texas Comptroller of Public Accounts (TCPA), Texas imposes a State sales and use tax of 6.25 percent on all retail sales, leases and rentals of most goods, as well as taxable services. Local taxing jurisdictions (cities, counties, special purpose districts and transit authorities) can also impose up to 2 percent sales and use tax for a maximum combined rate of 8.25 percent (TCPA, 2021a). Texas imposes a franchise tax on applicable taxable entities that provide goods and services. The franchise tax rate is based on an entities' profit margin as determined by a formula based on gross receipts (TCPA, 2021b). In addition, Texas imposes a miscellaneous gross receipts tax on utilities. The rates of the miscellaneous gross receipt tax is based on the population of the incorporated area where business is done (TCPA, 2021c).

Property Taxes

Property taxes in New Mexico are among the lowest in the United States. Four governmental entities within New Mexico are authorized to impose property taxes—the State, counties, municipalities, and school districts. Property assessment rates are 33.3 percent of the property value (Holtec, 2020a). The tax applied to property is a composite of State, county, municipal, and school district levies. Millage or mill rate is a term municipalities use to calculate property taxes. The amount of municipal tax payable by a property owner is calculated by multiplying the mill rate by the assessed value of a property and dividing by 1,000. New Mexico distributes revenues from property tax rate totals as follows: 11.85 mills to counties, 7.65 mills to municipalities, and .5 mills to school districts. Eddy and Lea Counties have a large concentration of mineral extraction properties but very small portions of the State's residential property tax base.

In Texas, property taxes are based on the most current year's market value. For year 2020, Andrews County, Texas, had a county property tax rate of $0.5099 per $100 assessed value, a school district tax of $1.1164 per $100 assessed value, and a municipal tax rate for the City of Andrews of $0.181917 per $100 assessed value (TCPA, 2020). The county tax rate for Gaines County was $0.5455. Tax rates for municipalities in Gaines County range from $0.5335 to $0.9693, and school district tax rates range from of $1.2264 to $1.3433, respectively (TCPA, 2020).

A summary of 2020 taxable values for the four counties within the socioeconomic ROI for the proposed CISF is provided in EIS Table 3.11-6.

Table 3.11-6 2020 Tax Values in the Socioeconomic Region of Influence

County	Total ($)
Lea County, New Mexico	7,067,438,527
Eddy County, New Mexico	7,763,196,980
Andrews County, Texas	5,225,039,647
Gaines County, Texas	3,512,178,696

Table 3.11-6 2020 Tax Values in the Socioeconomic Region of Influence	
County	Total ($)
Sources: Andrews County, 2021; Lea County, 2020; Gaines County, 2021; Eddy County, 2020	

3.11.5 Community Services

Similar to the ongoing regional housing planning and development efforts described in Section 3.11.3 (Housing), community infrastructure projects such as water and electrical utility expansions, roadway expansions, a new fire station in south Carlsbad, and Carlsbad main street enhancements are planned in the ROI (City of Carlsbad, 2018; State of New Mexico Interstate Stream Commission Office of the State Engineer, 2016).

Andrews, Texas, is positioned to support community initiatives in the next several years, including further developing the downtown streetscape and business parks and securing long-term water needs (City of Andrews, 2019). Gaines County continues to heavily invest in its agribusiness, and the City of Seminole is considering transportation improvements for truck traffic (Seminole Economic Development Board, 2018; Permian Basin Regional Planning Commission, 2015).

Education

There are 12 public school districts in the ROI (NCES, 2020). For the 2019–2020 school year, the total enrollment in early childhood education public schools, including public charter schools, for children age 3 through Grade 12 in the ROI was approximately 34,000students (NMPED, 2021; TEA, 2021). There were also 6 private schools in the ROI in the 2017–2018 school year (NCES, 2018). In addition, New Mexico Junior College, University of the Southwest, and New Mexico State University Carlsbad are located in the ROI. Additionally, Andrews County, Texas, hosts a business and technology center. However, the closest universities and other post-secondary schools in Texas are located in Midland-Odessa and Lubbock, Texas, which are outside the ROI.

Hospitals

The proposed CISF project area is located approximately 58 km [36 mi] east of the Carlsbad Medical Center in Carlsbad and approximately 61 km [38 mi] west of the Lea Regional Medical Center in Hobbs, which are the closest hospitals to the proposed CISF with emergency services (Holtec, 2020a). The Artesia General Hospital in Artesia; Memorial Hospital in Seminole, Texas; and Permian Regional Medical Center in Andrews, Texas, also provide emergency services. The Nor-Lea Hospital District supports medical clinics in Tatum and Lovington. Medical clinics also provide health care services in the towns of Jal and Eunice (EDCLC, 2018).

Fire and Police

According to Holtec's ER, 18 police departments and 22 fire departments serve the four counties in the ROI, the vast majority of which are located in Eddy and Lea Counties (Holtec, 2020a). Because of the presence of the WIPP facility located in Eddy County, local fire fighters, law enforcement, and emergency medical staff have been trained to respond to emergencies that involve radioactive materials. Mutual-aid agreements also exist with all of the county fire and police departments. If additional fire or police services are required, nearby counties can provide additional response services. In particular, members of the proposed

CISF emergency response team can provide information and assistance in instances where radioactive/hazardous materials are involved (Holtec, 2020a).

3.12 Public and Occupational Health

This section summarizes the sources of radiation and chemical exposure and baseline health conditions at the proposed CISF project area and in the region surrounding the site {defined as land within an 80-km [50-mi] radius}, including natural background radiation levels. The radius was selected to be inclusive of (i) locations where people could live and work in the vicinity of the proposed project and (ii) other sources of radiation or chemical exposure in the region than those present in the CISF project area. Applicable radiation dose limits that have been established for the protection of public and occupational health and safety, potential exposure pathways and receptors, and available occupational and public health studies are described.

3.12.1 Sources of Radiation Exposure

Sources of radiation exposure in the proposed CISF project area and in the region surrounding the facility include background radiation and radiation from other sources such as nearby facilities or transportation.

3.12.1.1 Background Radiological Conditions

Radiation dose is a measure of the amount of ionizing energy that is deposited in the body. Ionizing radiation is a natural component of the environment and ecosystem, and members of the public are exposed to natural radiation continuously. Radiation doses to the general public occur from radioactive materials found in the Earth's soils, rocks, and minerals. Radon (Rn-222) is a radioactive gas that escapes into ambient air from the decay of uranium (and its progeny, radium-226) found in most soils and rocks. Naturally occurring low levels of uranium and radium are also found in drinking water and foods. Cosmic radiation from outer space is another natural source of exposure and ionizing radiation dose. In addition to natural sources of radiation, there are artificial or human-made sources that contribute to the dose the general public receives. Medical diagnostic procedures using radioisotopes and x-rays are a primary human-made radiation source. The National Council on Radiation Protection and Measurements (NCRP) (2009) estimates that the annual average dose to the public from all natural background radiation sources (radon and thoron, terrestrial, cosmic, internal) is {3.1 millisieverts (mSv) [310 millirem (mrem)]}. Because of the increase in medical imaging and nuclear medicine procedures, the annual average dose to the public from all sources (natural and human-made) is 6.2 mSv [620 mrem] (NCRP, 2009). Because the proposed CISF project area has no history of activities involving radioactive materials (Holtec, 2020a), the NRC staff consider the national background radiation estimates to be a reasonable approximation of the background radiological conditions.

3.12.1.2 Other Sources of Radiation Exposure

The region surrounding the proposed CISF includes several other projects that involve radioactive materials, including WIPP, NEF, and a potential International Isotopes Incorporated Fluorine Extraction Process and Depleted Uranium De-conversion Plant (FEP/DUP) (Holtec, 2020a). In addition, Waste Control Specialists operates a low-level radioactive waste storage and disposal site in Andrews County, Texas, approximately 63 km [39 mi] from the proposed CISF project area. The estimated or measured maximum operational radiological doses to the public from these facilities are described in the following paragraphs.

WIPP is located approximately 26 km [16 mi] southwest of the proposed CISF project (Holtec, 2020a). WIPP is the nation's first underground repository permitted to safely and permanently dispose of transuranic radioactive waste (TRU) and transuranic mixed waste (MTRU) generated through defense activities and programs. The facility has been operational since 1999 storing these wastes in underground salt caverns approximately 2,150 feet deep. From 1999 through 2014, 90,983 m^3 [3,213,031 ft^3] of waste was shipped to and disposed of at the WIPP facility. The environmental impacts of the WIPP are described in the Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement (DOE 1997), as well as the Waste Isolation Pilot Plant Annual Site Environmental Report for 2017 (DOE, 2018). For 2017, the DOE estimated the annual dose to an individual at the fence line was 1.04×10^{-6} mSv [1.04×10^{-4} mrem] (DOE, 2018).

NEF is located approximately 61 km [38 mi] southeast of the proposed CISF project (Holtec, 2020a). NEF enriches uranium using a gas centrifuge process. The enriched uranium is used in the manufacture of nuclear fuel for commercial nuclear power reactors. The environmental impacts of the NEF are documented in NUREG–1790 (NRC, 2005). Impacts related to radiation exposure include small public and occupational health and transportation impacts during normal operations and small to moderate public and occupational health and transportation impacts under evaluated accident conditions. In that analysis, the highest estimated annual public dose from normal facility operations was 0.019 mSv [19 mrem] (NRC, 2005).

FEP/DUP is expected to be located approximately 37 km [23 mi] northeast of the proposed CISF project (Holtec, 2020a). The FEP/DUP plans to de-convert depleted uranium hexafluoride into fluoride products for commercial resale and uranium oxides for disposal. An NRC license was granted in 2012, but construction of the facility has been deferred pending improvements in market conditions. The environmental impacts of the FEP/DUP are documented in NUREG–2113 (NRC, 2012). The highest annual public dose from proposed operations considering airborne emissions and direct exposure at the facility boundary was estimated to be 0.21 mSv [20.8 mrem] (NRC, 2012).

WCS operates two facilities authorized to dispose of Class A, B, and C low-level radioactive waste (LLRW) within the existing WCS site, located 63 km [39 mi] to the southeast of the proposed CISF project area. The two facilities are referred to as the Compact Waste Disposal Facility (CWF) and Federal Waste Disposal Facility (FWF). The CWF serves the Texas LLRW Compact (Texas and Vermont) and the FWF serves the DOE. WCS also operates a facility authorized to dispose of Atomic Energy Act Section 11e.(2) byproduct material. Annual radiological doses to the public from existing WCS facility operations are documented every 6 months in a semi-annual Radiological Environmental Monitoring Plan (REMP) Report to the Texas Commission on Environmental Quality (TCEQ). The WCS REMP report for year 2014 operations documented the annual estimated public dose for the year 2014 operations at 0.027 mSv [2.7 mrem] (WCS, 2015).

3.12.2 Pathways and Receptors

Under normal operations, the use of NRC-certified storage casks at the proposed CISF project would fully contain the stored radioactive material. Under these circumstances, the only applicable exposure pathway is individual workers and members of the public at or near the facility being exposed to direct radiation. Because direct radiation decreases with distance from the source, the level of exposure would vary based on the distance between the source and the receptor and the duration of the exposure (and, for workers, the amount of shielding during transfers). Therefore, the workers involved in canister transfers and the residents nearest the facility would be the individuals expected to receive the highest radiation exposures from the proposed CISF project. The nearest residents to the proposed CISF project are located at the Salt Lake Ranch, 2.4 km [1.5 mi] north of the proposed CISF project (Holtec, 2020a). Additional residences exist at the Bingham Ranch 3.2 km [2 mi] south and at the R360 complex, 3.2 km [2 mi] southwest.

3.12.3 Radiation Protection Standards

The NRC has a statutory responsibility, pursuant to the Atomic Energy Act of 1954, as amended, to protect worker and public health and safety. The NRC's regulations in 10 CFR Part 20 specify annual worker dose limits, including 0.05 Sv [5 rem] total effective dose equivalent (TEDE) and dose limits to members of the public, including 1 mSv [100 mrem] TEDE with no more than 0.02 mSv [2 mrem] in any 1-hour period from any external sources. Additionally, 10 CFR Part 72 includes an annual public dose limit of 0.25 mSv [25 mrem] committed dose equivalent to the whole body. These public dose limits from NRC-licensed activities are a fraction of the background radiation dose, as discussed in EIS Section 3.12.1.1.

Exposure to radiation presents an additional risk of cancer or a severe hereditary effect. The annual dose limit the International Atomic Energy Agency (IAEA), as well as the NRC, set to protect members of the public from the harmful effects of radiation is 1 mSv [100 mrem]. The additional risk of fatal cancer associated with a dose of 1 mSv [100 mrem], calculated using the scientific methods of the International Commission on Radiological Protection (ICRP, 2007) and applying a linear-no-threshold dose response assumption, is on the order of 1 in 20,000 or 1 in 250 if exposed at this level for 70 years. This small increase in lifetime risk can be compared to the baseline lifetime risks of 1 in 5 (males) or 1 in 6 (females) for developing a fatal cancer (ACS, 2022).

3.12.4 Sources of Chemical Exposure

Activities in the region surrounding the proposed CISF project area that may result in limited chemical exposure include oil and gas exploration and production, oil and gas related service industries, mineral extraction, livestock grazing, and agriculture (Holtec, 2020a). Nearby industrial operations include a potash mine, an oilfield waste treatment facility, and an industrial landfill. Within the proposed CISF project boundary but outside of the planned SNF storage area, there is an abandoned oil recovery facility and a producing well and recovery facility. The potential for hydrocarbon contamination from past practices exists within the proposed CISF project boundary (Holtec, 2020a). The oilfield waste treatment facility and industrial landfill within 4.8 km [3 mi] of the proposed CISF project area (Holtec, 2020a) are the local industrial operations in closest proximity to the proposed CISF project area.

3.12.5 Health Studies

Health studies characterize baseline health conditions applicable to the region where the proposed CISF project would be located. This includes occupational safety studies and public health evaluations.

3.12.5.1 Occupational Health

The New Mexico State Department of Health (NMDOH) evaluated workplace injuries and illnesses and found that the rate of work-related fatalities in New Mexico appeared to be declining, as are rates for the U.S., but New Mexico's occupational fatality rate remains well above the U.S. rate (NMDOH, 2018). They noted the top two areas of concern for occupational health in New Mexico are the high rates of transportation-related injuries and fatalities in two industries, oil and gas and construction.

In 2016, there were 41 workplace fatalities, of which 56.1 percent were transportation related (NMDOH, 2018). From 2011 through 2016, New Mexico's occupational transportation fatality rates were considerably higher (two to three times) than the comparable nationwide fatality rates. NMDOH noted that seat belt usage is low in the transportation industry. Out of the 31 occupational-related transportation fatalities in 2014, 63 percent of the decedents were not wearing their seat belts at the time of the accident. The second highest cause of death (17 percent) was contact with objects and equipment. Falls were noted as the cause in 7.3 percent of deaths.

Mining, quarrying, and oil and gas extraction was the single industry with the largest percentage of fatalities with 31.9 percent of deaths (NMDOH, 2018). Oil and gas-related fatalities are also among the most common in the State, occurring most frequently as a result of motor vehicle accidents, falls, struck-by-object injuries, or electrocutions. The crude fatality rate for the oil and gas industry in New Mexico for 2016 was 31.9 per 100,000 full-time equivalents (FTE) (ages 16 and over) – over three times the U.S. rate of 10.1 per 100,000 FTEs.

3.12.5.2 Public Health

Baseline health conditions have been evaluated by the NMDOH (NMDOH, 2018). For the three leading causes of death, New Mexico has lower death rates than the U.S. overall for heart disease and cancer, but much higher rates for unintentional injuries including drug overdose, motor vehicle injuries, and older adult falls. New Mexico also has substantially higher death rates than those of the U.S. for suicide and for cirrhosis and chronic liver disease, which is primarily because of alcohol use. Life expectancy from age 65 was reported for New Mexico at 20.7 years in 2016, compared with 19.4 years in the U.S. NMDOH reported years of life expectancy from age 65 was lower in southeastern New Mexico and generally higher in northern counties. Relative to the U.S., the New Mexico State Department of Health characterized New Mexico as having a low population with complex public health challenges.

3.13 Waste Management

This section describes the environment that the disposition of liquid and solid waste streams the proposed CISF generates could potentially affect. EIS Section 2.2.1 describes the types and volumes of liquid and solid waste that operation of the proposed CISF project could generate.

3.13.1 Liquid Wastes

Liquid wastes or effluents generated from the proposed CISF project are limited to stormwater, hazardous waste, and sanitary wastewater. Detailed descriptions of the liquid wastes the proposed CISF project generated and Holtec's proposed disposition are provided in EIS Section 2.2.1 and are briefly summarized here. The Solid Waste Disposal Act defines hazardous waste as a subset of solid waste; therefore, disposition of hazardous waste is addressed in EIS Section 3.13.2.

The affected environment for stormwater runoff includes drainages adjacent to the site that terminate in the Laguna Plata to the northwest and Laguna Gatuna to the east. There are no potable surface water resources within these stormwater drainages of the proposed CISF (Holtec, 2020a). These surface water features are designated as Surface Waters of the State and are described in more detail in EIS Section 3.5.1.1. To protect these waters from pollutants that could be conveyed in stormwater runoff, separate National Pollutant Discharge Elimination System (NPDES) stormwater permits from EPA are required for construction and operation of facilities such as the proposed CISF.

Sanitary wastes generated during the term of the license of the proposed CISF project would not produce effluents based on the proposed use of portable toilets or sewage collection tanks, which, as described in EIS Section 2.2.1.6 would be designed and operated in accordance with all applicable NMED regulations (such as NMAC 20.6.2) and Federal standards (Holtec, 2020a). During operation of the proposed CISF, Holtec would dispose of sanitary wastewater using sewage collection tanks and underground digestion tanks similar to septic tanks, but with no leach field. As described in EIS Section 2.2.1.6, after testing the waste in the collection tanks to ensure 10 CFR Part 20 release criteria and applicable State of New Mexico requirements are met, the resulting sewage would be removed from the tanks and disposed at an off-site treatment facility (Holtec, 2020a).

3.13.2 Solid Wastes

Solid wastes generated from the proposed CISF project would include nonhazardous solid waste, LLRW, and hazardous waste. Additionally, the SNF stored at the proposed CISF project would be removed and shipped to an NRC-licensed geologic repository when one becomes available.

All proposed phases of the proposed CISF project would generate nonhazardous solid waste. Nonhazardous solid waste would be disposed offsite in an NMED-permitted municipal landfill. The nearest municipal solid waste facility is the Sandpoint Landfill that is located 40 km [25 mi] west of the proposed CISF project area (Holtec, 2020a). Another landfill, the Lea County Solid Waste Authority landfill, is located east of Eunice. The Lea County landfill serves Eddy County and is jointly owned by Eddy County and the City of Carlsbad. The Sandpoint landfill has the capacity to dispose of nonhazardous solid waste and construction and demolition waste for approximately 30 years after year 2018 (NMED, 2010). The projected life of the Lea County landfill is 37 years (NMED, 2010). The annual waste received at these facilities is evaluated in EIS Section 4.14 to show how the proposed CISF project generation rate compares with the regional generation from other sources.

Holtec proposes that LLRW the proposed CISF project generated would be sent to licensed facilities for disposal (Holtec, 2020a). LLRW is managed under regional disposal compacts among States that provide for disposal and regulate some aspects of disposal for their member States. New Mexico is a member of the Rocky Mountain compact with Colorado and Nevada (RMLLWB, 2018). Generators of LLRW in the compact States can access disposal facilities in Richland, Washington, Clive, Utah, and Andrews, Texas.

The US Ecology LLRW disposal facility located in Richland, Washington, is approximately 2,607 km [1,619 mi] from the proposed CISF project and is accessible by both rail and highway. The State of Washington licensed US Ecology to dispose of Class A, B, and C waste (NRC, 2018). In 2017, the US Ecology facility disposed of 393.9 m^3 [13,910 ft^3] of LLRW (NRC, 2018). The facility is expected to operate until 2056 (WDOE, 2015).

The Energy*Solutions* facility in Clive, Utah, is licensed by the State of Utah to receive byproduct material, Class A LLRW, mixed waste (combined radioactive and hazardous wastes), and naturally occurring radioactive material. The Energy*Solutions* facility is the largest commercial LLRW disposal facility, and it accepts waste for disposal from all regions in the United States (NRC, 2018). The facility is accessible by both rail and highway and is located approximately 129 km [80 mi] west of Salt Lake City, Utah, and approximately 1,610 km [1,000 mi] from the proposed CISF project. In 2017, the Energy*Solutions* facility disposed of 142,009.7 m^3 [5,014,929 ft^3] of LLRW (NRC, 2018). An application for renewal of the LLRW disposal license is under review by the State of Utah.

WCS also operates a LLRW facility in Andrews County, Texas, that accepts compact waste (i.e., compressed to reduce the volume) as well as non-compact waste, if approved by the compact. The WCS facility is licensed to accept LLRW for disposal (NRC, 2018). The WCS facility is located approximately 120 km [72 mi] from the proposed CISF project area and is accessible by both rail and highway. In 2017, the WCS facility disposed of 326.64 m^3 [11,535 ft^3] of LLRW (NRC, 2018). The current license term expires in 2024, with provision for 10-year renewals (TCEQ, 2018).

Estimates of hazardous wastes the proposed CISF project generated would be less than 220 pounds per month and therefore would qualify the proposed CISF project as a Conditionally Exempt Small Quantity Generator (CESQG) (Holtec, 2020a). Holtec proposes to comply with all Federal and State requirements applicable to CESQGs. The proposed CISF project design does not include underground storage tanks. A spill prevention, control, and countermeasures plan may need to be developed because all diesel fuel storage tanks at the proposed CISF would be above ground. Although Holtec does not anticipate generating mixed waste, if any mixed waste were generated, it would be handled and stored in accordance with a 10 CFR Part 20 radiation protection plan and applicable hazardous waste requirements and would be sent to a licensed facility for disposal (Holtec, 2020a).

The SNF stored at the proposed CISF project would eventually be transported to an offsite geologic repository, in accordance with the national policy for SNF disposal established in the Nuclear Waste Policy Act of 1982, as amended. The affected environment for transportation of SNF is described in EIS Section 3.3. The affected environment for geologic disposal of SNF and high-level radioactive waste at Yucca Mountain has been described and evaluated in DOE's Final Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (DOE, 2008) and supplemented by NRC's Supplement to the U.S. Department of Energy's Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (NRC, 2016).

3.14 References

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20. "Standards for Protection Against Radiation." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 72. Code of Federal Regulations, Title 10, *Energy*, Part 72. "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste." Washington, DC: U.S. Government Publishing Office.

23 CFR Part 772. Code of Federal Regulations, Title 23, *Highways*, Part 772. "Procedures for Abatement of Highway Traffic Noise and Construction Noise." Washington, DC: U.S. Government Printing Office.

24 CFR Part 51. Code of Federal Regulations, Title 24, *Housing and Urban Development,* Part 51. "Environmental Criteria and Standards." Washington, DC: U.S. Government Printing Office.

29 CFR Part 1910. Code of Federal Regulations, Title 29, *Labor*, Part 1910. "Occupational Safety and Health Standards." Washington, DC: U.S. Government Printing Office.

36 CFR 60.4. Code of Federal Regulations, Title 36, *Parks, Forests, and Public Property*, § 60.4. "Criteria for evaluation." Washington, DC: U.S. Government Printing Office.

36 CFR Part 800. Code of Federal Regulations, Title 36, *Parks, Forests, and Public Property*, Part 800. "Protection of Historic Properties." Washington, DC: U.S. Government Printing Office.

36 CFR 800.16. Code of Federal Regulations, Title 36, *Parks, Forests, and Public Property*, § 800.16. "Definitions." Washington, DC: U.S. Government Printing Office.

40 CFR Part 50. Code of Federal Regulations, Title 40, *Protection of the Environment*, Part 50. "National Primary and Secondary Ambient Air Quality Standards." Washington, DC: U.S. Government Printing Office.

40 CFR Part 81. Code of Federal Regulations, Title 40, *Protection of the Environment*, Part 81. "Subpart D – Identification of Mandatory Class I Federal Areas Where Visibility Is an Important Value." Washington, DC: U.S. Government Printing Office.

40 CFR 81.242. Code of Federal Regulations, Title 40, *Protection of the Environment*, § 81.242. "Pecos-Permian Basin Intrastate Air Quality Control Region." Washington, DC: U.S. Government Printing Office.

40 CFR 81.332. Code of Federal Regulations, Title 40, *Protection of the Environment*, § 81.332. "Attainment Status Designations - New Mexico." Washington, DC: U.S. Government Printing Office.

40 CFR 81.344. Code of Federal Regulations, Title 40, *Protection of the Environment*, § 81.344, "Attainment Status Designations - Texas." Washington, DC: U.S. Government Printing Office.

69 FR 52040. *Federal Register*. Vol. 69, Issue 163. pp. 52,040–52,048. "Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions." 2004.

77 FR 71814. *Federal Register*. Vol. 77, No. 233. pp. 71,814–71,817. "Oil, Gas, and Potash Leasing and Development Within the Designated Potash Area of Eddy and Lea Counties, NM." Washington, DC: U.S. Government Printing Office. 2012.

78 FR 61622. *Federal Register*. Vol. 78, Issue 192. pp. 61,622-61,666. “Endangered and Threatened Wildlife and Plants; Proposed Threatened Status for the Western Distinct Population Segment of the Yellowbilled Cuckoo (Coccyzus americanus).” Washington, DC: U.S. Government Printing Office. 2013.

83 FR 25776. *Federal Register*. Vol. 83, No. 107. pp. 25,776–25,848. “Additional Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards.” Washington, DC: Government Printing Office. 2018.

85 FR 43203. *Federal Register.* Vol. 85, No. 137. pp. 43,203–43,204. “Endangered and Threatened Wildlife and Plants; 90-Day Finding for the Dunes Sagebrush Lizard.” Washington, DC: Government Printing Office. 2020.

85 FR 81813. *Federal Register.* Vol. 85, No. 243. pp. 81,813–81,822. “Endangered and Threatened Wildlife and Plants; 12-Month Finding for the Monarch Butterfly.” Washington, DC: Government Printing Office. 2020.

86 FR 29432. Federal Register. Vol. 86, No. 106. pp. 29,432–29,482. “Endangered and Threatened Wildlife and Plants; Lesser Prairie-Chicken; Threatened Status With Section 4(d) Rule for the Northern Distinct Population Segment and Endangered Status for the Southern Distinct Population Segment.” Washington, DC: Government Printing Office. 2021.

20 NMAC 2.3 New Mexico Administrative Code, Title 20, *Environmental Protection*, Chapter 2. Part 3 “Ambient Air Quality Standards.” Santa Fe, New Mexico: The Commission of Public Records Administrative Law Division.

20 NMAC 6.2 New Mexico Administrative Code, Title 20, *Environmental Protection*, Chapter 6. Part 2 “Ground and Surface Water Protection.” Santa Fe, New Mexico: The Commission of Public Records Administrative Law Division.

20 NMAC 6.4 New Mexico Administrative Code, Title 20, *Environmental Protection*, Chapter 6. Part 4 “Standards for Interstate and Intrastate Surface Water.” Santa Fe, New Mexico: The Commission of Public Records Administrative Law Division.

ACHP. “Consultation with Indian Tribes in the Section 106 Review Process: A Handbook.” Advisory Council on Historic Preservation. Washington, DC: Advisory Council on Historic Preservation. 2012.

ACS. “Lifetime Risk of Developing or Dying From Cancer.” Atlanta, Georgia: American Cancer Society. 2022. <https://www.cancer.org/cancer/cancer-basics/lifetime-probability-of-developing-or-dying-from-cancer.html> (Accessed 17 May 2022)

Andrews County. “2020-2021 Approved Budget.” Andrews, Texas: Andrews County. 2021. <https://www.co.andrews.tx.us/DocumentCenter/View/518/Andrews-County-Approved-Budget-2020-2021?bidId=>
(Accessed 23 February 2021)

Bachman, G.O. “Regional Geology and Cenozoic History of Pecos Region, Southeastern New Mexico.” USGS Open-File Report 80-1099. Albuquerque, New Mexico: U.S. Geological Survey. pp. 1–116. 1980.

Bachman, G.O. “Cenozoic Deposits of Southeastern New Mexico and an Outline of the History of Evaporite Dissolution.” *U.S. Geological Survey Journal of Research*. Vol. 4, No. 2. pp. 135–149. 1976. <http://www.wipp.energy.gov/library/Information_Repository_A/Supplemental_Information/Bachman%201976%20Cenozoic%20Deposits%20SE%20NM%20Evap%20Dissolution.pdf > (Accessed 10 September 2018)

Bachman, G.O. “Surficial Features and Late Cenozoic History in Southeastern New Mexico.” SGS Open-File Report USGS-4339-8. Albuquerque, New Mexico: U.S. Geological Survey. 1973. <https://pubs.usgs.gov/of/1973/0013/report.pdf> (Accessed 10 September 2018)

Bachman, G.O. and R.B. Johnson. “Stability of Salt in the Permian Salt Basin of Kansas, Oklahoma, Texas, and New Mexico.” Open-File Report USGS-4339-4. Denver, Colorado: U.S. Geological Survey. 1973. <https://pubs.usgs.gov/of/1973/0014/report.pdf> (Accessed 10 September 2018)

Ballou, Cookie. *Chihuahuan Desert Ecoregion*. National Park Service. 2018. <https://www.nps.gov/im/chdn/ecoregion.htm> (Accessed 2 July 2019)

Baugh, T.G., and M. Sechrist (editors). Protohistoric Apachean Adaptations within the Basin and Range Province of South-Central New Mexico and West Texas: A Perspective from the Fort Bliss Reservation. Directorate of Environment, Conservation Division, Fort Bliss, Texas. Contract No. DABT 51-97-D-0043, Delivery Order 12. El Paso, Texas: TRC Mariah Associates, Inc., 2001.

BEG. “TexNet Seismic Monitoring Program, TexNet Earthquake Catalog.” Austin, Texas: University of Texas Bureau of Economic Geology. 2020. <https://www.beg.utexas.edu/texnet-cisr/texnet/earthquake-catalog> (Accessed 3 December 2020)

Bjorklund, L.J. and W.S. Motts. “Geology and Water Resources of the Carlsbad Area, Eddy County, New Mexico.” U.S. Geological Survey Open File Report 59-9. Albuquerque, New Mexico: U.S. Geological Survey. 322 p. 1959.

BLM. “Draft Resource Management Plan and Environmental Impact Statement.” BLM/NM/PL-18-01-1610. Santa Fe, New Mexico: U.S. Department of the Interior Bureau of Land Management, Carlsbad Field Office. 2018a. <https://eplanning.blm.gov/epl-front-office/projects/lup/64444/153042/187358/BLM_CFO_Draft_RMP_-_Volume_I_-_EIS_-_August_2018_(1).pdf> (Accessed 23 May 2019)

BLM. “Summit Midstream Permian, LLC Chistera Pipeline Project Lea County, New Mexico.” DOI-BLM-NM-P020-2018-0804-EA. Carlsbad, New Mexico: U.S. Department of the Interior Bureau of Land Management, Carlsbad Field Office. 2018b. <https://eplanning.blm.gov/epl-front-office/projects/nepa/111389/152167/186386/Summit_NM-138195_Chistera_Pipeline_EA_04222018.pdf> (Accessed 6 November 2018)

BLM. “Summit Midstream, LP’s Severus Gathering Project in Lea County, New Mexico.” DOI-BLM-NM-P020-2017-0758-EA. Carlsbad, New Mexico: U.S. Department of the Interior Bureau of Land Management, Carlsbad Field Office. 2017a. <https://eplanning.blm.gov/epl-front-office/projects/nepa/88413/126080/153627/Summit_Severus_EA_11-14-2017.pdf> (Accessed 6 November 2018)

BLM. “BLM New Mexico Surface Ownership.” Vector Digital Data. U.S. Bureau of Land Management. 2012a. <https://www.nm.blm.gov/shapeFiles/state_wide/spatial_data_metadata.html> (Accessed 20 August 2018)

BLM. “BLM New Mexico Mineral Ownership.” Vector Digital Data. U.S. Bureau of Land Management. 2012b. <https://www.nm.blm.gov/shapeFiles/state_wide/spatial_data_metadata.html> (Accessed 20 August 2018)

BLM. “Standards for Survey Site Evaluation and Reporting for the CFO.” Carlsbad, New Mexico: U.S. Department of the Interior, Bureau of Land Management, Carlsbad Field Office. 2012c. < https://ipanm.org/wp-content/uploads/2016/05/BLM-Cultural-Resource-Standards.pdf> (Accessed 19 July 2021)

BLM. “BLM Grazing Allotment Polygons.” Vector Digital Data. U.S. Bureau of Land Management. 2011. <https://www.nm.blm.gov/shapeFiles/state_wide/spatial_data_metadata.html> (Accessed 20 August 2018)

BLM. “Procedures for Performing Cultural Resource Fieldwork on Public Lands in the Areas of New Mexico, Oklahoma, and Texas.” Manual Supplement H-8100-1. Washington, DC: Bureau of Land Management, U.S. Department of the Interior. 2005.

BLM. “Manual H-8410-1 - Visual Resource Inventory.” ADAMS Accession No. ML13014A664. Washington, DC: U.S. Department of the Interior Bureau of Land Management, Carlsbad Field Office. 1986.

BNSF. “Carload Network Map.” Fort Worth, Texas: Burlington Northern Santa Fe Railway Company. 2019. <https://www.bnsf.com/ship-with-bnsf/maps-and-shipping-locations/pdf/carload_map.pdf> (Accessed 9 May 2019)

Bowen National Research. “Texas Statewide Rural Housing Analysis.” TDHCA Reference Number 332-RFP11-1005. 2012. <https://www.tdhca.state.tx.us/housing-center/docs/12-Rural-Farm-Analysis-Rural.pdf> (Accessed 8 August 2018)

Boyd, D.E., M.D. Freeman, M.D. Blum, E.R. Prewitt, and J.M. Quigg. “Phase I Cultural Resources Investigations at Justiceburg Reservoir on the Double Mountain Fork of the Brazos River, Garza and Kent Counties, Texas.” Prepared for the City of Lubbock, Texas. Austin, Texas: Prewitt and Associates, Inc. 1989.

Bristol, S. “Environmental Contaminants in Water, Sediment and Biological Samples from Playa Lakes in Southeastern New Mexico – 1992.” Albuquerque, New Mexico: U.S. Fish and Wildlife Service, Environmental Contaminants Program. 1999.

Brown, K., M.E. Brown, B.G. Bury, P.C. Condon, R.I. Doucett, J R. Ferguson, C.D. Frederick, M.D. Glascock, M. Graham, R.G. Holloway, D.A. Hyndman, M.K. Logan, L. Perry, J.M. Quigg, M.S. Schackley, R. Wiseman, A. Romero, B.M. Winsborough. “The Laguna Plata Site Revisited: Current Testing and Analysis of New and Existing Assemblages at LA 5148, Lea County, New Mexico.” Albuquerque, New Mexico: TRC Environmental, Inc. 2010a.

Brown, K.L., M. Graham, H.C. Higgins, T.G. McEnany, S. Owens, and M. Quirola. “Permian Basin Project: Ethnographic and Archaeological Inventory with the Mescalero Apache Tribe of Potential Traditional Cultural Properties in the Vicinity of the Permian Basin MOA, BLM Pecos District, Eddy County, New Mexico.” Albuquerque, New Mexico: TRC. 2010b.

CDD. “City of Carlsbad Housing Analysis and Strategic Plan Update 2015.” Carlsbad, New Mexico: Carlsbad Department of Development. 2015. <https://www.developcarlsbad.org/media/userfiles/subsite_54/files/City%20of%20Carlsbad%20Housing%20Analysis%20and%20Strategic%20Plan%20Update%202015(1).pdf> (Accessed 19 May 2022)

CEQ. “Environmental Justice Guidance under the National Environmental Policy Act.” ADAMS Accession No. ML12199A438. Washington, DC: Council on Environmental Quality. 1997.

Cheeseman, R.J. “Geology and Oil/Potash Resources of Delaware Basin, Eddy and Lea Counties, New Mexico.” In: Geology and Mineral Deposits of Ochoan Rocks in Delaware Basin and Adjacent Areas. New Mexico Bureau of Mines and Mineral Resources, Circular 159, pp. 7-14. 1978.

City of Andrews. “Comprehensive Annual Financial Report.” Andrews, Texas: City of Andrews Finance Department. 2019. <http://www.cityofandrews.org/2018-09-30%20CAFR.pdf> (Accessed 9 December 2019)

City of Carlsbad. “Monthly Reports, Planning, Engineering and Regulation Department.” Carlsbad, New Mexico: City of Carlsbad. 2018. <https://www.cityofcarlsbadnm.com/download/planning_eng_reg/monthly_reports/building_activity_reports/2018/PERD-Monthly-Building-Rpt-08-2018.pdf> (Accessed 13 August 2018)

Collins, Michael B. “Clovis and Folsom Lithic Technology on and near the Southern Plains: Similar Ends, Different Means.” In *Folsom Lithic Technology*, edited by Daniel S. Amick, pp. 12–38. Archaeological Series No. 12. Ann Arbor, Michigan: International Monographs in Prehistory. 1999.

Condon, P.C. Paleoamerican Stone Selection at Blackwater Locality No. 1: Alibates Silicified Dolomite and Edwards Plateau Chert Frequency Analysis. Current Research in the Pleistocene. Vol. 23. pp. 94–95. 2006.

Consensus Planning. “City of Carlsbad Comprehensive Plan.” Albuquerque, New Mexico: Consensus Planning, Incorporated. 2020. <https://cityofcarlsbadnm.com/download/planning_eng_reg/publications/Final-Approved-Carlsbad-Comprehensive-Plan-1.28.2020-1.pdf> (Accessed 18 May 2022)

Davis, D.R. and J.S. Hopkins. “Lake Water Quality Assessment Surveys, Playa Lakes.” NMED/SWQ-93/2. Santa Fe, New Mexico: New Mexico Environment Department, Surface Water Quality Bureau. 1993.

Dein, F.J., L.A. Baeten, C.U. Meteyer M.K. Moore, M.D. Samuel, P.D. Miller, C. Murphy, S. Sissler, C.W. Jeske, J.R. Jehl, Jr., J.S. Yaeger, B. Bauer, and S.A. Mahoney.” Investigation Into Avian Mortality in the Playa Lakes Region of Southeastern New Mexico.” Final Report. pp. 1–122. Washington, DC: U.S. Geological Survey, Biological Resources Division. 1997.

DOE. “Waste Isolation Pilot Plant Annual Site Environmental Report for 2014.” DOE/WIPP-18-3591. Washington, DC: U.S. Department of Energy. 2018. <https://wipp.energy.gov/library/ser/DOE-WIPP-18-3591_Rev_0.pdf> (Accessed 14 July 2021)

DOE. “Waste Isolation Pilot Plant Shipment and Disposal Information.” Washington, DC: U.S. Department of Energy. 2021. <https://www.wipp.energy.gov/shipment-information.asp> (Accessed 15 July 2021)

DOE. “Final Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada.” DOE/EIS-0250F-S1. ADAMS Accession No. ML081750191 Package. Washington, DC: U.S. Department of Energy, Office of Civilian Radioactive Waste Management. 2008.

DOE. “Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement.” DOE/EIS-0026-S2. Washington, DC: U.S. Department of Energy. 1997. <https://www.energy.gov/nepa/downloads/eis-0026-s2-final-supplemental-environmental-impact-statement> (Accessed 29 August 2018)

Double Eagle Water Supply. Email correspondence to T. Holt from K. Cass. “Subject: Double Eagle Water Supply Follow-Up.” ADAMS Accession No. ML21201A139. Washington, DC: U.S. Nuclear Regulatory Commission. 2021.

Economic Profile System. “A Profile of Socioeconomic Trends.” ADAMS Accession No. ML21158A192. Bozeman, Montana: Headwaters Economics. 2021a.

Economic Profile System. “A Demographic Profile.” ADAMS Accession No. ML21158A204. Bozeman, Montana: Headwaters Economics. 2021b.

EDCLC. “Healthcare.” Hobbs, New Mexico: Economic Development Corporation of Lea County. 2018. <http://www.edclc.org/healthcare/> (Accessed 13 August 2018)

Eddy County. “Eddy County Special Commission Meeting, September 11, 2020.” Carlsbad, New Mexico: Eddy County. 2020. <https://www.co.eddy.nm.us/AgendaCenter/ViewFile/Agenda/_09112020-293> (Accessed 1 March 2021)

ELEA. “Memorandum of Agreement with Holtec International.” Eddy-Lea Energy Alliance. 2016.

ELEA. “GNEP Siting Report.” ADAMS Accession Nos. ML17310A225, ML17310A227, ML17310A230, and ML17310A231. Hobbs, New Mexico: Eddy-Lea Energy Alliance. 2007.

Elliott, L. “Descriptions of Systems, Mapping Subsystems, and Vegetation Types for Texas.” Austin, Texas: Texas Parks and Wildlife. 2014.

Encyclopedia Britannica. “New Mexico: Physical Features.” 2010. <https://kids.britannica.com/students/assembly/view/162086> (Accessed 28 August 2018)

EPA. “2014 National Emissions Inventory (NEI) Data.” Washington, DC: U.S. Environmental Protection Agency. 2018. <https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data> (Accessed 2 August 2018)

EPA. “National Ambient Air Quality Standards (NAAQS) Table.” Washington, DC: U.S. Environmental Protection Agency. 2016a. <https://www.epa.gov/criteria-air-pollutants/naaqs-table> (Accessed July 16, 2018)

EPA. “Fact Sheet – Proposed Revisions to the Prevention of Significant Deterioration and Title V Permitting Regulations for Greenhouse Gases (GHG) and Establishment of a GHG Significant Emissions Rate.” Washington, DC: U.S. Environmental Protection Agency. 2016b. <https://www.epa.gov/sites/production/files/2016-08/documents/ser_proposal_factsheet_8-29-16.pdf> (Accessed 26 December 2018)

EPA. “Level III and IV Ecoregions of the Continental United States.” Corvallis, Oregon: U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory. 2013.

EPA. “Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.” EPA/ONAC 550/9-74-004. ADAMS Accession No. ML110110692. Washington, DC: U.S. Environmental Protection Agency. 1974.

Evans, Glen L. Prehistoric Wells in Eastern New Mexico. *American Antiquity*. Vol. 17. pp. 1–9. 1951.

Forest Service. “A Working Glossary for Practitioners of Consultation Under Section 7 of the Endangered Species Act.” 2nd Edition. Lakewood, Colorado: U.S. Fish and Wildlife Service. 2016. <https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd531319.pdf> (Accessed 29 April 2020)

FWS. “Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project.” Project Code: 2022-0025363. Project Name: Holtec International New Mexico Spent Nuclear Fuel Storage Facility. ADAMS Accession No. ML22129A105. Albuquerque, New Mexico: U.S. Fish and Wildlife Service. 2022a.

FWS. “Service Seeks Public Comment on Lesser Prairie-Chicken Habitat Conservation Plan for Oil and Gas Development in Great Plains.” Washington, DC: U.S. Fish and Wildlife Service. 2022b. <https://www.fws.gov/press-release/2022-02/proposed-oil-and-gas-habitat-conservation-plan-lesser-prairie-chicken> (Accessed 12 May 2022)

FWS. “National Wetlands Inventory, Surface Waters and Wetlands.” Washington, DC: U.S. Fish and Wildlife Service. 2021a. <https://www.fws.gov/wetlands/data/Mapper.html> (Accessed 9 March 2021)

FWS. “Subject: Updated List of Threatened and Endangered Species that May Occur in Your Proposed Project Location, and/or may be Affected by Your Proposed Project.” Consultation Code: 02ENNM00-2018-SLI-0582. Project Name: Holtec International New Mexico Spent Nuclear Fuel Storage Facility. ADAMS Accession No. ML22133A067. Albuquerque, New Mexico: U.S. Fish and Wildlife Service. 2021b.

FWS. "Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project." Consultation Code: 02ENNM00-2018-SLI-0582. Project Name: Holtec International New Mexico Spent Nuclear Fuel Storage Facility. ADAMS Accession No. ML21257A381. Albuquerque, New Mexico: U.S. Fish and Wildlife Service. 2021c.

FWS. "FWS Critical Habitat for Threatened and Endangered Species Mapper." Washington, DC: U.S. Fish and Wildlife Service. 2021d. <https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77> (Accessed 9 March 2021)

FWS. "Yellow-billed Cuckoo (*Coccyzus americanus*)." Washington, DC: U.S. Fish and Wildlife Service, Environmental Conservation Online System. 2021e. <https://ecos.fws.gov/ecp/species/3911> (Accessed 9 March 2021)

FWS. "Dunes Sagebrush Lizard (*Sceloporus arenicous*)." Washington, DC: U.S. Fish and Wildlife Service, Environmental Conservation Online System. 2021f. <https://ecos.fws.gov/ecp/species/6631> (Accessed 9 March 2021)

FWS. "Candidate Species, Section 4 of the Endangered Species Act." Falls Church, Virginia: U.S Fish and Wildlife Service. 2017. <https://www.fws.gov/sites/default/files/documents/Candidate-Species.pdf> (Accessed 14 September 2021)

FWS. "Listing a Species as a Threatened or Endangered Species." Falls Church, Virginia: U.S. Fish and Wildlife Service. 2016. <https://www.fws.gov/sites/default/files/documents/ESA-Section-4-Listing.pdf> (Accessed 14 September 2021)

FWS. "Northern Aplomado Falcon (*Falco femoralis septentrionalis*), 5-Year Review: Summary and Evaluation." Albuquerque, New Mexico: U.S. Fish and Wildlife Service. 2014.

FWS. "Birds of Management Concern and Focal Species." Arlington, Virginia: U.S. Fish and Wildlife Service, Migratory Bird Program. 2011.

FWS. "Lesser Prairie-Chicken – Sand Dune Lizard Candidate Conservation Agreement (CCA) and Candidate Conservation Agreement with Assurances (CCAA) Frequently Asked Questions." Albuquerque, New Mexico: U.S. Fish and Wildlife Service. 2008.

FWS. "Investigation of the Role of Environmental Contaminants upon Ecological Sentinel Species and Their Habitats at Bitter Lake National Wildlife Refuge, New Mexico." Albuquerque, New Mexico: U.S. Department of the Interior, Fish and Wildlife Service Region 2. 2001.

Gaines County. "2County of Gaines, Budget Fiscal Year 2021." Seminole, Texas: Gaines County Appraisal District. 2021. <http://www.co.gaines.tx.us/upload/page/5482/docs/Budgets/2021/FY21GainesCountyApprovedBudget.pdf> (Accessed 23 February 2021)

GCRP. "Climate Science Special Report: Fourth National Climate Assessment, Volume I." Washington, DC: U.S. Global Change Research Program. 2017.

GEI Consultants. “Geotechnical Data Report Hi-Store CISF Phase 1 Site Characterization, Lea County, New Mexico.” ADAMS Accession No. ML18023A958. Woburn, Massachusetts: GEI Consultants. 2017.

Godwin, M.F., J.W. Clark, Jr., W.J. Weaver, and G.T. Goode. “A Phase I Archeological Survey of the Proposed Fluvanna Wind Farm on the Caprock Escarpment in Scurry and Borden Counties, Texas.” Austin, Texas: URS Corporation. 2001.

Green, F.E. “The Clovis Blades: An Important Addition to the Llano Complex.” *American Antiquity*. Vol. 29. pp. 145–165. 1963.

Haskell, J. Loring (editor). “Caprock Water System Archaeological Project, Lea County, New Mexico.” Agency of Conservation Archaeology, Eastern New Mexico University, Portales. 1977.

Hayes, P.T. “Geology of the Guadalupe Mountains, New Mexico.” U.S. Geological Survey Professional Paper No. 446. 1964.

Hendrickson, G.E. and R.J. Jones. “Geology and Groundwater Resources of Eddy County, New Mexico.” New Mexico Bureau of Mines and Mineral Resources Ground Water Report 3, 169 p. 1952.

Hester, J.J. “Blackwater Locality No. 1: A Stratified, Early Man Site in Eastern New Mexico.” Publication No. 8. Fort Burgwin Research Center, Southern Methodist University, Ranchos de Taos, New Mexico. 1972.

Hill, C.A. “Intrastratal Karst at the WIPP Site, Southeastern New Mexico.” In: Caves and Karst of Southeastern New Mexico. L. Land, V.W. Virgil, W. Raatz, P. Boston, and D.L. Love [eds.], New Mexico Geological Society Guidebook, 57th Annual Fall Field Conference, pp. 233–242. 2006.

Hill, D.V. “Understanding Sources of Variability of Brownware Ceramics in Southeastern New Mexico.” Manuscript on file, Office of the New Mexico State Historic Preservation Officer, Santa Fe. 2014.

Holtec. “Responses to Request for Additional Information. ADAMS Accession No. ML21228A203. Marlton, New Jersey: Holtec International. 2021.

Holtec. “Environmental Report-HI-STORE Consolidated Interim Storage Facility, Rev. 8.” ADAMS Accession No. ML20295A485. Marlton, New Jersey: Holtec International. 2020a.

Holtec. “Safety Analysis Report-HI-STORE Consolidated Interim Storage Facility.” ADAMS Accession No. ML20295A428. Marlton, New Jersey: Holtec International. 2020b.

Holtec. “Responses to Request for Additional Information.” ADAMS Accession No. ML19081A075. Marlton, New Jersey: Holtec International. 2019a.

Holtec. “Attachment 2 to Holtec Letter 5025040, HI-STORE RAI Part 2 Responses - January 2019.” ADAMS Accession No. ML19037A293. Marlton, New Jersey: Holtec International. 2019b.

Holtec. “Responses to Request for Additional Information.” ADAMS Accession No. ML19248C132. Marlton, New Jersey: Holtec International. 2019c.

Holtec. “HI-STORE CIS (Consolidated Interim Storage Facility) License Application Responses to Requests for Supplemental Information.” ML18345A151 Package. Marlton, New Jersey: Holtec International. 2018.

Holtec. “HI-STORE CIS (Consolidated Interim Storage Facility) License Application Responses to Requests for Supplemental Information.” ADAMS Accession No. ML17310A218 Package. Marlton, New Jersey: Holtec International. 2017.

HUD. “Affordable Housing.” Washington, DC: U.S. Department of Housing and Urban Development. 2018. <https://www.urban.org/sites/default/files/publication/97496/housing_affordability_local_and_national_perspectives_1.pdf#:~:text=Current%20affordability%20metrics%20measure%20household-level%20and%20market-level%20trends,post%20measure%2C%20comparing%20actual%20spending%20and%20actual%20income> (Accessed 7 August 2018)

Hunt, J.E. *Archaeological Site Survey Form for LA 89676 (PAC /LE-148)*. Laboratory of Anthropology, Museum of New Mexico, recorded February 28. 1992.

ICRP (International Commission on Radiological Protection). “The 2007 Recommendations of the International Commission on Radiological Protection.” *Annals of the International Commission on Radiological Protection.* ICRP Publication 103. Amsterdam Netherlands: Elsevier, Inc. 2007. <http://www.icrp.org/publication.asp?id=ICRP%20Publication%20103> (Accessed 28 June 2019)

Idowu, J. and R. Flynn. “Growing Plants in Caliche Soils.” Guide A-151. Las Cruces, New Mexico: New Mexico State University. 2015.

Intrepid. “Our Locations.” Denver, Colorado: Intrepid. <https://www.intrepidpotash.com/locations/> (Accessed 1 November 2021)

Iowa State University. “Iowa Environmental Mesonet – Wind Roses.” Ames, Iowa: Iowa State University. 2017. <https://mesonet.agron.iastate.edu/sites/windrose.phtml?station=HOB&network=NM_ASOS> (Accessed 2 August 2018)

Jelinek, A.J. *A Prehistoric Sequence in the Middle Pecos Valley, New Mexico*. University of Michigan, Ann Arbor. 1967.

Jerina, A. “The Permian Basin and Why It Is Great.” Croft Production Systems, Oil and Gas Blog. 2014. <https://www.croftsystems.net/oil-gas-blog/> (Accessed 19 August 2022)

Johnson, K.S., E.W. Collins, and S.J. Seni. “Sinkholes and Land Subsidence Owing to Salt Dissolution near Wink, Texas, and Other Sites in Western Texas and New Mexico.” In: Johnson, K.S. and J.T. Neal (eds), Evaporite Karst and Engineering/Environmental Problems in the United States: Oklahoma Geological Survey Circular 109, pp. 183–185. 2003.

Kelly, T. E. “Hydrologic Assessment of the Salt Lakes Area, Western Lea County, New Mexico.” Prepared by Geohydrology Associates, Inc., Albuquerque, New Mexico for Pollution Control, Inc., Lovington, New Mexico. 1984.

Kelly, T.E. “Water Resources Study of the Carlsbad Potash Area, New Mexico.” Contract No. YA-512-CT8-195. Denver, Colorado: U.S. Bureau of Land Management. 1979.

Kim, J.W., Z. Lu, and K. Degrandpre. “Ongoing Deformation of Sinkholes in Wink, Texas, Observed by Time-Series Sentinel-1A SAR Interferometry (Preliminary Results).” *Remote Sensing*. Vol. 8(4) 313. 2016.

Land, L. “Evaporite Karst in the Permian Basin Region of West Texas and Southeastern New Mexico: The Human Impact.” In Land, L. (ed) 13th Sinkhole Conference, National Cave and Karst Research Institute, Symposium 2, Carlsbad, New Mexico. pp. 113–122. 2013.

Land, L. “Anthropogenic Sinkholes in the Delaware Basin Region: West Texas and Southeastern New Mexico.” *West Texas Geological Society Bulletin*. Vol. 48. pp. 10–22. 2009.

Land, L. “Hydrogeology of Bottomless Lakes State Park.” In Land, L., V. Lueth, B. Raatz, Pl Boston, and D. Love (eds). Caves and Karst of Southeastern New Mexico: New Mexico Geological Society, Guidebook 57. pp. 95–96. 2006.

Land, L. “Evaporite Karst and Regional Ground Water Circulation in the Lower Pecos Valley.” In Johnson, K.S. and J.T. Neal (eds). Evaporite Karst and Engineering/Environmental Problems in the United States: Oklahoma Geological Survey Circular 109. Norman, Oklahoma: The University of Oklahoma. pp. 227–232. 2003.

Lang, B. and D.C. Rogers. “Biodiversity Survey of Large Branchiopd Crustaea in New Mexico.” Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2002.

Laumbach, K.W., T. Laumbach, and K. Silverbird. *A Cultural Resource Inventory of the Proposed Laguna Plata Archaeological District*. Cultural Resource Management Division, Report 335, Department of Sociology and Anthropology, New Mexico State University, Las Cruces. 1979.

Lea County. “Lea County New Mexico, Comprehensive Annual Financial Report, 2019-2020.” Lovington, New Mexico: Lea County Finance Department. 2020. <https://d38trduahtodj3.cloudfront.net/files.ashx?t=fg&rid=LeaCounty&f=5013_Lea_County_CAFR_FY20a.pdf> (Accessed 23 February 2021)

Main, Rhonda. Limited Testing at Maljamar, Lea County, New Mexico. Laboratory of Anthropology Note 78, Museum of New Mexico, Santa Fe. 1992.

McLachlan, M.M., A. Daniels, and A.M. Bartuszevige. “Playa Decision Support System User’s Manual – A Geospatial Tool to Prioritize Playas for Conservation and Restoration.” Lafayette, Colorado: Playa Lakes Joint Venture. 2014.

Meltzer, D.J. and M.B. Collins. Prehistoric Water Wells on the Southern High Plains: Clues to Altithermal Climate. *Journal of Field Archaeology*. Vol. 14. pp. 9–28. 1987.

Mercer, J.W. "Geohydrology of the Proposed Waste Isolation Pilot Plant Site, Los Medanos Area, Southeastern New Mexico." U.S. Geological Survey Water-Resources Investigations Report 83-4016. 111 p. 1983.

Mercer, J.W. and B.O. Orr. "Interim Data Report on the Geohydrology of the Proposed Waste Isolation Pilot Plant Site, Southeast New Mexico." U.S. Geological Survey Water-Resources Investigations Report 79-98. p. 178. 1979.

Mercer, J.W. and B.R. Orr. "Review and Analysis of Hydrogeologic Conditions Near the Site of a Potential Nuclear Waste Laboratory, Eddy and Lea Counties, New Mexico." U.S. Geological Survey Open-File Report. 1977.

Miller, M.R, T.B. Graves, and R.H. Leslie. "The Merchant Site: A Late Prehistoric Ochoa Phase Settlement in Southeastern New Mexico." Prepared for the Bureau of Land Management, Carlsbad Field Office. Versar Cultural Resources Report No. 836EP, NMCRIS No. 132077. El Paso, Texas: Versar, Inc. 2016.

Mitchusson, T. "Long-Range Plan for the Management of Sandhill Cranes in New Mexico, 2003-2007". Santa Fe, New Mexico: Division of Wildlife, New Mexico Department of Game and Fish. 2003.

Murrell, M.L., T.M. Mills, C.J. Gregory, and D.T. Unruh. "A Cultural Resource Inventory of the Holtec International Proposed Consolidated Interim Storage Facility (CISF) Project Area, Lea County, New Mexico." Prepared for Tetra Tech, Inc. Albuquerque, New Mexico: Statistical Research, Inc. 2016.

National Park Service. "National Register Bulletin, Guidelines for Evaluating and Documenting Traditional Cultural properties." Washington, DC: U.S. Department of the Interior, National Park Service. 2014.

NCRP. "Ionizing Radiation Exposure of the Population of the United States." Report No. 160. Bethesda, Maryland: National Council on Radiation Protection and Measurements. 2009. <https://ncrponline.org/publications/reports/ncrp-report-160/> (Accessed 29 August 2018)

NCES. "Search for Public Schools." 2019-2020 School Year. Washington, DC: U.S. Department of Education, National Center for Education Statistics (NCES). 2020. <https://nces.ed.gov/ccd/schoolsearch/> (Accessed 21 February 2021)

NCES. "Search for Private Schools." 2017-2018 School Year. Washington, DC: U.S. Department of Education, National Center for Education Statistics (NCES). 2018. <https://nces.ed.gov/surveys/pss/privateschoolsearch/> (Accessed 21 February 2021)-

New Mexico Bureau of Geology and Mineral Resources. "Total Dissolved Solids in New Mexico Well Water." Socorro, New Mexico: New Mexico Institute of Mining and Technology, New Mexico Bureau of Geology and Mineral Resources. 2019. <https://geoinfo.nmt.edu/resources/water/chemistry/tds.html> (Accessed 21 October 2019)

New Mexico Energy and Minerals Department. Hearings for Exceptions to Order No. R-3221, Southeast New Mexico, "No-Pit" Order. Stamets, R.L., letter to OCD Staff and Attorneys Practicing Before the Division. Santa Fe, New Mexico: New Mexico Energy and Minerals Department, Oil Conservation Division. 1985. <https://ocdimage.emnrd.nm.gov/imaging/Filestore/SantaFeAdmin/CF/ADA-03-00616%20Case%20Files%20Part%2013/09235_0030.pdf > (Accessed 19 May 2022)

New Mexico Rare Plant Technical Council. "Rare Plant County Search, Lea." Albuquerque, New Mexico: New Mexico Rare Plant Technical Council. 2020. <https://nmrareplants.unm.edu/rarelist.php> (Accessed 23 April 2020)

Nicholson, A. Jr. and A. Clebsch, Jr. "Geology and Ground-Water Conditions in Southern Lea County, New Mexico." ADAMS Accession No. ML042430324. Ground-Water Report 6, U.S. Geological Survey in cooperation with the New Mexico Institute of Mining and Technology, State Bureau of Mines and Mineral Resources, and New Mexico State Engineer. Socorro, New Mexico. 1961.

NMBF. "Action Taken: Board of Finance Meeting." Governor's Cabinet Room – Fourth Floor, State Capital Building – Santa Fe, New Mexico. New Mexico Board of Finance. 2016.

NMDA. Memorandum: New Mexico Noxious Weed List Update. Las Cruces, New Mexico: New Mexico Department of Agriculture. 2016.

NMDGF. "Biota Information System of New Mexico." Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2019a. <http://www.bison-m.org/index.aspx> (Accessed 24 April 2019)

NMDGF. "Project Title: Proposed Holtec Consolidated Interim Storage Facility." Project ID NMERT-203. ADAMS Accession No. ML21195A387. Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2019b.

NMDGF. Letter (August 31) C. Hayes, New Mexico Game and Fish Department, to Jill Caverly, NRC. RE: Holtec International HI-STORE Consolidated Interim Storage Facility Project, Environmental Impact Statement (EIS), Public Scoping; NMDGF No. 18390. ADAMS Accession No. ML18247A573. Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2018a.

NMDGF. "2017-2018 Deer Hunter Harvest Report." ADAMS Accession No. ML22138A354. Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2018b. <http://www.wildlife.state.nm.us/download/hunting/harvest/2017_2018-Deer-Harvest-Report.pdf> (Accessed 17 August 2018)

NMDGF. "2017-2018 Pronghorn Hunter Harvest Report." ADAMS Accession No. ML22138A357. Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2018c. <http://www.wildlife.state.nm.us/download/hunting/harvest/2017_2018-Pronghorn-Harvest-Report.pdf> (Accessed 17 August 2018)

NMDGF. “Game Management Unit (GMU).” Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2017. <http://www.wildlife.state.nm.us/hunting/maps/big-game-unit-maps-pdfs/> (Accessed 17 August 2018)

NMDGF. “State Wildlife Action Plan.” Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2016. <https://www.wildlife.state.nm.us/download/conservation/swap/New-Mexico-State-Wildlife-Action-Plan-SWAP-Final-2019.pdf> (Accessed 17 August 2018)

NMDOH. “2018: The State of Health in New Mexico.” Santa Fe, New Mexico: New Mexico Department of Health. 2018. <https://nmhealth.org/publication/view/report/4442/> (Accessed 29 August 2018)

NMDOT. “Road Segments by Posted Route/Point with (AADT) Info.” Santa Fe, New Mexico: New Mexico Department of Transportation. Email from Jessica Crane, NMDOT, to Tetra Tech. 2016.

NMED. “Progress Report for the State Implementation Plan for Regional Haze”. Santa Fe, New Mexico: Air Quality Bureau – Environmental Protection Division – New Mexico Environment Department. 2014.

NMED. “2010 New Mexico Solid Waste.” Santa Fe, New Mexico: New Mexico Environment Department, Solid Waste Bureau. 2010.

NMEMNRD. “State Endangered Plant List.” Santa Fe, New Mexico: New Mexico Energy, Minerals and Natural Resources Department. 2022. <https://www.emnrd.nm.gov/sfd/rare-plants/state-rare-plant-list/> (Accessed 12 May 2022)

NMEMNRD. “New Mexico Rare Plant Conservation Strategy.” Santa Fe, New Mexico: New Mexico Energy, Minerals and Natural Resources Department, Forestry Division. 2017. <http://www.emnrd.state.nm.us/SFD/documents/NMRarePlantConsStrategy_Final_reduced.pdf > (Accessed 23 April 2020)

NMOCD. “NM OCD Oil and Gas Map – ArcGIS Web Application.” New Mexico Oil Conservation Division. 2020. <https://nm-emnrd.maps.arcgis.com/apps/webappviewer/index.html?id=4d017f2306164de29fd2fb9f8f35ca75> (Accessed 19 November 2020)

NMOCD. “NM_Wells_State_Wide_UTM_NAD83_Z13.” Vector Digital Data. New Mexico Oil Conservation Division. 2016. <http://www.emnrd.state.nm.us/OCD/ocdgis.html> (Accessed 21 August 2018)

NMOSE. “Lea County Regional Water Plan.” New Mexico: State of New Mexico, Interstate Stream Commission, Office of the State Engineer. 2016. <https://www.ose.state.nm.us/Planning/RWP/Regions/16_Lea%20County/2016/Reg%2016_Lea%20County_Regional%20Water%20Plan%202016_December%202016.pdf> (Accessed 10 September 2019)

NMOSE. "New Mexico Office of the State Engineer Underground Water Basins in New Mexico." New Mexico Office of the State Engineer, Declared Groundwater Basin Maps. 2005. <http://www.ose.state.nm.us/Maps/PDF/underground_water.pdf> (Accessed 17 August 2018)

NMPED. "STARS, STARS Enrollment Data." 2018-2019 Enrollment by district by location by grade. Santa Fe, New Mexico: New Mexico Public Education Department. 2020. <https://webnew.ped.state.nm.us/bureaus/information-technology/stars/> (Accessed 21 February 2021)

NMTRD. "Gross Receipts Tax Rate Schedule, Effective January 1, 2021 through June 30 2021." Santa Fe, New Mexico: New Mexico Taxation and Revenue Department. 2021.

NMTRD. "Corporate Income Tax and Corporate Franchise Tax." FYI-350. Santa Fe, New Mexico: New Mexico Taxation and Revenue Department. 2020a.

NMTRD. "2020 Tax Rate Table." Santa Fe, New Mexico: New Mexico Taxation and Revenue Department. 2020b.

NMTRD. "Gross Receipts and Compensating Taxes: An Overview, July 1, 2020 – June 30, 2021." FYI-105. Santa Fe, New Mexico: New Mexico Taxation and Revenue Department. May 2020c.

NMTSO. "Recent Seismic Events – New Mexico Tech Seismological Observatory." New Mexico Tech Seismological Observatory. 2020. <https://geoinfo.nmt.edu/nmtso/home.html> (Accessed 19 May 2022)

NOAA. "Climates of the States, Climatology of the United States No. 60 (New Mexico)." Asheville, North Carolina: National Oceanic and Atmospheric Administration, National Centers for Environmental Information. 2018a. <https://www.ncei.noaa.gov/data/climate-normals-deprecated/access/clim60/states/Clim_NM_01.pdf> (Accessed 12 July 2018)

NOAA. "Storm Events Database – New Mexico." Asheville, North Carolina: National Oceanic and Atmospheric Administration, National Centers for Environmental Information. 2018b. <https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=35%2CNEW+MEXICO> (Accessed 30 July 2018)

NOAA. "NOAA National Centers for Environmental Information – State Climate Summaries – New Mexico." Asheville, North Carolina: National Oceanic and Atmospheric Administration, National Centers for Environmental Information. 2017. <https://statesummaries.ncics.org/nm> (Accessed 1 August 2018)

NRC. "Low-Level Waste Disposal Statistics." Washington, DC: U.S. Nuclear Regulatory Commission. 2018. <https://www.nrc.gov/waste/llw-disposal/licensing/statistics.html> (Accessed 26 August 2018)

NRC. NUREG–2184, "Supplement to the U.S. Department of Energy's Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada." ADAMS Accession No. ML16125A032. Washington, DC: U.S. Nuclear Regulatory Commission. 2016.

NRC. NUREG–2125, "Spent Fuel Transportation Risk Assessment: Final Report." ADAMS Accession No. ML14031A323. Washington, DC: U.S. Nuclear Regulatory Commission. 2014.

NRC. NUREG–2113, "Environmental Impact Statement for the Proposed Fluorine Extraction Process and Depleted Uranium Deconversion Plant in Lea County, New Mexico." ADAMS Accession No. ML12220A380. Washington, DC: U.S. Nuclear Regulatory Commission. 2012.

NRC. NUREG–1790, "Environmental Impact Statement for the Proposed National Enrichment Facility in Lea County, New Mexico." ADAMS Accession No. ML15155B297 Package. Washington DC: U.S. Nuclear Regulatory Commission. 2005.

NRC. NUREG–1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs." ADAMS Accession No. ML032450279. Washington, DC: U.S. Nuclear Regulatory Commission. 2003.

NRCS. "New Mexico HUC-10 Boundaries." Digital Vector Data. Albuquerque, New Mexico: U.S. Department of Agriculture, Natural Resource Conservation Service. 2005. < https://www.nrcs.usda.gov/wps/portal/nrcs/main/nm/technical/dma/gis/> (Accessed 20 August 2018)

Office of Information and Regulatory Affairs. "Listing Determination and Critical Habitat Designation for the Dunes Sagebrush Lizard." RIN: 1018-BG22. Washington DC: Office of Information and Regulatory Affairs. 2022. <https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202110&RIN=1018-BG22> (Accessed 20 May 2022)

Pangburn, J. and S. Therriault. "The Proposed Holtec Railroad Spur, Fence Line, and Access Road Rights-of-Way Located in Sections 13,19, 20, 21, 22, 23, 24 in T 20 S R 32 E; and Section 19 in T 20 S R 33 E, Lea County, New Mexico." Prepared for Center of Excellence for Hazardous Materials Management representing Holtec International by APAC, Carlsbad, New Mexico. 2019a.

Pangburn, J. and S. Therriault. "The Proposed Extension to the Holtec Site named HI-STORE a Consolidated Interim Storage Facility (CISF) for Spent Nuclear Fuel in Lea County, New Mexico." Prepared for The Center of Excellence for Hazardous Materials Management representing Holtec International by APAC, Carlsbad, New Mexico. 2019b.

Parry, W.J. and R.L. Kelly. Expedient Core Technology and Sedentism. In *The Organization of Core Technology*, edited by Jay K. Johnson and Carol A. Morrow. pp. 285–304. Westview Special Studies in Archaeological Research, Westview Press, Boulder. 1987.

Playa Lakes Joint Venture. "Playa Maps and Tools." Lafayette, Colorado: Playa Lakes Joint Venture. 2019. <https://pljv.org/playas/playa-tools/**Error! Hyperlink reference not valid.**> (Accessed 24 January 2020)

Pratt, B., D. Scurlock, and V.J. Glover. "Llano, River, and Mountain: The Southeast New Mexico Regional Overview, Volume 1: Historic Overview." By Boyd Pratt and Dan Scurlock. pp. 233–252. Santa Fe, New Mexico: New Mexico Historic Preservation Division. 1989.

Permian Basin Regional Planning Commission. "Permian Basin Comprehensive Economic Development Strategy (CEDS) 2010-2020). Midland, Texas: Permian Basin Regional Planning Commission (PBRPC) Economic Development District. 2015. <http://www.pbrpc.org/pdfs/EDD/2015/2015-2020%20PB-CEDS.pdf> (Accessed 7 September 2018)

Powers, D.W., R.L. Beauheim, R.M. Holt, and D.L. Hughes. "Evaporite Karst Features and Processes at Nash Draw, Eddy County, New Mexico." In: Caves and Karst of Southeastern New Mexico. L. Land, V.W. Virgil, W. Raatz, P. Boston, and D.L. Love [eds.], New Mexico Geological Society Guidebook, 57th Annual Fall Field Conference, pp. 253-265. 2006.

Powers, D.W. "Jal Sinkhole in Southeastern New Mexico: Evaporite Dissolution, Drill Holes, and the Potential for Sinkhole Development. In: Johnson, K.S. and J.T. Neal, eds. Evaporite Karst and Engineering/Environmental Problems in the United States: Oklahoma Geological Survey Circular 109. pp. 219–226. 2003.

Powers, D.W., S.J. Lambert, S.E. Shaffer, L.R. Hill, and W.D. Weart, eds. "Geological Characterization Report Waste Isolation Pilot Project (WIPP) Site, Southeastern New Mexico." ADAMS Accession No. SAND78-1956. Albuquerque, New Mexico: Sandia Laboratories. 1978.

Railey, J.A. and W.T. Whitehead (editors). JO BAR TANK, Archaeological Data Recovery at LA 16902 for the South Eddy Cryogenic Plant, Eddy County, New Mexico. SWCA Cultural Resources Report No.: 16-718. Albuquerque, New Mexico: SWCA Environmental Consultants, 2017.

Railey, J.A. Permian Basin Research Design 2016-2026 (Volume I: Native American Archaeology and Cultural Resources). Prepared for the Bureau of Land Management Carlsbad Field Office. Albuquerque, New Mexico: SWCA Environmental Consultants. 2016.

Rhatigan, R. "Update of the Census for Lea County: Population Dynamics." Albuquerque, New Mexico: University of New Mexico Geospatial and Population Studies. 2015. <http://52.26.4.43/media/publications/Lea_County_Population_Report.pdf> (Accessed 12 July 2018)

Richey, S.F., J.G. Wells, and K.T. Stephens. "Geohydrology of the Delaware Basin and Vicinity, Texas and New Mexico." U.S. Geological Survey, Water-Resources Investigations Report 84-4077. Albuquerque, New Mexico: U.S. Department of the Interior. 1985.

Rocky Mountain Low-Level Radioactive Waste Board. Denver, Colorado. 2018. <http://www.rmllwb.us/index.htm> (Accessed 31 May 2019)

Schroeder, A.H. and D.S. Matson. "A Colony on the Move: Gaspar Castaño de Sosa's Journal, 1,590-1,591. Santa Fe, New Mexico: School of American Research Press. 1965.

Sebastian L. and F. Levine. The Mexican and American Historical Periods, in Sebastian, L. and S. Larralde, eds. Living on the Land: 11,000 Years of Human Adaptation in Southeastern New Mexico. Cultural Resource Series No. 6. Bureau of Land Management, New Mexico. 1989.

Seminole Economic Development Board. “Seminole, Texas, SEDC.” Seminole Economic Development Board: Seminole, Texas. 2018. <https://www.countyoffice.org/seminole-economic-development-seminole-tx-b71/> (Accessed 7 September 2018)

Seymour, D.J. A Rancheria in the Gran Apacheria: Evidence of Intercultural Interaction at the Cerro Rojo Site. *Plains Anthropologist*. Vol. 49(190). pp. 153–192. 2004.

Seymour, D.J., M.T. Harlan and D.V. Hill. *Conquest and Concealment: After the El Paso Phase on Fort Bliss: An Archaeological Study of Manso, Suma, and Early Apache*. United States Army Air Defense Artillery Center and Fort Bliss Directorate of Environment, Lone Mountain Archaeological Services, Albuquerque. 2002.

Smith, C., J. Runyon, and G. Agogino. A Progress Report on a Pre-Ceramic Site at Rattlesnake Draw, Eastern New Mexico. *Plains Anthropologist*. Vol. 11. pp. 302–313. 1966.

SMU Research News. “Radar Images Show Large Swath of West Texas Oil Patch is Heaving and Sinking at Alarming Rates.” 2018.

Snee, J.E.L and M.D. Zoback. “State of Stress in the Permian Basin, Texas and New Mexico: Implications for Induced Seismicity.” *The Leading Edge*, Special Section: Induced Seismicity. Vol. 37, No. 2. pp. 127–34. 2018.

Speth, J.D., editor. “Life on the Periphery: Economic Change in Late Prehistoric Southeastern New Mexico.” Ann Arbor, Michigan: University of Michigan, Museum of Anthropology, Memoirs No. 37. 2004.

Speth, J.D. and W.J. Parry. “Late Prehistoric Bison Procurement in Southeastern New Mexico: The 1978 Season at the Garnsey Site (LA 18399).” Ann Arbor, Michigan: University of Michigan, Museum of Anthropology, Technical Report No. 12. 1980.

Speth, J.D. and W.J. Parry. “Late Prehistoric Bison Procurement in Southeastern New Mexico: The 1977 Season at the Garnsey Site.” Ann Arbor, Michigan: University of Michigan, Museum of Anthropology Technical Report No. 8. 1978.

Stanford, D.J. “Clovis: Origins and Adaptations: An Introductory Perspective.” R. Bonnichson and K.L. Turnmire, eds. pp. 1–14. Corvallis, Oregon: Center for the Study of the First Americans, Oregon State University. 1991.

State of New Mexico Interstate Stream Commission Office of the State Engineer. “Lea County Regional Water Plan.” Santa Fe, New Mexico: State of New Mexico Interstate Stream Commission Office of the State Engineer. 2016. <http://www.ose.state.nm.us/Planning/RWP/Regions/16_Lea%20County/2016/Reg%2016_Lea%20County_Regional%20Water%20Plan%202016_December%202016.pdf> (Accessed 7 August 2018)

Stuart, T., D. Batcho, and D.V. Hill. “An Archaeological Clearance Survey of a Proposed Plant Site and Contractor's Yard near Cuervo, New Mexico, including a Description of a Probable Apache Tipi Ring Site.” Batcho & Kauffman Associates Cultural Resources Report Number 5. Las Cruces, New Mexico. 1986.

SwRI. “Scientific Notebook #1333 for the Holtec Consolidated Interim Storage Facility EIS Supporting Calculations.” ADAMS Accession No. ML19352G685. San Antonio, Texas: Southwest Research Institute, Center of Nuclear Waste Regulatory Analyses. 2019.

TCEQ. “WCS Radioactive Material License R04100.” Austin, Texas: Texas Commission on Environmental Quality. 2018. <https://www.tceq.texas.gov/permitting/radmat/licensing/wcs_license_app.html> (Accessed 26 August 2018)

TCPA. “Taxes, Sales and Use Tax.” Austin, Texas: Texas Comptroller of Public Accounts. 2021a. <https://comptroller.texas.gov/taxes/sales/#> (Accessed 23 February 2021)

TCPA. “Taxes, Franchise Tax Overview.” Austin, Texas: Texas Comptroller of Public Accounts. 2021b. <https://comptroller.texas.gov/taxes/publications/98-806.php> (Accessed 23 February 2021)

TCPA. “Taxes, Miscellaneous Gross Receipts Tax.” Austin, Texas: Texas Comptroller of Public Accounts. 2021c. <https://comptroller.texas.gov/taxes/misc-gross-receipts/> (Accessed 23 February 2021)

TCPA. “Tax Rates and Levies”. Austin, Texas: Texas Comptroller of Public Accounts. 2020. <https://comptroller.texas.gov/taxes/property-tax/rates/>. (Accessed 23 February 2021)

TEA. “Student Enrollment Reports.” School Year 2019-2020. Austin, Texas: Texas Education Agency. 2021. <https://rptsvr1.tea.texas.gov/adhocrpt/adste.html> (Accessed 21 February 2021)

Travis, James R. “Statewide Yellow-billed Cuckoo Survey–2004.” Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2005. <http://www.bison-m.org/documents/48541_2005_Travis_YellowBilledCuckoo_Scan.pdf> (Accessed 23 April 2020)

Turner, E.S. and T.R. Hester. *A Field Guide to Stone Artifacts of Texas Indians*. 2nd Ed. Texas Monthly Field Guide Series. Gulf Publishing, Houston, Texas. 1993.

USACE. “No Permit Required – Action No. SPA-2021-00059-LCO, Holtec International HI-STORE FACILITY.” ADAMS Accession No. ML21155A229. Las Cruces, New Mexico: U.S. Department of the Army, Corp of Engineers, Albuquerque District. 2021.

USCB. “TIGERweb Nation-Based Data Files.” Washington, DC: U.S. Department of Commerce, U.S. Census Bureau. 2019a. <https://tigerweb.geo.census.gov/tigerwebmain/TIGERweb_nation_based_files.html> (Accessed 13 April 2020)

USCB. 2015–2019 5-year American Community Survey; Table DP03: Selected Economic Characteristics; Table DP04: Selected Housing Characteristics; Table DP05: ACS Demographic and Housing Estimates; Table B03002: Hispanic or Latino Origin by Race;; Table B17010: Poverty Status in the Past 12 Months of Families by Family Type by Presence of Related Children Under 18 Years by Age of Related Children; Table B17021: Poverty Status of Individuals by Living Arrangement; Table S2001: Earnings in the Past 12 Months (in 2019 Inflation-Adjusted Dollars); Table S2301, Employment Status. Washington, DC: U.S. Department of Commerce, U.S. Census Bureau. 2019b. <https://data.census.gov/cedsci/> (Accessed 21 February 2021)

USCB. "Table 1, Residence County to Workplace County Commuting Flows for the United States and Puerto Rico Sorted by Residence Geography: 5-Year ACS, 2011–2015. Washington, DC: U.S. Department of Commerce, Census Bureau. 2015. <https://www.census.gov/data/tables/2015/demo/metro-micro/commuting-flows-2015.html> (Accessed 22 April 2019)

USCB. "Geographic Areas Reference Manual." Washington, DC: Department of Commerce, Bureau of the Census. 1994. <https://www2.census.gov/geo/pdfs/reference/GARM/Ch8GARM.pdf> (Accessed 12 July 2018)

USDA. "2017 Census of Agriculture." Washington, DC: U.S. Department of Agriculture. 2019. <https://www.nass.usda.gov/Publications/AgCensus/2017/index.php#full_report> (Accessed 19 April 2019)

USDA. "wss_aoi_2019-08-27_12-56-35." Vector Digital Data. U.S. Department of Agriculture, Natural Resource Conservation Service, Web Soil Survey. 2019. <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm> (Accessed 12 September 2019)

USDA. "CropScape – Cropland Data Layer, 2018." Washington, DC: U.S. Department of Agriculture. 2018. <https://nassgeodata.gmu.edu/CropScape/> (Accessed 14 September 2019)

USGS. "Search Earthquake Catalog." U.S. Geological Survey Earthquake Hazards Program, Earthquakes. 2020. <https://earthquake.usgs.gov/earthquakes/search/ > (Accessed 3 December 2020)

USGS. "Quaternary Fold and Fault Database of the United States." U.S. Geological Survey Earthquake Hazards Program, Faults. 2018a. <https://www.usgs.gov/programs/earthquake-hazards/faults> (Accessed 19 May 2022)

USGS. "2018 United States (Lower 48) Seismic Hazard Long-Term Model." U.S. Geological Survey Earthquakes Hazards, Seismic Hazard Maps and Site Specific Data. 2018b. <https://www.usgs.gov/natural-hazards/earthquake-hazards/science/2018-united-states-lower-48-seismic-hazard-long-term?qt-science_center_objects=0#qt-science_center_objects> (Accessed 12 November 2020)

USGS. "National Hydrography Data Set." Vector Digital Data. U.S. Geological Survey National Map. 2018c. <https://nhd.usgs.gov/index.html> (Accessed 28 August 2018)

USGS. “Texas Seismicity Map (M2.5+) 1973 to Present.” U.S. Geological Survey Earthquakes Hazard Program, Earthquakes. 2017. <https://www.usgs.gov/programs/earthquake-hazards/science/information-region-texas >
(Accessed 19 May 2022)

USGS. “Laguna Gatuna 7.5 Minute Quadrangle.” Raster Digital Data. U.S. Geological Survey. 2013. <https://rgis-data.unm.edu/rgisportal/> (Accessed 20 August 2018)

USGS. “Hobbs, NM 1:250,000 Quad USGS Land Use/Land Cover, 2000.” Vector Digital Data. U.S. Geological Survey. 2009. <https://rgis-data.unm.edu/rgisportal/> (Accessed 20 August 2018)

USRRB. “Employer Status Determination, Texas and New Mexico Railway, LLC (TXN).” Chicago, Illinois: U.S. Railroad Retirement Board. 2016. <https://secure.rrb.gov/pdf/bcd/bcd16-06.pdf> (Accessed 24 January 2019)

Vertrees, C.D., G.L. Evans, and C.H. Atchison. “Paleozoic Geology of the Delaware and Val Verde Basins.” Geology of the Val Verde Basin Field Trip Guidebook, West Texas Geological Society. pp. 64–73. 1959.

Vierra, B.J. *The Late Archaic Across the Borderlands*. Late Archaic Stone Tool Technology across the Borderlands. pp. 187–218. University of Texas Press, Austin, Texas. 2005.

Vine, J.D. “Surface Geology of the Nash Draw Quadrangle, Eddy County, New Mexico.” USGS Bulletin 1141-B. Washington, DC: U.S. Department of the Interior. U.S. Geological Survey. 1963.

WAFWA. “Southern Great Plains Crucial Habitat Assessment Tool.” Boise, Idaho: Western Association of Fish and Wildlife Agencies. 2021. <https://www.sgpchat.org>
(Accessed 7 May 2021)

Watco. “Texas & New Mexico Railway (TXN).” Pittsburg, Kansas: Watco Companies. 2021. <https://www.watco.com/service/rail/texas-new-mexico-railway-txn/> (Accessed 15 July 2021)

WCS. “Annual/Semi-Annual Radiological Environmental Monitoring Plan Report for January-December of 2014.” ADAMS Accession No. ML16330A085. Email communication (March 30) to Charles Maquire, Texas Commission on Environmental Quality. Andrews, Texas: Waste Control Specialists. 2015.

WDOE. “Report to Legislature on US Ecology Commercial Low-Level Radioactive Waste Site Closure.” Richland, Washington: Washington State Department of Ecology. Washington State Department of Health. 2015. <https://fortress.wa.gov/ecy/publications/documents/1505013.pdf> (Accessed 26 August 2018)

Wilson, John P. “The El Paso Electric Survey, Amrad to Eddy County, Southeastern New Mexico.” Archaeological and Historical Research Report No. 34. Submitted to El Paso Electric Company and the Bureau of Land Management, Roswell District Office. Las Cruces, New Mexico: Archaeological and Historical Resources 1984.

Wolfe, R.L., S.C. Kyle, J.C. Pitman, D.M. VonDeBur, and M.E. Houts. “The 2018 Lesser Prairie-Chicken Range-wide Conservation Plan Annual Progress Report.” Boise, Idaho:

Western Association of Fish and Wildlife Agencies. 2019. <https://wafwa.org/wp-content/uploads/2020/07/LPCRWP_AnnualReport_2018.pdf> (Accessed 23 April 2020)

Zhang, A., J. Lu, and J.W. Kim. "Detecting Mining-Induced Ground Deformation and Associated Hazards Using Spaceborne InSAR Techniques." *Geomatics, Natural Hazards and Risk*. Vol. 9, No. 1. pp. 211–223. 2018.

4 ENVIRONMENTAL IMPACTS OF CONSTRUCTION, OPERATION, AND DECOMMISSIONING AND MITIGATIVE ACTIONS

4.1 Introduction

This chapter provides the U.S. Nuclear Regulatory Commission (NRC) staff's evaluation of the potential environmental impacts that could occur during all three stages of the license term (construction, operation, and decommissioning) of the proposed Holtec consolidated interim storage facility (CISF) project (hereafter referred to as the proposed CISF project or proposed facility) under the proposed action and the No-Action alternative for all resource areas and for accidents. As discussed in detail in Chapter 1 of this Environmental Impact Statement (EIS), Holtec has submitted a license application to the NRC requesting authorization for an initial phase (Phase 1) of the project to store up to 8,680 metric tons of uranium (MTUs) [9,568 short tons] in 500 canisters for a license period of 40 years (Holtec, 2020a). Holtec plans to subsequently request amendments to the license to store an additional 500 canisters for each of 19 expansion phases of the proposed CISF project (a total of 20 phases) to be completed over the course of 20 years, expanding the proposed facility to eventually store up to 10,000 canisters of spent nuclear fuel (SNF) (Holtec, 2020a). Holtec's expansion of the proposed project (i.e., Phases 2-20) is not part of the proposed action currently pending before the NRC. However, the NRC staff will consider these expansion phases in its impact determination in this EIS, where appropriate, when the environmental impacts of the potential future expansions could be determined so as to conduct a bounding analysis for the proposed project. The NRC staff conducted this analysis as a matter of discretion because Holtec provided the analysis of the environmental impacts of the anticipated expansion of the proposed facility as part of its license application (Holtec, 2020a,b). For the bounding analysis, the NRC staff assume the storage of up to 10,000 canisters of SNF. A connected action to the proposed CISF project includes construction and operation of a rail spur on land leased from the Bureau of Land Management (BLM) to transport SNF from the main rail line to the proposed facility.

The construction stage of the proposed CISF project would include the construction of the proposed facility and associated buildings and infrastructure as well as the construction of infrastructure that would support the proposed rail spur for transporting SNF to and from the proposed CISF project. Construction activities affecting each resource area are discussed within the resource specific section. The operations stage of the proposed action would include operation of the proposed facility and also removal of the SNF inventory (defueling) for transport to a final repository. This EIS chapter will analyze the impacts from the construction and operation stages of the proposed action (Phase 1), as well as subsequent phases of the proposed CISF project (i.e., Phases 2-20). For additional information on the stages and phases of the proposed action, see EIS Chapter 2, Section 2.2.1. As explained in that section, the land areas discussed in this evaluation include the proposed project area, which is defined as the land included in entire licensed area {421 hectares (ha) [1,040 acres (ac)]}; the storage and operations area, which includes storage pads and associated facilities and infrastructure (discussed further in EIS Section 4.2.1); and the protected area, where access is restricted by fencing (discussed further in EIS Section 4.2.1.1).

As described in EIS Section 2.2.1.4, decommissioning and reclamation of the proposed facility would include the dismantling of the proposed facility and rail spur. At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released and the license terminated. Decommissioning activities, in accordance with Title 10 of the *Code* *of Federal Regulations* (10 CFR) Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. Holtec has committed to reclamation of the proposed project area (Holtec, 2020a). Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; erosional control; and restoring and reclaiming disturbed areas. The decommissioning evaluation in this EIS is based on currently available information and plans. Because decommissioning and reclamation is likely to take place well into the future, all technological changes that could improve the decommissioning and reclamation processes cannot be predicted. As a result, the NRC requires that licensees applying to decommission an Independent Spent Fuel Storage Installation (ISFSI) (such as the proposed CISF project) submit a Final Decommissioning Plan. The requirements for the Final Decommissioning Plan are delineated in the *Code of Federal Regulations* (CFR) 72.54(d), 72.54(g), and 72.54(i). The NRC staff would undertake a separate evaluation and National Environmental Policy Act (NEPA) review and prepare an environmental assessment or EIS, as appropriate, at the time the Decommissioning Plan is submitted to the NRC.

This chapter also evaluates the potential impacts from the No-Action alternative. Under the No-Action alternative, Holtec would not construct or operate a CISF at the proposed location. SNF is assumed to remain at the nuclear power plants and ISFSIs until a means of disposal or an alternative means of storage is available. The rail spur also would not be built.

The resource areas evaluated in this section of this EIS include land use, transportation, geology and soils, water resources, ecology, noise, air quality, historic and cultural resources, visual and scenic resources, socioeconomics, environmental justice, public and occupational health, and waste management. This section of the EIS also evaluates the environmental impacts of accidents. The environmental impacts are based on information provided in Holtec's Environmental Report (ER) (Holtec, 2020a), Safety Analysis Report (SAR) (Holtec, 2020b), responses to NRC requests for additional information (RAIs) (Holtec, 2021, 2019a) and additional information the NRC staff identified.

As described in EIS Section 1.2.2, BLM (NRC, 2018) and the New Mexico Environment Department (NMED) (NRC, 2019) are cooperating agencies consistent with Memoranda of Understanding (MOU) signed with the NRC. The proposed rail spur connecting the main rail line to the proposed CISF project is on BLM land and requires BLM permits. Therefore, a MOU with BLM was established with the goal to develop one EIS that provides all of the environmental information and analyses needed for the NRC to make a licensing decision, as well as the information needed for the BLM to perform analyses, draw conclusions, and make permitting decisions. The NMED MOU allows the NRC staff to incorporate into the EIS NMEDs special expertise and information on water resources impacts directly related to the proposed CISF.

The NRC staff will use the Council on Environmental Quality (CEQ) regulations-based standard of significance for assessing environmental impacts, as described in the NRC guidance in NUREG–1748 (NRC, 2003) and summarized as follows:

SMALL: The environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE: The environmental effects are sufficient to alter noticeably, but not destabilize, important attributes of the resource.

LARGE: The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

4.2 Land Use Impacts

This section describes the potential environmental impacts on land use associated with the proposed action (Phase 1), Phases 2-20, and the No-Action alternative. Impacts on land use result from commitment of the land for the proposed CISF project and therefore its potential exclusion from other possible uses.

4.2.1 Impacts from the Proposed CISF

As described in EIS Section 2.2.1.1, the proposed CISF project would be situated on approximately 421 ha [1,040 ac] of land (herein referred to as the proposed project area) in Lea County, New Mexico (EIS Figure 2.2-1). At full build-out, which would include all Phases (1-20), the facilities and infrastructure associated with the proposed CISF project would be located on approximately 133.5 ha [330 ac] (the storage and operations area) within the larger 421-ha [1,040-ac] proposed project area (EIS Figure 2.2-2). Land would be converted from its primary use as rangeland for cattle grazing to use for the proposed CISF project during its license term. The primary land use impact, besides limiting its use for grazing, would be land disturbance during construction and operation. As described in EIS Section 2.2.1, the proposed CISF project would be constructed in 20 phases (Phases 1-20) over a 21-year period (Holtec, 2020a). As discussed in EIS Section 3.2.1, the Eddy-Lea Energy Alliance (ELEA) currently owns surface rights to property within the proposed project area and the surface rights have been approved for sale to Holtec (Holtec, 2019a). The State of New Mexico owns the subsurface property (or mineral) rights within the proposed project area (EIS Figure 3.2-2).

The following sections discuss the potential environmental impacts on land use from the construction, operation, and decommissioning stages of the proposed CISF project.

4.2.1.1 Construction Impacts

The proposed action (Phase 1) construction would disturb approximately 48.3 ha [119.4 ac] and would include: 2.5 ha [6.2 ac] for a site access road; 15.9 ha [39.4 ac] for the railroad spur; and 0.57 ha [1.4 ac] for the security building, administration building, parking lot, and concrete batch plant/laydown area (Holtec, 2020a). The remaining land disturbance {approximately 29.3 ha [72.4 ac]} would be associated with constructing the initial SNF storage modules and pad, cask transfer building, and associated infrastructure. Additional overhead power lines to serve the proposed CISF project would be constructed during the proposed action (Phase 1) and extend 1.6 km [1 mi] to the south from the center of the proposed CISF project (Holtec, 2020a). The land clearances for these lines are included in the total land disturbance areas (Holtec, 2020a).

Construction of Phases 2-20 would disturb an additional 85.2 ha [210.6 ac] of land for constructing additional SNF storage modules and pads. Within the protected (fenced) area, Holtec estimates that the construction of the concrete pads when all 20 phases are completed would disturb approximately 44.5 ha [110 ac] (Holtec, 2020a). At full build-out, the approximate 133.5 ha [330 ac] of disturbed land from construction would be approximately one-third of the 421-ha [1,040-ac] proposed project area.

During construction of all phases of the proposed CISF project, Holtec has committed to use the following mitigation measures to reduce the impacts of surface disturbance: (i) minimize the construction footprint to the extent practicable; (ii) stabilize disturbed areas with natural and low-water maintenance landscaping; and (iii) protect undisturbed areas with silt fencing and straw bales, as appropriate (Holtec, 2020a).

As described in EIS Section 3.2, existing land uses within and surrounding the proposed project area include cattle grazing, underground potash mining, oil and gas exploration and development, access to and maintenance of pipeline rights-of-way, and recreational activities (Holtec, 2020a,b). At full build-out, the 114.5-ha [283-ac] protected area containing the SNF storage pads and cask transfer building would be enclosed by security fencing to restrict and control access (Holtec, 2020a).

Construction of the proposed CISF project would modify the current land use by eliminating cattle grazing on the 133.5 ha [330 ac] of land (the storage and operations area) used for the full build-out of the proposed CISF project facilities and infrastructure. Grazing would be allowed to continue on the remaining 287.5 ha [710 ac] of the 421 ha [1,040 ac] proposed project area. Approximately 93 percent of land in Lea County is used as rangeland for grazing {approximately 1.05 million ha [2.6 million ac]} (NRC, 2012). Eliminating grazing on 133.5 ha [330 ac] of land would result in a loss of 0.01 percent of the land available for grazing.

As described in EIS Section 3.2.4, mineral extraction activities in the vicinity of the proposed project consist of underground potash mining and oil and gas extraction. The proposed project area is in an area of known potash leasing. As described in EIS Section 3.2.1, the State of New Mexico and the BLM own the subsurface property (mineral) rights within and surrounding the proposed project area, and these rights are leased to production companies for development. Potash beneath the proposed project area is leased to Intrepid Mining LLC (Intrepid), while underground potash surrounding the proposed project area is leased to various potash production companies, including Intrepid and Mosaic Potash. As further described in EIS Section 3.2.4, Intrepid operates two underground potash mines within 9.6 km [6 mi] of the proposed project area (EIS Section 3.2.4) (ELEA, 2016; Holtec, 2020a,b). Potash in mines in the vicinity of the proposed project area is extracted from the Permian Salado Formation at depths of approximately 549 to 914 m [1,800 to 3,000 ft]. Potash would remain available for extraction by leaseholders from the Permian Salado Formation beneath the proposed CISF project area. However, given the current market prices for potash, the surplus international supply, the requirements for obtaining additional permits for any new mines or to expand existing extraction activities, engineering challenges, and the constraints on the existing local potash mill for processing potash ores, it is highly unlikely that additional potash activities or extraction will occur beneath the proposed CISF site (Holtec, 2021; SEC, 2021; USGS, 2021). Even if potash price fluctuations were to become more prevalent, the changes in potash supply that would result would not likely make the proposed resources near the proposed project more desirable for extraction. There are significant potash reserves available in southeastern New Mexico outside of the proposed project area (Holtec, 2021). For these economic and geographic reasons, the construction and operation of the proposed CISF would not adversely affect potash activities or extraction.

As discussed further in EIS Section 3.2.4, the proposed project area is in a region of active oil and gas exploration and development. One operating gas well is present within the proposed project area along with numerous plugged and abandoned wells (Holtec, 2020a,b). None of these oil and gas wells are located within the 133.5-ha [330-ac] storage and operation area or where any land would be disturbed by construction activities. Therefore, construction of the proposed CISF would not have an effect on oil and gas operations regardless of drilling method within the proposed project area (Holtec, 2020a). In addition, Holtec has stated that it has no plans to use any of the plugged and abandoned wells (Holtec, 2020b). All of the plugged and abandoned wells are located in the eastern portion of the proposed project area. The closest plugged and abandoned well to the storage and operations area is approximately 0.65 km [0.4 mi] to the east.

Existing oil and gas leases within and adjacent to the proposed project area would remain in effect. Oil and gas reserves will remain available for extraction either by horizontal or vertical drilling through drill islands (Holtec, 2021). As described previously, the storage and operations area for the proposed CISF, which would include project facilities and infrastructure, would encompass 134 ha [330 ac] of land at full build-out. This would include the 114.5 ha [283 ac] protected area at full build-out (i.e., the area that would contain the SNF storage pads and cask transfer building), where access is controlled and restricted by fencing. Therefore, within the protected area, surface drilling would be restricted. As described in EIS Section 3.2.4, oil and gas exploration targets within and surrounding the proposed project area range from relatively shallow oil and gas at approximately 727 to 1,524 m [2,385 to 5,000 ft] in upper to middle Permian formations to deep gas targets in middle Paleozoic formations in excess of 4,877 m [16,000 ft] deep (NMOCD, 2020; ELEA, 2007). Furthermore, within 1.6 km [1 mi] of the proposed CISF, there are four active oil and gas wells with vertical depths ranging from 2,369 to 4,073 m [7,772 to 13,363 ft] and 12 plugged and abandoned wells with vertical depths ranging from 938 to 958 m [3,079 to 3,144 ft] (NMOCD, 2020). Therefore, any future oil and gas development (e.g., drilling and fracking) beneath the proposed project area will likely continue to occur at depths greater than 938 m [3,079 ft].

Because of potential conflicts between oil and gas production and potash mining in southeastern New Mexico, the Federal and New Mexico governments have issued requirements for implementing administrative controls to minimize conflict between the industries and ensure the safety of operations (Holtec, 2019c). In December 2012, the U.S. Secretary of the Interior issued Order 3324, “Oil, Gas, and Potash Leasing and Development Within Designated Potash Area of Eddy and Lea Counties, NM” (77 FR 71814). This order provides procedures and guidelines for orderly co-development of oil and gas and potash resources on Federally owned mineral estate within the Designated Potash Area (DPA) in southeastern New Mexico. Under this order, the oil and gas industry uses drilling islands that BLM established, from which all new drilling of vertical, directional, and horizontal wells that penetrate potash formations are allowed, to manage the impact on potash resources. The Belco Tetris Shallow and Belco Deep drill islands are located approximately 0.4 km [0.25 mi] and 0.8 km [0.5 mi] west of the proposed project area, respectively, and the Anise Tetris drill island to the south of the proposed project area. These drill islands would be used for any future drilling and development of oil and gas reserves on Federally owned mineral estate in the vicinity of the proposed project area and in the DPA. Because oil and gas drilling on Federal lands are already limited to drill islands under Order 3324, construction and operation of the proposed CISF would not impact oil and gas exploration and development activities on Federally owned land adjacent to and surrounding the proposed site.

Mineral estate owned by the State of New Mexico within the DPA (which includes the proposed CISF project area) is subject to rules and regulations promulgated in Order R-111 by the New Mexico Oil Conservation Commission (NMOCC) to govern oil and gas drilling and plugging activities within the DPA. The objective of these rules and regulations is to protect correlative rights, assure maximum conservation of the oil, gas, and potash resources of New Mexico, prevent waste, and permit the economic recovery of oil, gas, and potash minerals in the DPA. Order R-111 underwent numerous revisions in response to changing conditions and relationships within the oil and gas and potash industries. NMOCC rescinded and replaced the order with R-111-P, on April 21, 1988 (NMOCC, 1988).

As discussed in EIS Section 3.2.5, four natural gas pipelines and one potable water pipeline currently cross the proposed project area. The four natural gas pipelines are located east of the proposed 133.5-ha [330-ac] storage and operations area, and the change in land use from construction of the proposed CISF project would not limit access to or maintenance of their rights-of-way. The potable water pipeline that traverses the proposed storage and operations area is owned by Intrepid and services the Intrepid East Mine facility (Holtec, 2020a). Holtec has committed to coordinate with Intrepid to relocate the potable water pipeline so that it would not interfere with construction and operation activities associated with the proposed CISF project (Holtec, 2020a). Because the existing pipeline runs along the surface, relocation of the pipeline would result in minimal additional land disturbance. The City of Carlsbad Water Department would provide potable water for the proposed CISF project via the existing water line or a new water line from the Double Eagle water system. The new water supply pipe would share the majority of the proposed rail spur right-of-way and, therefore, no notable additional construction would be required to provide water to the proposed facility (Holtec, 2020a, Double Eagle Supply, 2021).

Currently, recreational activities at and in the vicinity of the proposed project area include big and small game hunting, camping, horseback riding, hiking, bird watching, and sightseeing (Holtec, 2020a). However, the proposed project area is currently private property owned by ELEA and would continue to be private property if purchased by Holtec. Holtec has stated that if purchased for use as a CISF, the property would be designated “Off-Limits” to prevent accidental public use and that “No Trespassing” signs would be posted along the property boundary, in accordance with State and Federal requirements for posting real estate property (Holtec, 2020a). Consistent with current access allowances on public and private lands, the public would have access to open, unfenced lands for recreational activities on public and some privately-owned land surrounding the proposed project area.

In summary, the approximate 48.3 ha [119.4 ac] of disturbed land that would occur under the proposed action (Phase 1) and the approximate 133.5 ha [330 ac] of disturbed land for full build-out (Phases 1-20) from construction would be relatively small compared to the 421-ha [1,040-ac] proposed project area. For all phases, Holtec has committed to mitigation measures, such as stabilizing disturbed areas with natural landscaping and protecting undisturbed areas with silt fencing and straw bales to reduce the impacts of surface disturbance during construction. Prohibiting grazing within the fenced 114.5-ha [283-ac] protected area would have a minor impact on local livestock production because there would be abundant open land available for grazing around the storage and operations area and surrounding the proposed project area. Likewise, because there would be abundant open land available around the proposed project area, impacts to recreational activities would be minor. Potash would remain available for extraction by leaseholders from the Permian Salado Formation at depths of approximately 549 to 914 m [1,800 to 3,000 ft] beneath the proposed CISF project area. Existing oil and gas leases within and adjacent to the proposed project area would remain in effect. Oil and gas reserves will remain available for extraction either by horizontal or vertical drilling. Therefore, the NRC staff concludes that the land use impacts during the construction stage for the proposed action (Phase 1) would be SMALL, and potential impacts for Phases 2-20 would also be SMALL.

4.2.1.1.1 Rail Spur

The rail spur would be constructed to connect the proposed CISF project to an industrial railroad that lies 6.1 km [3.8 mi] to the west. The disturbed land area for the rail spur would be 15.9 ha [39.4 ac] of BLM-managed land. The rail spur would be routed across relatively flat BLM-managed land west of the proposed CISF project and would not cross any major highways (Holtec, 2020a). A site access road would also be constructed across relatively flat BLM-managed land from the proposed CISF project southward to U.S. Highway 62/180 and would be approximately 1.6 km [1 mi] in length. Construction of the rail spur and site access road would require right-of-way approval on Federal lands from BLM. Therefore, due to the small amount of disturbed land, relatively flat terrain, lack of highway crossing, and joint location of the access road along the rail spur right-of-way, the NRC and BLM staff conclude that impacts from construction of the rail spur on land use would be SMALL.

4.2.1.2 Operations Impacts

For the proposed action (Phase 1), there are no activities that would require additional ground-disturbing activities. Similar to the construction stage, cattle grazing would be prohibited within the storage and operations area. The primary changes to land use during the operations stage of the proposed action (Phase 1) would be land disturbance associated with construction of SNF storage pads and modules for additional phases, because the applicant intends to operate each existing phase concurrently with construction of new phases.

For subsequent phases of the proposed CISF project (Phases 2-20), the primary changes to land use during the operations stage of each of those phases would continue to be land disturbance associated with construction of additional SNF storage pads and modules for subsequent phases. As described previously, construction of Phases 2-20 would require an additional 85.2 ha [210.6 ac] of land to the proposed action (Phase 1). To ensure that construction of additional SNF storage pads would not adversely impact operations, Holtec would maintain an adequate buffer distance between operational and construction areas (Holtec, 2020a). Furthermore, during operations the current primary land use (cattle grazing) would be prohibited on 133.5 ha [330 ac] of land. As described previously, approximately 93 percent of land in Lea County is used as rangeland for grazing {approximately 1.05 million ha [2.6 million ac]} (NRC, 2012). Restricting grazing on the 133.5-ha [330-ac] storage and operations area at full build-out would result in a loss of 0.01 percent of the land available for grazing. Due to the abundance of surrounding land for grazing, this impact on land use would not be significant. As previously mentioned, except for the 133.5-ha [330-ac] storage and operations area, the remainder of the 421-ha [1,040-ac] proposed project area would remain largely undeveloped and open to grazing.

As described in the previous section on construction impacts, plugged and abandoned oil and gas wells within the proposed project area are located in areas that would not be impacted by operation of the proposed CISF. Operation impacts on oil and gas and potash operations would be the same as those of the construction phase. Potash would remain available for extraction by leaseholders from the Permian Salado Formation at depths of approximately 549 to 914 m [1,800 to 3,000 ft] beneath the proposed CISF project area. Existing oil and gas leases within and adjacent to the proposed project area would remain in effect. Oil and gas reserves will remain available for extraction either by horizontal or vertical drilling or through drill islands (Holtec, 2021). Operation of the proposed CISF project would not prohibit access to rights-of-way for maintenance of existing gas pipelines within the proposed project area. Abundant land surrounding the proposed project area would be available for grazing and land outside the

133.5-ha [330-ac] full build-out storage and operations area would remain largely undeveloped. Therefore, the NRC staff concludes that land use impacts associated with the operations stage for the proposed action (Phase 1) and for Phases 2-20 of the proposed CISF project would be similar to construction and would be SMALL.

Defueling

Defueling the CISF would involve removal of SNF from the proposed CISF. Because similar equipment is used to remove the SNF canisters from the storage facility as for emplacement, and because no new construction is anticipated, defueling would have land use impacts similar to the emplacement of SNF earlier in the operations stage. For example, the previously constructed cask transfer building would be utilized and maintained, but no additional land use impacts would be anticipated. Therefore, the NRC staff concludes that the land use impacts from defueling the proposed CISF project during operations would be SMALL.

4.2.1.2.1 Rail Spur

The potential environmental impacts on land use would include operation of the rail spur that would be constructed to connect existing rail lines to the proposed CISF project. Operation of the rail spur would be consistent with the local industrial uses of the land in the vicinity of the proposed project area, which supports potash mining, oil and gas exploration and development, and oil and gas service industry facilities (EIS Section 3.2), many of which make use of existing rail lines for materials transportation. Maintenance of the rail spur is anticipated during the operations stage. This may require use of limited equipment for repairs but is not anticipated to require land disturbance beyond that experienced during construction of the rail spur. For these reasons, the NRC and BLM staffs conclude that impacts from operation of the rail spur on land use would be SMALL.

4.2.1.3 Decommissioning and Reclamation Impacts

At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. Decommissioning activities for the proposed action (Phase 1) and for Phases 2-20 would involve the same activities, but the activities would be scaled to address the overall size of the CISF (i.e., the number of phases completed).

Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area (Holtec, 2020a). Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; erosional control; and restoring and reclaiming disturbed areas. EIS Sections 2.2.1.4 and 2.2.1.7 describe the decommissioning and reclamation activities. These activities would have land use impacts similar in scale to the construction stage.

At the end of reclamation, all lands would be returned to their preoperational land use of livestock grazing (Holtec, 2020a). Any remaining infrastructure would constitute a small portion of the area returned to pre-project conditions. Because the land use impacts for decommissioning and reclamation do not exceed those for construction or operation of the proposed CISF and would decrease as vegetation is reestablished in reclaimed areas, the NRC staff concludes that the land use impact associated with the decommissioning stage for the proposed action (Phase 1) and for Phases 2-20 of the proposed CISF project would be SMALL.

4.2.1.3.1 Rail Spur

Decommissioning of the rail spur and associated access road would occur at the discretion of the landowner (BLM). As part of the rail spur permit application, BLM would define activities necessary to complete decommissioning per their authority and guidelines. The NRC and BLM staff anticipate that decommissioning activities would be similar to those used to decommission the proposed CISF (e.g., dismantling and removing materials and roads; restoring and reclaiming disturbed areas) and would have impacts similar in scale to the construction stage of the rail spur. At the end of decommissioning, the land would be returned to its preoperational land use of livestock grazing, etc. Because the land use impacts for decommissioning do not exceed those for construction or operation of the proposed CISF and would decrease as vegetation is reestablished in reclaimed areas, the NRC and BLM staffs conclude that the land use impact for the rail spur would be SMALL. As stated under the construction stage, because of the small amount of disturbed land, the relatively flat terrain, lack of highway crossing, and joint location of the access road along the rail spur right-of-way, the NRC and BLM staff conclude that if the rail spur is left in place (i.e., not dismantled) impacts would be SMALL.

4.2.2 No-Action Alternative

Under the No-Action alternative, the NRC would not license the proposed CISF project. Therefore, impacts such as land disturbance and access restrictions on current land use would not occur. Construction impacts would be avoided because SNF storage pads, buildings, and transportation infrastructure would not be built. Operational impacts would also be avoided because no SNF canisters would arrive for storage. Impacts to land use from decommissioning activities would not occur, because unbuilt SNF storage pads, buildings, and transportation infrastructure require no decontamination and land surfaces need no reclamation. The current land uses on and near the project, including grazing and natural resource extraction, remain essentially unchanged under the No-Action alternative. No concrete storage pad or infrastructure (e.g., rail spur or cask-handling building) for transporting and transferring SNF to the proposed CISF would be constructed. SNF destined for the proposed CISF would not be transferred from commercial reactor sites (in either dry or wet storage) to this proposed facility. In the absence of a CISF, the NRC staff assumes that SNF would remain onsite in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue as detailed in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available.

4.3 <u>Transportation Impacts</u>

The potential transportation impacts during the construction, operations, and decommissioning stages of the proposed action (Phase 1) and Phases 2-20 of the CISF project are detailed in the following sections.

4.3.1 Impacts from the Proposed CISF

As discussed throughout this section, potential transportation impacts may occur during all life cycle stages of the proposed CISF project. Impacts such as increases in traffic, potential changes to traffic safety, and increased degradation of roads would result from the use of roads for shipping equipment, supplies, and produced wastes, as well as because of commuting workers during the lifecycle of the proposed CISF project. Other impacts, including radiological and nonradiological health and safety impacts under normal and accident conditions, could result from the proposed use of national rail lines to transport shipments of SNF to and from the proposed CISF project. Where onsite rail access is limited, these rail shipments of SNF could include relatively short segments of barge or heavy-haul truck transportation, as needed, to move SNF from nuclear power plants and ISFSIs to the nearest rail line. The following sections describe the potential transportation impacts for the proposed action (Phase 1), Phases 2-20, and the No-Action alternative.

4.3.1.1 Construction Impacts

During the construction stage of the proposed CISF, trucks would be used to transport construction supplies and equipment to the proposed project area. The use of an onsite concrete batch plant would limit the shipment of large premanufactured concrete structures during construction. The regional and local transportation infrastructure that would serve the proposed CISF project is described in EIS Section 3.3. Access to the proposed CISF project from nearby communities would be from U.S. Highway 62/180, which traverses the proposed project area.

The NRC staff's construction traffic impact analysis considered the volume of estimated construction traffic from supply shipments, waste shipments, and workers commuting (EIS Section 2.2.1.7) and determined the estimated increase in the applicable annual average daily traffic counts on the roads used to access the proposed project area. The ER did not provide estimates of construction supply shipments, so the NRC staff estimated the number of annual shipments during construction based on the volume of demolition waste materials that would need to be shipped offsite during site reclamation. The NRC staff consider this approach reasonable because the volume of materials used to construct the proposed facility is expected to be approximately the same as the amount of demolition waste produced when the facility is decommissioned.

The NRC staff estimated a total of 70 daily construction supply and waste shipments from Table 2.2-4. Accounting for the effect of travel in both directions for each shipment, this amount of shipping would increase the existing volume of daily truck traffic on U.S. Highway 62/180 (EIS Section 3.3) of 2,449 trucks per day by 5.6 percent. Based on this analysis, the supply and waste shipments for the construction stage of the proposed action (Phase 1) would have a minor impact on daily traffic on U.S. Highway 62/180 near the proposed CISF project. Further away from the proposed project area, near Carlsbad, the existing truck traffic is higher because of the confluence of major roadways and increased commercial activity, and the proposed CISF project shipments would be more dispersed and therefore represent a smaller percentage of existing traffic and would be less noticeable. For construction stages Phases 2-20, the approximate volume of construction supplies and wastes would be less than that required for construction of the proposed action (Phase 1) because the proposed facilities and infrastructure would already be built; however, the construction would occur in 1 year instead of 2, and therefore the number of supply shipments and the resulting truck traffic would double, resulting in a change of 11 percent from the existing traffic conditions. The NRC staff concludes this increase in traffic would result in a minor impact to existing traffic conditions during the construction stage of Phases 2-20.

In addition to construction supply shipments, an estimated peak construction work force of 80 workers would commute to and from the proposed CISF project construction site using individual passenger vehicles and light trucks on a daily basis (Holtec, 2020a). These workers could account for an increase of 160 vehicles per day (80 vehicles each way) on U.S. Highway 62/180 during construction. This amounts to an approximate 5 percent increase in daily car traffic on U.S. Highway 62/180 from the proposed CISF project construction. Based on this analysis, the construction stage of the proposed action (Phase 1) would have a minor impact on the daily Highway 62/180 traffic near the proposed CISF project site. Further away from the proposed project area, for example, near Carlsbad, the existing car traffic is higher, and the proposed CISF shipments would represent a smaller percentage of existing traffic and therefore would be less noticeable. This minor increase in car traffic for local and regional car traffic would not significantly increase traffic safety problems or road degradation relative to existing conditions. For the construction stage of Phases 2-20, buildings and infrastructure would already be constructed, so the same or a smaller construction worker commuting volume would occur as described previously for the construction phase of the proposed action (Phase 1) and would contribute the same or less transportation impacts. Considering the combination of both the transportation impacts from the preceding analysis of construction supply shipments and workers commuting, the NRC staff concludes that the transportation impacts from the construction stage of the proposed action (Phase 1) and Phases 2-20 would be SMALL.

4.3.1.1.1 Rail Spur

Construction of the rail spur that connects the existing rail line to the proposed CISF project could result in transportation impacts. Construction of the rail spur would occur during the construction stage of the proposed action (Phase 1). The workforce required to construct the rail spur was included in the analysis of commuter impacts to transportation. The additional construction supplies necessary to build the rail spur would be significantly less than that required for construction of the proposed CISF. Therefore, the addition of supplies and supply shipments would be less than those for the construction stage of the proposed action (Phase 1) and minor. The rail spur would be a non-carrier private spur routed across BLM-managed land west of the proposed CISF project and would travel approximately 8 km [5 mi] and would not cross any major highways (Holtec, 2020a). A site access road would also be constructed across BLM-managed land from the proposed CISF project southward to U.S. Highway 62/180 and would be approximately 1.6 km [1 mi] in length. Construction of the rail spur and site access road would require right-of-way approval on Federal lands from BLM. Based on the minor changes proposed to the existing transportation infrastructure, the NRC and BLM staff conclude that impacts on transportation from construction of the rail spur during the construction stage of the proposed action (Phase 1) would be SMALL. During the construction stage of Phases 2-20, no additional construction of the rail spur would occur and therefore there would be no further rail spur construction impacts on transportation beyond those from the proposed action (Phase 1).

4.3.1.2 Operations Impacts

Similar to the construction stage, during operation of the proposed CISF, Holtec would continue to use roadways for supply and waste shipments in addition to workforce commuting. Additionally, Holtec proposes using the national rail network for transportation of SNF from nuclear power plants and ISFSIs to the proposed CISF and eventually from the CISF to a geologic repository, when one becomes available. The regional and local transportation infrastructure that would serve the proposed CISF is described in EIS Section 3.3. The operations impacts the NRC staff evaluated include traffic impacts from shipping equipment, supplies, and produced wastes, and from workers commuting during CISF operations. Other impacts evaluated included the radiological and non-radiological health and safety impacts to workers and the public under normal and accident conditions from the proposed nationwide rail transportation of SNF to and from the proposed CISF.

4.3.1.2.1 Transportation Impacts from Supply Shipments and Commuting Workers

The NRC staff's traffic impact analysis for the operations stage of the proposed CISF considered the volume of estimated operations traffic from supply shipments, waste shipments, and workers commuting (Table 2.2-4), then determined the estimated increase in the applicable annual average daily traffic counts on the roads used to access the proposed project area. Assuming a hauling capacity of 15 m^3 [20 yd^3] per truck, the NRC staff estimated 73 waste shipments would occur during operations per year or about 1 shipment every 5 days. Other wastes would be generated in much smaller quantities during operations and would therefore not contribute significantly to shipping traffic. Based on this information, the NRC staff concludes that supply and waste shipments during the operations stage of the proposed action (Phase 1) and during Phases 2-20 would not noticeably contribute to traffic impacts and therefore the impacts would be minor.

Holtec estimated that the operations workforce would include 40 regular employees and 15 security staff at full build-out. This workforce would commute to and from the proposed CISF project using individual passenger vehicles and light trucks on a daily basis (Holtec, 2020a). These workers could account for an increase of 110 vehicles per day (55 vehicles each way) on U.S. Highway 62/180 during the operations stage of the proposed action (Phase 1). This increase amounts to an approximate 3 percent increase in daily car traffic on U.S. Highway 62/180 from the operation of the proposed CISF project. Based on this analysis, the operations stage of the proposed action (Phase 1) would have a minor impact on the daily U.S. Highway 62/180 traffic near the proposed CISF project site. Further away from the proposed project area, for example, near Carlsbad, the existing car traffic is higher, and the proposed CISF commuter traffic would represent a smaller percentage of existing traffic and therefore would be less noticeable. This minor increase in car traffic for local and regional car traffic would not significantly increase traffic safety problems or road degradation relative to existing conditions.

During the operations stage of Phases 2-20, construction of additional phases would occur concurrently with operations; therefore, up to an additional 80 construction workers would be commuting during the same time period. Therefore, the total workforce commuting during operations (combined with the construction of next phases) could add 270 vehicles per day (135 vehicles each way) to the existing U.S. Highway 62/180 traffic during operations, representing an 8 percent increase in daily car traffic on U.S. Highway 62/180. Based on this analysis, the proposed traffic from the operations stage of Phases 2-20 when construction and operation are occurring concurrently would have a minor impact on daily traffic on U.S. Highway 62/180 near the proposed CISF project site and would be less for operation of Phase 20 (e.g., at full build-out). Further away from the proposed CISF project area, for example, near Carlsbad, the existing car traffic is higher because of the confluence of major roadways and increased commercial activity, and the proposed CISF project traffic would represent a smaller percentage of existing traffic and therefore would be less noticeable. This minor increase in local and regional car traffic would not significantly increase traffic safety problems or road degradation relative to existing conditions. Considering the combined transportation impacts from the preceding analysis of operations supply and waste shipments and worker commuting, including during concurrent construction and operation, the NRC staff concludes that the traffic impacts from the operations stage of the proposed action (Phase 1) and the operations stage of Phases 2-20 would be minor.

4.3.1.2.2 Transportation Impacts from Nationwide SNF Shipments to and from the CISF

During operation of any project phase (Phase 1 or Phases 2-20), SNF would be shipped from existing storage sites at nuclear power plants or ISFSIs to the proposed CISF. These shipments must comply with applicable NRC and U.S. Department of Transportation (DOT) regulations for the transportation of radioactive materials in 10 CFR 71 and 73 and 49 CFR 107, 171–180, and 390–397, as appropriate to the mode of transport. These regulations comprehensively address several aspects of transportation safety, including testing and approval of packaging, proper placarding and labeling of packages and shipments, limiting the dose rate from packages and conveyances, approved routing for shipments of spent fuel, safeguards, and incident reporting.

The radiological impacts on the public and workers of spent fuel shipments from a reactor have been previously evaluated in several NRC assessments and were found to be negligible (NRC, 2014; 2001; 1977). Because operation of the proposed CISF project would involve shipping SNF from reactors across the U.S. and eventually to a repository after storage, the radiological and nonradiological health impacts to workers and the public from this project-specific transportation, considering both incident-free and accident conditions, are evaluated in greater detail in this section.

The following analysis of SNF transportation impacts focuses on the proposed use of rail transportation. The higher capacity SNF canisters and casks that are expected to be used in a cross-country transportation campaign exceed the limits of legal weight trucks. Heavy-haul trucks that are capable of hauling higher capacity SNF casks are oversized vehicles that are less practical for long-distance cross-country transportation, as demonstrated by challenges that have been documented traveling short distances (DOE, 2014). The NRC staff are aware that some existing reactors lack direct rail access and would need to use supplemental transportation involving heavy-haul truck or barge (for those with water access) from the reactor site to the nearest rail access. The impacts of using these other modes to supplement rail transportation of SNF was previously evaluated by DOE (DOE, 2008; 2002) and found to not significantly change the minor radiological impacts from a national mostly-rail SNF transportation campaign and therefore are not evaluated further in this impact analysis. This DOE analysis evaluated the differences in estimated impacts of using barge to transport SNF from 17 of 24 reactor sites (that did not have direct rail access but were located along waterways) to the nearest barge dock with rail access. The estimated incident-free radiological and nonradiological impacts for national SNF transportation under the mostly-rail with barge transportation scenario were the same or less than the minor impacts DOE estimated for the mostly rail scenario (for example, 1.7 latent cancer fatalities for involved workers; 0.7 latent cancer fatalities for the public). DOE also found minor radiological and nonradiological accident impacts that were the same or not notably different between the mostly rail and mostly rail with barge transportation scenarios.

Some reactor sites, in particular those that have been shut down or decommissioned but continue to store SNF in dry storage casks, may require local transportation infrastructure upgrades to remove the SNF from the site (DOE, 2014). These upgrades, for example, could include installing or upgrading rail track, roads, or barge slips necessary to transfer SNF offsite. Because these infrastructure upgrades would be needed (regardless of whether the proposed CISF project is approved) to allow shipment of SNF from reactor sites to a repository in accordance with the Nuclear Waste Policy Act of 1982 (NWPA), these enhancements are beyond the scope of the proposed action and are therefore not evaluated further. Additionally, because these infrastructure improvements are expected to be small construction projects limited to preexisting, previously disturbed, and previously evaluated reactor sites that are dispersed throughout the U.S., the environmental impacts are expected to be minor and are not evaluated further for cumulative impacts in Chapter 5 of this EIS.

4.3.1.2.2.1 Radiological Impacts to Workers from Incident-Free Transportation of SNF

The potential radiological health impacts to workers from incident-free transportation of SNF to and from the proposed CISF project would occur from exposures to the normal radiation emitted from the loaded transportation casks that is within specified regulatory limits. The highest occupational exposures would occur to workers who spend the most time within close proximity to loaded SNF transportation casks. This includes the transportation crew, escorts, inspectors, and rail yard workers. Holtec's analysis of the incident-free radiological impacts to workers involved in transportation of SNF assumed that DOE would administratively control occupational exposures to an annual dose of 5 mSv [500 mrem], based on information from a prior DOE analysis (DOE, 2008), which is a fraction of the 10 CFR Part 20 annual occupational dose limit of 0.05 Sv [5 rem] (Holtec, 2020a). The NRC staff found this assumption reasonable if DOE were to ship the SNF from reactor sites to the proposed CISF. If the SNF were shipped by an NRC licensee, then the occupational doses to workers would be required to be limited to the 10 CFR Part 20 standard of 0.05 Sv [5 rem].

The NRC staff estimated the potential radiological impacts to workers from the proposed transportation of SNF from nuclear power plants and ISFSIs to the proposed CISF based on prior NRC transportation risk estimates in NUREG–2125, "*Spent Fuel Transportation Risk Assessment"* (NRC, 2014). In the NUREG–2125 analysis, the NRC staff executed the RADTRAN 6 transportation risk assessment code (Weiner et al., 2014) to calculate worker and public doses and risks from the transportation of SNF along various representative national routes under incident-free and accident conditions. In that analysis, the NRC staff calculated occupational doses for groups of workers, including rail crew, escorts in transit, and railyard workers, as well as crew and escorts at stops. Because the resulting dose estimates were presented for single shipments and for each kilometer traveled and for each hour of transportation, the NRC staff scaled the results by these variables (e.g., number of shipments, distance, and time) to generate estimates that were applicable to the proposed CISF project (SwRI, 2019). The NRC staff selected a representative route that was bounding for the proposed shipments of SNF to the proposed CISF and scaled the calculated doses to match the number of proposed shipments and, as applicable, the shipment distance and time.

The representative route selected from NUREG–2125 for the NRC staff's CISF analysis was rail transport from the Maine Yankee nuclear power plant to the town of Deaf Smith, Texas. The reported distance for this shipment was 3,362 km [2,101 mi] (NRC, 2014). This route was selected as bounding for this EIS because most of the potential origins (U.S. nuclear power plants) for shipments destined for the proposed CISF are located east of the proposed CISF, and the distance of the selected representative route is larger than the actual distances that would be traveled from most U.S. nuclear power plants to the proposed CISF. Furthermore, the transportation characteristics along the route from Maine to Texas would be diverse and include several rural small towns as well as suburban and urban areas that would have dose and risk-related conditions that are representative of conditions on railways that could be potentially used for the proposed project. Railways across the nation also share consistent characteristics, including minimum rail setbacks from public buildings and other publicly accessible areas. Because dose estimates increase with shipment distance, selecting a route with a larger distance than that actually expected is bounding. Additionally, NUREG–2125 included separate dose calculations for two types of NRC-certified rail casks (characterized as rail-lead and rail-steel). For the proposed CISF incident-free dose analyses, the NRC staff selected dose results for the rail-lead cask because the external dose rate was set at the regulatory maximum and was therefore a bounding incident-free dose rate for any NRC-certified transportation cask that might be used for future shipments of SNF of various specifications (including, for example, high-burnup fuel).

To estimate the potential radiological impacts to workers from the proposed transportation of SNF from nuclear power plants and ISFSIs to the proposed CISF, the NRC staff scaled single-shipment dose estimates [for the in-transit train crew and escorts and the railyard workers and inspectors at stops based on dose results in NUREG–2125 (NRC, 2014)] by the number of shipments (500 Phase 1 shipments; 10,000 full-build-out shipments). The NRC staff scaled reported rail crew and escort in-transit doses from NUREG–2125 (NRC, 2014) by the distance traveled and shipment duration, respectively, to derive the single-shipment in-transit dose estimates for these groups of workers. The NRC staff calculated the shipment duration by dividing the reported distances traveled on the representative route in rural, suburban, and urban population zones by the applicable train speeds in those zones. The single-shipment railyard worker dose estimates were the sum of the origin and destination rail classification stop doses in NUREG–2125. The single-shipment dose-to-rail inspectors at stops was estimated by scaling the one-hour SNF truck inspection dose in NUREG–2125 by the duration and number of in-transit rail inspections per shipment that were described in NUREG–2125 (i.e., three 4-hour inspections).

All single-shipment doses were summed and then scaled by the number of shipments for the proposed action (Phase 1) and full build-out (Phases 1-20) to calculate incident-free occupational population doses that were converted to health effects by applying a current cancer risk coefficient assuming a linear, no-threshold dose response. A linear, no-threshold dose response assumes, for radiation protection purposes, that any increase in dose, however small, results in an incremental increase in health risk. The cancer risk coefficient is 5.7×10^{-2} health effects per person-Sv [5.7×10^{-4} per person-rem] (ICRP, 2007), where the health effects include fatal cancers, nonfatal cancers, and severe hereditary effects. The NRC staff's calculated incident-free dose and health effects risk results for the proposed CISF SNF transportation are provided in Table 4.3-1. An estimate of the expected non-project baseline cancer that would occur in a population of comparable size to the exposed population (that does not include the estimated health effects from the proposed transportation) is also provided in EIS Table 4.3-1 for comparison. Both the National Council on Radiation Protection and Measurements (NCRP) and the International Commission on Radiological Protection (ICRP) suggest that when the collective (population) dose is less than the reciprocal of the risk coefficient (i.e., less than $1/5.7 \times 10^{-2}$ health effects per person-Sv or 17.54 person-Sv) the assessment should find that the most likely number of excess health effects is zero (ICRP, 2007). Based on this consideration, the occupational health effects estimates for the proposed action (Phase 1) are most likely zero, and, for full build-out (Phases 1-20), 1.4 health effects. The estimate of excess occupational health effects for all phases (full build-out) of 1.4 is a small fraction of the estimated 250 non-project baseline cancer within the same population. This result suggests that among the 748 workers included in the analysis, 250 workers would be expected to get cancer from natural or other non-project related causes, and most likely no workers would be expected to get cancer or hereditary health effects from project-related incident-free transportation radiation doses under the proposed action (Phase 1) and 1.4 would be expected to get these health effects from full build-out (Phases 1-20).

Table 4.3-1 Comparison of Estimated Population Doses and Health Effects from Proposed Transportation* of SNF to the Proposed CISF Along a Representative Route with Non-Project Baseline Cancer

	Incident-Free			Accident (No Release)		
Exposed Population	**Collective Dose (person-Sv)**	**Health Effects†**	**Non-Project Baseline Cancer‡**	**Collective Dose (person-Sv)**	**Health Effects†**	**Non-Project Baseline Cancer‡**
Occupational						
Phase 1	1.3	0.07	250	Emergency Responder (consequence) 0.92 mSv [92 mrem]		
All Phases	25	1.4	250			
Public						
Phase 1	0.18	0.01	440,000	0.03	0.002	440,000
All Phases	3.6	0.21	440,000	0.66	0.04	440,000

*500 shipments of SNF (Phase 1) occurring over an approximated 1 year operational period; 10,000 shipments of SNF (All Phases) occurring over an approximated 20 years of operational periods within a 40 year license term.

†Health effects includes fatal cancer, nonfatal cancer, and severe hereditary effects. Estimated by multiplying the collective dose by the health risk coefficient of 5.7×10^{-2} health effects per person-Sv.

‡Non-project baseline cancer is estimated by multiplying the exposed population by the U.S. risk of getting a cancer (1/3) (EIS Section 3.12.3). Estimated occupational population (748 total) includes 3 crew and 1 escort on each of 12 trains (48 total), and 2 rail yard workers at each of 2 classification stops per shipment at 100 different rail yards (400 total) to account for dispersed actual routes, and 1 inspector at 3 stops per shipment at 100 different rail yards (300 total). Public population is based on NUREG–2125 reported population along representative route of 1,321,024.

To convert Person-Sv to Person-Rem, multiply by 100.

The NRC staff also compared the estimated incident-free occupational collective doses with the expected background radiation doses for the same population over the proposed duration of the SNF shipments. These background collective doses were calculated by taking the product of the annual average natural background radiation dose in the United States of 3.1 mSv [310 mrem] (EIS Section 3.12.1.1), the proposed duration of the SNF transportation of 1 year for the proposed action (Phase 1) and 20 years for full build-out (Phases 1-20), and the number of individuals in the exposed population of 748 workers. The resulting background collective doses were 2.3 person-Sv [230 person-rem] for the proposed action (Phase 1) and 46 person-Sv [4,600 person-rem] for full build-out (Phases 1-20), which are greater than the comparable project collective doses (Table 4.3-1).

Considering the low calculated doses, estimated relative health effects, the comparison with estimated collective background doses, and radiation dose limits, the radiological impact to workers from incident-free transportation of SNF to and from the proposed CISF project during the operations stage of the proposed action (Phase 1) and the operations stage of Phases 2-20 would be minor. This conclusion applies regardless of which radiation dose limits are applied (e.g., the DOE administrative limit or the NRC standard).

4.3.1.2.2.2 Radiological Impacts to Members of the Public from Incident-Free Transportation of SNF

The potential radiological health impacts to the public from incident-free transportation of SNF to and from the proposed CISF project would occur from exposures to the normal radiation emitted (during transportation) from the loaded transportation casks that is within specified regulatory limits. Because the applicable gamma and neutron radiation fields associated with a loaded SNF transportation cask naturally attenuate with distance from the source, past analyses of the doses received by members of the public from transportation of SNF indicate low doses that are well below regulatory limits and are a small fraction of the annual dose attributable to naturally occurring background radiation (DOE, 2008; NRC, 2014, 2001). The highest accumulated exposures over time to this low level of radiation to members of the public would occur to those individuals who spend the most time within close proximity to the rail lines used for SNF transportation. This includes individuals who may live or work adjacent to rail lines used for SNF transportation.

Holtec's analysis of the incident-free radiological impacts to the public from SNF transportation to and from the proposed CISF project was based on an analysis Interim Storage Partners (ISP) submitted for a separate CISF licensing action that NRC staff is currently reviewing. Therefore, the NRC staff performed an independent analysis of the potential radiological impacts to the public from the proposed incident-free transportation of SNF from nuclear power plants and ISFSIs to the proposed CISF based on an approach similar to the approach applied in the preceding analysis of the occupational radiological impacts. This approach involves scaling prior NRC transportation risk estimates in NUREG–2125 (NRC, 2014). By the number of proposed shipments [as documented in SwRI (2019)], converting collective doses to health effects, and interpreting health effects results using ICRP guidance. NUREG–2125 includes calculations of in-transit incident-free public doses to residents along the route, to occupants of vehicles sharing the route, and to residents near SNF transportation stops. The resulting incident-free doses and health effects for the proposed CISF SNF transportation are provided in Table 4.3-1.

All of the estimated public cancer and hereditary health effects from the proposed incident-free SNF transportation during the operations stage of the proposed action (Phase 1) and all of the operations stages of Phases 2-20 are below the aforementioned NCRP and ICRP non-zero health effects threshold (ICRP, 2007 in EIS Section 4.3.1.2.2.1) and therefore are most likely to be zero. By comparison, the estimated non-project baseline cancer within the same population of 1,321,024 was 440,000. This result suggests that among the 1,321,024 members of the public included in the analysis, 440,000 people would be expected to get cancer from natural or other non-project related causes and most likely no members of the public would be expected to get cancer or hereditary health effects from project-related incident-free transportation radiation doses.

The NRC staff also compared the estimated incident-free public collective doses with the expected background radiation doses for the same population over the proposed duration of the SNF shipments. These background collective doses were calculated by taking the product of the annual average natural background radiation dose in the United States of 3.1 mSv [310 mrem] (EIS Section 3.12.1.1), the proposed duration of the SNF transportation of 1 year for the proposed action (Phase 1) and 20 years for full build-out (Phases 1-20), and the number of individuals in the exposed population of 1,321,024. The resulting background collective doses were 4.1×10^3 person-Sv [4.1×10^5 person-rem] for the proposed action (Phase 1) and

8.2×10^4 person-Sv [8.2×10^6 person-rem] for full build-out (Phases 1-20), which are greater than the comparable project collective doses (Table 4.3-1).

The NRC staff also evaluated the radiological impact of the proposed SNF transportation on a maximally exposed individual member of the public, based on the transportation risk analysis provided in NUREG–2125 (NRC, 2014). The maximally exposed individual in this calculation is the member of the public that could receive a much higher dose from passing SNF shipments relative to other members of the public based on their close proximity to the rail track and the number of shipments to which they are exposed. In this calculation, the maximally exposed individual is located 30 m [98 ft] from the rail track and is exposed to the direct radiation emitted from all 10,000 passing rail shipments of SNF at full build-out under normal operations. The resulting accumulated dose is 0.06 mSv [6 mrem]. For comparison, the NRC limits annual public doses from licensed facility operations to 1.0 mSv [100 mrem] (10 CFR Part 20), and limits individual does form an operating ISFSI to 0.25 mSv [25 mrem], and the annual average natural background radiation exposure in the United States is 3.1 mSv [310 mrem] (EIS Section 3.11.1.1).

Based on the preceding analysis of the potential radiological impacts under incident-free conditions, the NRC staff concludes that the radiological impacts to the public from proposed SNF transportation during the operations stage of the proposed action (Phase 1) and the operations stage of Phases 2-20 would be minor.

4.3.1.2.2.3 Radiological Impacts to Workers and the Public from SNF Transportation Accidents

The potential radiological health impacts to workers and the public from SNF transportation to and from the proposed CISF under accident conditions would occur from exposures to the radiation emitted from the loaded transportation casks after an accident has occurred and during the time when emergency response actions are taken to address the accident scene. Under some accident conditions, the radiation shielding on the transportation cask can be damaged, causing the radiation dose in the proximity of the package to increase. Under rare severe accident conditions, the potential for breaching a transportation cask and releasing a fraction of the radioactive contents is possible and has been considered in past SNF transportation risk assessments (NRC, 2014, 2001; DOE, 2008). These prior assessments conservatively modeled accidental releases of radioactive material during transportation and did not specifically account for the added containment provided by canisters. All SNF proposed to be transported to and from the proposed CISF would be shipped in canisters that are placed in NRC-certified transportation casks. In the most recent analysis (NRC, 2014), as described in more detail in this section, the NRC staff concluded that an accidental release of canistered fuel during transportation did not occur under the most severe impacts studied, which encompassed all historic or realistic accidents.

The NRC staff evaluated the potential public and occupational impacts of the proposed SNF transportation under accident conditions. NUREG–2125 reports an average freight rail accident frequency of 1.32×10^{-7} per railcar-kilometer [2.12×10^{-7} accidents per railcar-mile] based on DOT historic accident frequencies from 1991 to 2007 (NRC, 2014). This frequency broadly applies to all accidents ranging from minor to severe. The frequency further decreases by orders of magnitude when the focus narrows to specific less-frequent accident scenarios, such as severe accidents. While the actual rail configurations and routes that would be used to ship SNF to the proposed CISF would be determined prior to shipping and are currently unknown, considering the previously described bounding representative route with a distance of 3,362 km [2,101 mi] and assuming a 3-car train, after 500 shipments for the proposed action (Phase 1) and 10,000 shipments at full build-out, no accidents of any severity would be expected during the proposed action (Phase 1) and thirteen accidents of any severity would be expected to occur over a 20-year period.

In NUREG–2125, the NRC staff conducted detailed engineering analyses of transportation accident consequences including cask and SNF responses to severe accident conditions involving impact force and fire (thermal effects) within and beyond the hypothetical accident conditions found in 10 CFR 71.73 (NRC, 2014). The results of the study concluded that no SNF releases would occur from a severe long-lasting fire. Additionally, for the evaluation of impact accidents, the steel shielded cask with inner welded canister (i.e., rail-steel cask) had no release and no loss of gamma shielding effectiveness under the most severe impacts studied, which encompassed all historic or realistic accidents. Because the proposed design of the CISF would require SNF to be contained within inner welded canisters, the transportation of the SNF to the proposed CISF would also require SNF to be in canisters that would be shipped in transportation casks similar to the configuration evaluated in NUREG–2125. Therefore, the NRC staff considers the conclusion in NUREG–2125 regarding the resiliency of the rail-steel cask to severe accident conditions (resulting in no release under severe accident conditions) applicable to the evaluation of potential CISF SNF transportation impacts under accident conditions. Under accident conditions with no release, NUREG–2125 evaluated the dose consequence to an emergency responder that spends 10 hours at an accident site at an average distance of 5 m [16 ft] from the cask, 0.69 mSv [69 mrem] for the rail-steel cask, and 0.92 mSv [92 mrem] for the rail-lead cask (NRC, 2014). The exposure time of 10 hours is a conservative assumption based on a prior DOE study (DOE, 2002) that indicated first responders would take about an hour to secure the vehicle and the accident scene. These same consequences would apply for an accident during any phase of the proposed CISF project. For comparison, the NRC annual public dose limit applicable to licensed operating facilities in 10 CFR Part 20 is 1 mSv [100 mrem]. Based on this information, the NRC staff concludes that the occupational radiological impacts from the proposed SNF transportation under accident conditions during the operations stage of the proposed action (Phase 1) and the operations stage of Phases 2-20 would be minor.

The NRC staff also evaluated the potential radiological impacts to the public from the proposed SNF transportation under accident conditions. As with the preceding analysis of occupational radiological impacts from accidents, based on the analyses in NUREG–2125 (NRC, 2014), the NRC staff considers the conclusion in NUREG–2125 regarding the resiliency of the rail-steel cask to severe accident conditions (resulting in no release under severe accident conditions) applicable to the evaluation of potential CISF SNF transportation impacts under accident conditions. Under accident conditions with no release, NUREG–2125 estimated the dose risk to the public as a population dose that accounts for the accident probability. The accident scenario involves a 10-hour delay in movement of the cask at the accident scene where members of the public in the surrounding area (800 m [2,625 ft] in all directions) are exposed to direct radiation from the cask. The NRC staff used the same NUREG–2125 representative route as described previously for the occupational dose impact analysis and scaled the resulting population dose by the number of shipments and converted the population dose to health effects using the same cancer risk coefficient (SwRI, 2019). The public dose risk and health effects from proposed CISF SNF transportation under accident conditions are provided in Table 4.3-1. All of the estimated radiological health effects to the public from the proposed SNF transportation under accident conditions are below the aforementioned ICRP threshold (ICRP, 2007 in EIS Section 4.3.1.2.2.1) and are therefore likely to be zero.

The NRC staff also compared the estimated public collective dose risks under accident conditions with the expected background radiation doses for the same population over the proposed duration of the SNF shipments. These background collective doses were calculated by taking the product of the annual average natural background radiation dose in the United States of 3.1 mSv [310 mrem] (EIS Section 3.12.1.1), the proposed duration of the SNF transportation of 1 year for the proposed action (Phase 1) and 20 years for full build-out (Phases 1-20), and the number of individuals in the exposed population of 1,321,024. The resulting background collective doses were 4.1×10^3 person-Sv [4.1×10^5 person-rem] for the proposed action (Phase 1) and 8.2×10^4 person-Sv [8.2×10^6 person-rem] for full build-out (Phases 1-20), which are greater than the comparable project collective doses (Table 4.3-1).

Based on the preceding analysis, the NRC staff concludes that the radiological impacts to workers and the public from the proposed SNF transportation under accident conditions during the operations stage of the proposed action (Phase 1) and the operations stages of Phases 2-20 would be minor.

4.3.1.2.2.4 Non-Radiological Impacts to Workers and the Public from SNF Transportation

Nonradiological impacts to workers and the public from incident-free SNF rail transportation and from rail accidents would also occur during the period of operations. The nonradiological impacts associated with incident-free SNF transportation include typical occupational injuries and diesel emissions such as typical air pollutants and greenhouse gas emissions. The impacts from exhaust emissions from SNF transportation were not quantified because prior analysis in the YM FEIS (DOE, 2002) concluded that SNF transportation would not be a significant contributor to air quality. The occupational impacts associated with transportation of SNF by rail under both normal and accident conditions include injuries and fatalities. Considering the occupational fatality and injury rates for workers involved in transportation and warehousing in EIS Table 4.13-1, and assuming 24 additional workers to operate 12 locomotives for the single year of the operations stage of the proposed action (Phase 1), the NRC staff estimated that there would be 1.1 additional injuries and 3.1×10^{-3} fatalities. For the operations stage of Phases 2-20, the same estimated annual injuries and fatalities would apply. If all operation stages for the full build-out were conducted over a period of 20 years, the cumulative total injuries would be 22 injuries and 6.2×10^{-2} fatalities.

The potential nonradiological impacts to the public from transportation accidents include traffic fatalities (e.g., accidents at rail crossings) and fatalities involving individuals trespassing on railroad tracks. The potential fatalities to members of the public from any rail accidents was estimated conservatively for the operations stage of the proposed action (Phase 1) by taking the product of the fatalities (worker and public) per distance traveled by rail (2.27×10^{-8} fatalities per railcar-km) (NRC, 2001) and a bounding estimate of the total rail distance associated with SNF transportation of 1.0×10^7 km [6.3×10^6 mi]. The total railcar distance was estimated by assuming each of the 500 canisters per phase was shipped on a three-car train the distance from Maine Yankee to Deaf Smith, Texas {3,362 km [2,100 mi]} (NRC, 2014) and the result was doubled to address two-way travel. This resulted in an estimated 0.23 fatalities for shipping 500 canisters of SNF from reactors to the proposed CISF for the proposed action (Phase 1). During the operations stage of Phases 2-20, an additional 500 canisters would be shipped to the proposed CISF per phase with an estimated number of fatalities equal to the proposed action (Phase 1) estimate, until the maximum of 10,000 canisters has been shipped. At full build-out, the estimated distance for shipping 10,000 canisters would be 2.0×10^8 km [1.3×10^8 mi], resulting in an estimated 4.6 fatalities for shipping all SNF from reactors to the proposed CISF over the duration of the proposed SNF shipping campaign. For context, the number of freight rail fatalities reported by DOT's Bureau of Transportation Statistics for year 2020 was 551 (DOT, 2021). If these annual freight rail fatalities were assumed to continue at this same rate over a 20-year period the number of fatalities would be 11,020, and over a 40-year period, the number of fatalities would be 22,040.

Based on the preceding analysis, the NRC staff concludes that the nonradiological impacts to workers and the public from SNF transportation to the CISF project during the operations stage of the proposed action (Phase 1) and during the operations stages of Phases 2-20 would be minor.

4.3.1.2.2.5 Defueling

When a geologic repository becomes available, the SNF stored at the proposed CISF would be removed and sent to the repository for final disposal. Removal of the SNF from the proposed CISF, or defueling, would contribute to additional transportation impacts that would be similar in nature to the impacts evaluated for shipping SNF from nuclear power plants and ISFSIs to the proposed CISF project that were described in EIS Sections 4.3.1.2 with workforce commuter traffic impacts similar to those discussed under the emplacement activities earlier in the operations stage. These additional shipments of SNF to a repository would involve different routing and shipment distances than from the nuclear power plants and ISFSIs to the proposed CISF project. Therefore, this section includes additional impact analyses of the radiological and nonradiological health and safety impacts to workers and the public under normal and accident conditions from the national rail transportation of SNF from the proposed CISF project to a repository.

The NRC staff estimated the potential radiological impacts to workers and the public from the transportation of SNF from the proposed CISF to a geologic repository under incident-free and accident conditions based on an approach similar to the approach applied in the preceding analysis of the public and occupational radiological impacts of SNF shipments to the proposed CISF project. This approach involved selecting a representative route from the prior NRC transportation risk assessment in NUREG–2125 (NRC, 2014) that adequately bounded the distance of the proposed shipments and then scaling the NUREG–2125 dose results for that route by the number of proposed shipments and, as applicable, the shipment distance, duration, and the number and duration of inspections (SwRI, 2019). As before, the population dose results were converted to health effects using the same ICRP cancer risk coefficient.

The assumed route of SNF shipments would travel from the proposed CISF to the proposed repository at Yucca Mountain, Nevada. The representative route selected from NUREG–2125 for the NRC staff's CISF defueling analysis travels by rail from the town of Deaf Smith, Texas, to the Idaho National Engineering Laboratory. The reported distance for this shipment was 1,913 km [1,196 mi] (NRC, 2014). This route was selected because the distance was bounding and the varied conditions (e.g., population characteristics) were considered by NRC staff to be adequate to represent the routes that would be taken by actual SNF shipments from the proposed CISF for the purpose of evaluating the potential radiological impacts of the proposed SNF transportation.

The occupational and public radiation dose and health effects estimates from the proposed CISF SNF transportation to a repository under incident-free and accident conditions are provided in EIS Table 4.3-2. An estimate of the expected non-project baseline cancer that would occur in a population of comparable size to the exposed population (that does not include the estimated health effects from the proposed transportation) is also provided in EIS

Table 4.3-2 for comparison. Both the National Council on Radiation Protection and Measurements (NCRP) and the ICRP suggest that when the collective (population) dose is less than the reciprocal of the risk coefficient (i.e., less than $1/5.7 \times 10^{-2}$ health effects per person-Sv or 17.54 person-Sv), the assessment should find that the most likely number of excess health effects is zero (ICRP, 2007).

All of the estimated radiological health effects to workers and the public from the proposed SNF transportation under incident-free and accident conditions are below the aforementioned ICRP threshold (ICRP, 2007 in EIS Section 4.3.1.2.2.1) and are therefore likely to be zero. For example, the incident-free public dose results suggest that among the 298,590 members of the public included in the analysis, 99,530 people would be expected to get cancer from natural or other non-project related causes and most likely no members of the public would be expected to get cancer or hereditary health effects from project-related incident-free transportation radiation doses. These results are within expectations because the methods applied are similar to the preceding analysis of SNF shipments from reactors to the CISF but with a shorter route distance, which reduces the estimated doses and health effects. Additionally, because the nonradiological impacts associated with these SNF shipments would be similar to the nonradiological impacts evaluated for the incoming SNF shipments to the CISF but would scale lower with the reduced shipment distance, the nonradiological impacts for the repository shipments would be less than the incoming shipment impacts previously evaluated in this EIS section.

The NRC staff also compared the estimated public collective doses under incident-free conditions in Table 4.3-2 with the expected background radiation doses for the same population over the proposed duration of the SNF shipments. These background collective doses were calculated by taking the product of the annual average natural background radiation dose in the United States of 3.1 mSv [310 mrem] (EIS Section 3.12.1.1), the proposed duration of the SNF transportation of 1 year for the proposed action (Phase 1) and 20 years for full build-out (Phases 1-20), and the number of individuals in the exposed population of 298,590. The shipping durations were estimated by the NRC staff based on Holtec's total number of canisters (500 for the proposed action and approximately 10,000 for full build-out) divided by Holtec's maximum annual receipt of SNF delivery to the CISF of 500 canisters (Holtec, 2020a). The resulting background collective doses were 9.2×10^2 person-Sv [9.2×10^4 person-rem] for the proposed action (Phase 1) and 1.8×10^4 person-Sv [1.8×10^6 person-rem] for full build-out (Phases 1-20), which are greater than the comparable project collective doses (Table 4.3-2).

Table 4.3-2 Comparison of Estimated Population Doses and Health Effects from the Proposed Transportation* of SNF Along a Representative Route to a Repository with Non-Project Baseline Cancer

	Incident-Free			Accident (No Release)		
Exposed Population	**Collective Dose (person-Sv)**	**Health Effects†**	**Non-Project Baseline Cancer‡**	**Collective Dose (person-Sv)**	**Health Effects†**	**Non-Project Baseline Cancer‡**
Occupational						
Phase 1	0.50	0.03	10	Emergency Responder (consequence) 0.92 mSv [92 mrem]		
All Phases	10	0.57	10			
Public						

Table 4.3-2 Comparison of Estimated Population Doses and Health Effects from the Proposed Transportation* of SNF Along a Representative Route to a Repository with Non-Project Baseline Cancer						
	Incident-Free			Accident (No Release)		
Exposed Population	Collective Dose (person-Sv)	Health Effects†	Non-Project Baseline Cancer‡	Collective Dose (person-Sv)	Health Effects†	Non-Project Baseline Cancer‡
Phase 1	0.09	0.005	99,530	0.03	0.002	99,530
All Phases	1.8	0.10	99,530	0.66	0.04	99,530

*500 shipments of SNF (Phase 1) occurring over an estimated 1-year operational period; approximately 10,000 shipments of SNF (All Phases) occurring over an approximated 20-year period within a 40-year license term.
†Health effects includes fatal cancer, nonfatal cancer, and severe hereditary effects. Estimated by multiplying the collective dose by the health risk coefficient of 5.7×10^{-2} health effects per person-Sv.
‡Non-project baseline cancer is estimated by multiplying the exposed population by the U.S. risk of getting a cancer (1/3) (EIS Section 3.12.3). Estimated occupational population (29 total) for single point-to-point route includes 3 crew and 1 escort on each of 6 trains (24 total), 1 inspector at 1 stop, plus 2 railyard workers at 2 assumed classification stops (4 total). Public population is based on NUREG–2125 reported population along

Based on the preceding analysis, the NRC staff concludes that the radiological and nonradiological impacts to workers and the public from SNF transportation from the CISF project to a geological repository during the defueling activities of the operations stage of the proposed action (Phase 1) and during the defueling activities of the operations stage of Phases 2-20 would be minor.

4.3.1.2.3 Rail Spur

The potential environmental impacts from transportation associated with the rail spur would include operation of the rail spur that connects the existing rail line to the proposed CISF. The short distance, lack of road crossings, and remote and sparsely populated location of the proposed rail spur would not significantly add to the impacts from the CISF project operations that were described in EIS Section 4.3.1.2. This includes minor changes to impacts associated with road traffic and the radiological and nonradiological health and safety impacts to workers and the public under normal and accident conditions from the proposed national rail transportation of SNF to and from the proposed CISF. For these reasons, the NRC and BLM staff conclude that impacts on transportation from operation of the rail spur during the operations stage of the proposed action (Phase 1) and during the operations stage of Phases 2-20 would be minor.

4.3.1.2.4 Overall Summary of Operations Impacts

The detailed operations stage impact analyses are documented in the foregoing EIS sections (4.3.1.2.1 through 4.3.1.2.3). Considering the minor transportation impact conclusions from these impact analyses of the proposed operations stage activities, including supply shipment and commuting worker traffic, the radiological and nonradiological impacts of nationwide SNF shipments to and from the CISF, and the operation of the proposed rail spur, the NRC staff concludes that the overall transportation impacts from the operations stage of the proposed action (Phase 1) and the operations stage of Phases 2-20 would be SMALL.

4.3.1.3 Decommissioning and Reclamation Impacts

At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. Decommissioning activities for the proposed action (Phase 1) and for Phases 2-20 would involve the same activities, but the activities would be scaled to address the overall size of the CISF (i.e., the number of phases completed).

Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area (Holtec, 2020a). Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; erosional control; and restoring and reclaiming disturbed areas. EIS Sections 2.2.1.4 and 2.2.1.7 describe the decommissioning and reclamation activities.

During the decommissioning and reclamation stage of the proposed CISF project, the primary transportation impacts would be traffic impacts from the use of trucks to transport reclamation waste materials to a disposal facility and from the commuting workforce (EIS Section 2.2.1.7). Based on the low levels of decommissioning-related transportation (EIS Section 2.2.1.7), the NRC staff concludes that the decommissioning transportation impacts during the decommissioning and reclamation stage would be negligible and are not evaluated further in this section. The regional and local transportation infrastructure that would serve the proposed CISF project is described in EIS Section 3.3. Access to the proposed CISF project from nearby communities would be from U.S. Highway 62/180, which traverses the proposed project area.

The NRC staff's decommissioning and reclamation traffic impact analysis considered the volume of estimated traffic from reclamation waste shipments and worker commuting (EIS Table 2.2-4) and determined the estimated increase in the applicable annual average daily traffic counts on the roads used to access the proposed project area. The NRC staff's estimated number of annual reclamation waste shipments as 18,950 or approximately 52 trucks per day. This estimate assumes a waste-hauling capacity of 15 m^3 [20 yd^3], which is applicable to a typical roll-off container. For the decommissioning and reclamation stage of Phases 2-20, this same waste volume estimate would also apply to the reclamation of any individual phase; however, the number of shipments could double if these phases were reclaimed within a year's time (comparable to the duration of construction).

Under the current application, decommissioning and reclamation would occur at the end of the 40-year license term. Therefore, the NRC staff adjusted the current truck traffic taking into account future economic growth. Considering the past 15 years of job growth in the socioeconomic region of influence (ROI) of 35 percent (EIS Section 3.11.2), the NRC staff annualized the reported historical job growth rate at 2.0 percent and assumed the truck traffic would increase at the same rate over the next 40 years. Accounting for the effect of compounding, the existing truck traffic on Highway 62/180 (EIS Section 3.3) of 2,449 trucks per day would increase to 5,452 trucks per day after 40 years. Based on this 40-year adjusted baseline daily truck traffic and the estimated daily truck traffic from reclamation waste shipments, the NRC staff calculated a 2 percent increase in truck traffic from shipping the nonhazardous reclamation waste from the proposed action (Phase 1). For any other single phase (Phases 2-20) a shorter assumed duration of reclamation (1 year) could double this estimated increase in traffic. Based on this analysis, the nonhazardous demolition waste for the decommissioning and reclamation stage of the proposed action (Phase 1) or any other single phase (Phases 2-20) would have a minor impact on daily truck traffic on U.S. Highway 62/180 near the proposed CISF project.

The NRC staff estimated the volume of nonhazardous demolition waste from reclamation of the full build-out (Phases 1-20) of the proposed project in EIS Section 2.2.1.7. Assuming this volume of waste material would need to be shipped during a reclamation period of approximately 10 years for the proposed CISF project, the NRC staff's estimated number of annual shipments during reclamation of full build-out was 75,900 or approximately 208 trucks per day. This estimate assumes a truck capacity of 15 m^3 [20 yd^3], which is applicable to a typical roll-off container. Considering the aforementioned 40-year adjusted baseline daily truck traffic and the estimated annual truck traffic from reclamation waste shipments, the NRC staff calculated an annual 8 percent increase in truck traffic from shipping the proposed CISF full build-out nonhazardous reclamation waste. If the proposed reclamation took less than 10 years, the projected annual increase in truck traffic would increase proportionately (e.g., 16 percent increase in traffic if reclamation occurred over a 5-year period). Based on this analysis, the nonhazardous reclamation waste shipments during the decommissioning and reclamation stage of the proposed CISF at full build-out would have a minor impact, if the reclamation occurs over a period greater than 5 years.

In addition to the reclamation waste shipments, during the decommissioning stage of the proposed action (Phase 1) and during the decommissioning and reclamation stage of Phases 2-20, the NRC staff assume that a reclamation work force (similar to the construction workforce) of 80 workers (Holtec, 2020a) would commute to and from the proposed CISF using individual passenger vehicles and light trucks on a daily basis. This reclamation worker commuting would occur for the duration of demolition and removal activities. These workers could account for an increase of 160 vehicles per day (80 vehicles each way) on Highway 62/180 during the decommissioning and reclamation stage. This amounts to a 4 percent increase in the current daily car traffic on Highway 62/180. Based on this analysis, the proposed CISF commuting worker traffic would have a minor impact on the daily Highway 62/180 traffic near the proposed CISF project during the decommissioning and reclamation stage of the proposed action (Phase 1) and during the decommissioning and reclamation stage of Phases 2-20. Further away from the proposed project area, for example, near Carlsbad, the existing car traffic is greater, and the proposed CISF project shipments would represent a smaller percentage of existing traffic and therefore would be less noticeable. The NRC staff concludes that this small increase in car traffic would not significantly increase traffic safety problems or road degradation relative to existing conditions.

4.3.1.3.1 Rail Spur

The potential environmental impacts from the rail spur on transportation would result from decommissioning and reclamation of the rail spur that connects the existing rail line to the proposed CISF project. Decommissioning and reclamation of the rail spur would consist of conducting radiological surveys, dismantling the rail line and hauling the waste to a licensed facility, if the landowner (BLM) determines not to keep the infrastructure in place. There would be a small increase in traffic because of workers dismantling the rail line and a limited amount of materials that would need to be disposed, but the NRC and BLM staff anticipate the increase in traffic from these activities to be equal to or less than the traffic increase associated with construction impacts. Therefore, because it is not anticipated to impact traffic conditions beyond those experienced during the construction stage of the rail spur, the NRC and BLM staff conclude that impacts on transportation from decommissioning the rail spur would be minor during the decommissioning stage of the proposed action (Phase 1) and during the decommissioning stage of Phases 2-20 or at full build-out.

4.3.1.3.2 Summary of Overall Decommissioning and Reclamation Impacts

Based on the preceding analysis, the NRC staff concludes that the transportation impacts from reclamation waste shipments and commuting workers and during the decommissioning and reclamation stage of the proposed action (Phase 1) and during the decommissioning and reclamation stage of Phases 2-20 would be SMALL. Impacts to truck traffic would be SMALL from reclamation of the proposed CISF at full build-out, if the reclamation occurs over a 10-year period.

4.3.2 No-Action Alternative

Under the No-Action alternative, the NRC would not license the proposed CISF project. Therefore, transportation impacts such as increased traffic from proposed transportation and radiation exposures to workers and the public from the transportation of SNF to and from the proposed CISF project would not occur. Construction impacts would be avoided, because SNF storage pads, buildings, and transportation infrastructure would not be built. Operational impacts would also be avoided, because no SNF transportation to and from the proposed CISF would occur. Transportation impacts from the proposed decommissioning and reclamation activities would not occur, because unbuilt SNF storage pads, buildings, and transportation infrastructure require no decommissioning and reclamation. The current transportation conditions on and near the project would remain unchanged by the proposed CISF under the No-Action alternative. In the absence of a CISF, the NRC staff assumes that SNF would remain onsite in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue as detailed in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available.

4.4 Geology and Soils Impacts

This section describes the potential environmental impacts to geology and soils for the proposed action (Phase 1), Phases 2-20, and the No-Action alternative.

4.4.1 Impacts from the Proposed CISF

As described in EIS Section 3.4.2, the ground surface at the proposed project area is covered by a laterally extensive veneer of Quaternary alluvial deposits ranging in thickness from 7.6 to 12.2 m [25 to 40 ft]. The alluvial deposits consist of (from top to bottom): (i) 0 to 0.6 m [0 to 2 ft] of surface soil (topsoil) consisting of varying amounts of sand and clay; (ii) 0.6 to 4.1 m [2 to 13.5 ft] of caliche (referred to as the Mescalero Caliche); and (iii) 5.2 to 8.5 m [17 to 28 ft] of residual soil consisting of sand, clay, and gravel. The alluvial deposits are underlain by bedrock of the Triassic Dockum Group consisting of shale, siltstone, and sandstone of the Santa Rosa Formation and the overlying Chinle Formation. The Triassic Dockum Group is about 183 m [600 ft] thick beneath the proposed project area (EIS Figure 3.4-7). As described in EIS Section 3.4.2, site topography ranges in elevation from 1,073 to 1,079 m [3,520 to 3,540 ft] above mean sea level and slopes gently northward and eastward across the proposed project area.

4.4.1.1 Construction Impacts

Construction for the proposed action (Phase 1) and for Phases 2-20 of the proposed CISF project would require an area of flat terrain; therefore, cut and fill would be required on some portions of the proposed CISF project. To minimize the impacts of cut and fill, Holtec would use materials from higher portions of the site for fill at the lower portions of the site, to the extent possible (Holtec, 2020a).

Excavation and grading for the proposed CISF project would disturb soils to a depth of approximately 7.6 m [25 ft] below grade (Holtec, 2020a). Holtec estimates that approximately 135,517 m^3 [177,250 yd^3] of soil would be excavated for each phase (1-20) of the proposed CISF project (Holtec, 2020a). The proposed action (Phase 1) would also include excavation of approximately 61,547 m^3 [80,500 yd^3] of soil for construction of the site access road, railroad spur, security building, administration building, and parking lot. Excavated soil would be stockpiled inside the 421-ac [1,040-ac] proposed project area, but outside the 114.5-ha [283-ac] protected area. Holtec estimates that approximately 10 percent of the stockpiled soils would be used for backfill and site grading (Holtec, 2020a). The remaining stockpiled soils would be stored onsite or disposed of at an approved offsite disposal facility. Because excavation depth is limited to near-surface geology, construction activities are not expected to cause seismic or fault-related impacts.

Clearing and grading of soils may result in soil erosion from wind and water. The proposed project area would be situated primarily in the Simona fine sandy loam and Simona-Upton association (EIS Figure 3.4-8), which are slightly susceptible to water erosion and somewhat susceptible to wind erosion (Holtec, 2020a). Stormwater runoff could also potentially impact nearby drainages and playa lakes (e.g., Laguna Plata and Laguna Gatuna) by increasing the sediment load to these surface water features. Holtec would implement several types of mitigation measures to limit soil loss and reduce stormwater runoff impacts. To control soil erosion because of site clearing and grading, Holtec has committed to applying the following best management practices (BMPs): (i) using acceptable methods to stabilize disturbed soils; (ii) using earthen berms, dikes, and sediment fences to limit suspended solids in runoff; (iii) stabilizing cleared areas not covered by pavement or structures as soon as practicable; (iv) reusing excavated materials whenever possible; and (v) stockpiling soil using techniques to reduce erosion (Holtec, 2020a). To control soil erosion because of stormwater runoff, Holtec has committed to applying the following BMPs, which would be performed through compliance with a Stormwater Pollution Prevention Plan (SWPPP): (i) stabilizing drainage culverts and ditches by lining them with rock aggregate/riprap and (ii) creating berms with silt fencing/straw bales to reduce flow velocity and prohibit scouring (Holtec, 2020a). These mitigation measures would be implemented starting with the proposed action (Phase 1) and would continue through subsequent phases (Phases 2-20).

Leaks and spills of oil and hazardous materials from construction equipment could also impact soils. Holtec has committed to implementing a Spill Prevention, Control, and Countermeasures (SPCC) Plan to minimize the impacts of potential soil contamination (Holtec, 2020a). Spills of oil or hazardous materials could also run off into nearby drainages during storm events. As described in EIS Sections 2.2.1.6 and 4.5.1, stormwater runoff during construction and operations would be regulated under National Pollutant Discharge Elimination System (NPDES) permit requirements. These permits and mitigation measures would be implemented starting with the proposed action (Phase 1) and would continue through subsequent phases (Phases 2-20).

Impacts to geology and soils during construction would be limited to soil disturbance, soil erosion, and potential soil contamination from leaks and spills of oil and hazardous materials. Holtec would implement mitigation measures, BMPs, NPDES permit requirements, and the SPCC Plan to limit soil loss, avoid soil contamination, and minimize stormwater runoff impacts. Therefore, the NRC staff concludes that the potential impacts to geology and soils associated with the construction stage for the proposed action (Phase 1) and for Phases 2-20 of the proposed CISF project would be SMALL.

4.4.1.1.1 Rail Spur

Similar to impacts to geology and soils during the construction stage, the impacts from the construction of the rail spur would be limited to soil disturbance, soil erosion, and potential soil contamination from leaks and spills of oil and hazardous materials. The disturbed land area for the rail spur would be 15.9 ha [39.4 ac] of BLM-managed land. Holtec would implements the same mitigation measures, BMPs, NPDES permit requirements, and spill prevention and cleanup plans as for the proposed CISF, to limit soil loss, avoid soil contamination, and minimize stormwater runoff impacts. Therefore, due to the small amount of disturbed land area and similar mitigation measures to those implemented under the construction stage, the NRC and BLM staff conclude that the potential impacts to geology and soils from construction of the rail spur would be SMALL.

4.4.1.2 Operations Impacts

Operation of the proposed action (Phase 1) and Phases 2-20 of the proposed CISF project would not be expected to impact underlying bedrock, because storage structures are passive (i.e., they have no moving parts). The SNF canisters and storage systems are designed to robustly contain radiological materials. The SNF canisters do not contain any material in liquid form, and the SNF transportation and storage canisters are sealed to prevent any liquids from contacting the SNF assemblies (Holtec, 2020a). Therefore, during normal operations, there is no potential for radiological contamination of soils from a leaking canister. Holtec would conduct routine monitoring and inspections during all phases to verify that the proposed CISF project is performing as expected (Holtec, 2020a). Leaks and spills of oil and hazardous materials from equipment and vehicles used to operate the facility could contaminate soils or runoff into nearby drainages during storm events. As in the construction stage, Holtec would continue to implement the SPCC Plan to minimize the impacts of potential soil contamination, and stormwater runoff would continue to be regulated under NPDES permit requirements. Holtec would also continue to implement mitigation measures for stormwater management through its SWPPP.

Operation of the proposed action (Phase 1) and Phases 2-20 would not be expected to impact the potential for seismic events, sinkhole development, or subsidence. The proposed CISF project would be located in an area of southeastern New Mexico that has low seismic risk. The proposed CISF would have a total depth of 7.6 m [25 ft] and would not intersect any active faults. The NRC's safety review will determine whether the proposed CISF project would be constructed in accordance with 10 CFR 72.122, General Design Criteria, Overall Requirements, which requires that structures, systems, and components important to safety be designed to withstand the effects of natural phenomena such as earthquakes without impairing their capability to perform safety functions. Therefore, the NRC staff does not anticipate that the proposed CISF would impact seismic activity at the proposed project location nor be impacted by seismic events.

As described in EIS Section 3.4.5, sinkholes and karst features formed in evaporite and gypsum bedrock are common features of the lower Pecos region of west Texas and southeastern New Mexico. A number of these features are of anthropogenic (man-made) origin and are associated with improperly cased abandoned oil and water wells, or with solution mining of salt beds in the shallow subsurface (Land, 2009, 2013). As described in EIS Section 4.2.1.1, numerous plugged and abandoned oil and gas wells are present within the proposed project area (Holtec, 2020a,b). However, none of these oil and gas wells are located within the 133.5-ha [330-ac] storage and operation area or where any land would be impacted by construction and operation activities. Holtec has stated that it has no plans to use any of the plugged and abandoned wells (Holtec, 2020b). In addition, the subsurface geologic conditions at the proposed project area are not conducive to karst development or subsidence. No thick sections of soluble rocks are present at or near the land surface. The shallowest formation containing relatively thick soluble materials (i.e., gypsum and halite) is the Rustler Formation, which is located at least 335 m [1,100 ft] below ground surface, which is over 305 m [1,000 ft] below the depth of the CISF design and is unlikely to be impacted by the proposed CISF project. Therefore, because the subsurface geologic conditions and because the proposed CISF project operations do not produce any liquid effluent that could facilitate dissolution of halite and gypsum, the NRC staff does not anticipate that the proposed CISF would lead to the development of sinkholes or subsidence. Information on regional subsidence is in EIS Section 5.4.

In summary, operation of the proposed action (Phase 1) and Phases 2-20 would not be expected to impact underlying bedrock, because storage structures are passive and designed to robustly contain radiological materials. Holtec would continue to implement the SPCC Plan to minimize the impacts of potential soil contamination, and stormwater runoff would continue to be regulated under NPDES permit requirements. Holtec would implement mitigation measures for stormwater management through its SWPPP. Operation of the proposed CISF project would not be expected to impact or be impacted by seismic events, subsidence, or sinkhole development. The facility must meet specific design and operational criteria to ensure that it can safely withstand seismic events, such as earthquakes. The potential for sinkhole development or subsidence is low because (i) plugged and abandoned wells within the proposed project area are located outside the 133.5 ha [330 ac] storage and operations area, (ii) the proposed CISF project does not produce any liquid effluent that could facilitate dissolution, and (iii) no thick sections of soluble rocks are present at or near the land surface. Therefore, the NRC staff concludes that the impacts to geology and soils associated with the operations stage for the proposed action (Phase 1) and for Phases 2-20 of the proposed CISF project would be SMALL and that the potential impacts to the proposed CISF project from seismic events, subsidence, or sinkhole development would be SMALL.

Defueling

Defueling the CISF for the rail spur would involve removal of SNF from the proposed CISF. Because activities for defueling are similar to those during the emplacement of SNF, defueling is not anticipated to result in the usage of any additional geology or soil resources. Impacts to geology and soils for defueling would be minimal, and less than those evaluated under the construction stage. Permits and mitigation measures applied during earlier activities of the operations stage would continue. Therefore, the NRC staff concludes that the geology and soil impacts from defueling the proposed CISF project would be SMALL.

4.4.1.2.1 Rail Spur

Impacts to geology and soils from operation of the rail spur would be minimal. Minimal, if any, additional geologic resources would be needed beyond those associated with construction of the rail spur. Mitigation measures, BMPs, NPDES permit requirements, and spill prevention and cleanup plans implemented to avoid and reduce impacts to geology and soils during the construction stage would apply to operation of the rail spur. Maintenance activities on the rail spur would not be likely to create significant soil disturbances, and impacts would be less significant than during construction of the spur. As for the proposed project area, impacts from subsidence are not anticipated in the rail spur area. Shaking or vibratory motion from natural or induced seismicity is unlikely to be significant enough to affect the rail spur infrastructure. Transportation impacts on rail, including potential accident scenarios, are discussed in EIS Section 4.3.1.2. Therefore, the NRC and BLM staff conclude that the potential impacts to geology and soils from operation of the rail spur would be SMALL.

4.4.1.3 Decommissioning and Reclamation Impacts

At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. Decommissioning activities for the proposed action (Phase 1) and for Phases 2-20 would involve the same activities, but the activities would be scaled to address the overall size of the CISF (i.e., the number of phases completed).

Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area (Holtec, 2020a). Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; erosional control; and restoring and reclaiming disturbed areas. EIS Sections 2.2.1.4 and 2.2.1.7 describe the decommissioning and reclamation activities.

Contaminated soils would be disposed of at approved and licensed waste disposal facilities. During dismantling of the proposed CISF project, soil disturbance would occur from the use of heavy equipment, such as bulldozers and graders, to demolish SNF storage facilities, buildings, and associated infrastructure. This soil disturbance would be limited to areas previously disturbed during the construction and operation stages. Mitigation measures used to reduce soil impacts during construction (EIS Section 4.4.1.1) would be applied during decommissioning. After project facilities and infrastructure are removed, disturbed areas would be regraded with fill from stockpiles, covered with topsoil, contoured, and reseeded with native vegetation (Holtec, 2020a). After decommissioning and reclamation activities are complete, the site would be released. Therefore, the NRC staff concludes that the potential impact on geology and soils associated with the decommissioning and reclamation stage for the proposed action (Phase 1) and Phases 2-20 of the proposed CISF project would be SMALL.

4.4.1.3.1 Rail Spur

Decommissioning of the rail spur would occur at the discretion of the landowner (BLM). Similar to the impacts to geology and soils described for the construction stage, the impacts of decommissioning the rail spur would be limited to soil disturbance, soil erosion, and potential soil contamination from leaks and spills of oil and hazardous materials. Holtec would implement mitigation measures, BMPs, NPDES permit requirements, and spill prevention and cleanup plans, to limit soil loss, avoid soil contamination, and minimize stormwater runoff impacts. Therefore, the NRC and BLM staff conclude that the potential impacts to geology and soils from decommissioning of the rail spur would be SMALL. If the rail spur is not decommissioned, potential impacts to geology and soils are anticipated to be minor, resulting from soil contamination from rail use, soil disturbance, and erosion.

4.4.2 No-Action Alternative

Under the No-Action alternative, the NRC would not license the proposed CISF project. Therefore, impacts such as soil disturbance or contamination would not occur. Construction impacts would be avoided because SNF storage pads, buildings, and transportation infrastructure would not be built. Operational impacts would also be avoided because no SNF canisters would arrive for storage. Impacts to geology and soils from decommissioning activities would not occur, because unbuilt SNF storage pads, buildings, and transportation infrastructure require no decontamination and undisturbed soils need no reclamation. The current geology and soil conditions on and near the project would remain essentially unchanged under the No-Action alternative. In the absence of a CISF, the NRC staff assumes that SNF would remain onsite in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue as detailed, in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available.

4.5 Water Resources Impacts

This section describes the potential impacts to water resources (surface water and groundwater) for the proposed action (Phase 1), Phases 2-20, and the No-Action alternative.

4.5.1 Surface Water Impacts

Impacts to surface waters and wetlands at the proposed project area may result from erosion runoff, spills and leaks of equipment fuels and lubricants, and stormwater discharges.

4.5.1.1 Impacts from the Proposed CISF

As described in EIS Section 3.5.1, no perennial streams are located within the proposed project area. Surface drainage at the site flows into two ephemeral playa lakes having no external drainage: Laguna Gatuna to the east and Laguna Plata to the northwest (EIS Figure 3.5-2). Both Laguna Gatuna and Laguna Plata are designated as “Surface Waters of the State” under New Mexico Administrative Code (NMAC) 20.6.4 and are protected as Surface Waters of the State as described in the text box in EIS Section 3.5.1 (Holtec, 2020a). Water for construction and operation of the proposed CISF project would be provided by City of Carlsbad Water Department through the existing water supply pipeline, owned by Intrepid Mining LLC, currently in place at the proposed CISF project or via a new water supply line from the Double Eagle Water System, which would share the majority of the rail spur right-of-way, resulting in no notable additional construction(Holtec, 2020a; Holtec, 2019a, Double Eagle Supply, 2021).

Holtec would need to obtain a NPDES permit for construction and for operations (EIS Section 2.2.1.6) to address potential impacts on water and provide mitigation as needed to maintain water quality standards and avoid degradation of water resources at or near the proposed CISF project. As part of the NPDES permits, Holtec would develop a SWPPP that would prescribe BMPs to be employed to reduce impacts to water quality during the license term. EPA Region 6 would issue the NPDES permits, with NMED oversight review. If Holtec does not qualify for general NPDES permits, site-specific NPDES permits would be required. The NPDES permits and the SWPPP would be required to remain valid throughout all phases of the proposed project.

4.5.1.1.1 Construction Impacts

During the construction stage of the proposed action (Phase 1), grading and clearing of the proposed project area for the SNF storage structures, site access road, security building, administration building, parking lot, concrete batch plant, laydown area, and associated infrastructure would cause surface disturbance, resulting in soil erosion and sediment runoff into nearby drainages. Holtec has committed to erosion and sediment control BMPs (e.g., sediment fences) to minimize any adverse effects, such as erosion and sedimentation on surface water resources. Leaks and spills of fuels and lubricants from construction equipment and stormwater runoff from impervious surfaces resulting from the proposed facility construction and concrete batch plant installation could impact surface water quality. Implementation of a SPCC Plan and a SWPPP would minimize the adverse effects of any leaks or spills of fuels and lubricants.

As described in EIS Section 3.5.1.4, no floodplains are located within or in the vicinity of the proposed project area. The topography of the proposed project area slopes gently northward toward two drainages, one leading to Laguna Plata to the northwest and the other to Laguna Gatuna to the east. Based on a flooding analysis for full build-out (Phases 1-20), Holtec stated that both Laguna Plata and Laguna Gatuna would be able to accept runoff from a 24-hour/19 cm [7.5 in] storm event with excess freeboard (Holtec, 2020a).

As described in EIS Section 3.5.1.5, Holtec states that there are no wetlands within or in the immediate vicinity of the proposed project area. Conditions in playa lakes that could potentially receive surface runoff from the proposed CISF project (i.e., Laguna Plata and Laguna Gatuna) are not favorable for the development of aquatic or riparian habitat (Holtec, 2020a). Furthermore, soils and water (when present) in Laguna Plata and Laguna Gatuna are highly mineralized. Holtec is required to obtain a Section 401 certification from NMED for any discharge to Waters of the United States (WOTUS), including jurisdictional wetlands. However, the USACE concluded there are no WOTUS at the proposed CISF nor any which would receive runoff or otherwise be impacted by the proposed project (USACE, 2021). Therefore, Holtec will not be required to obtain a Clean Water Act Section 401 certification.

In summary, Holtec would: (i) implement mitigation measures to control erosion and sedimentation; (ii) develop and comply with a SPCC Plan and a SWPPP; and (iii) obtain a required NPDES construction permit to address potential impacts from discharge to surface water, including playas, and provide mitigation as needed to maintain water quality standards. Therefore, the NRC staff concludes that the potential impacts to surface waters, including jurisdictional wetlands, during the construction stage for the proposed action (Phase 1) would be SMALL.

For the construction stages of Phases 2-20, additional land would be disturbed and converted to storage facility pads, resulting in additional impervious cover. Surface disturbance would result in additional soil erosion and sediment runoff into nearby drainages. Holtec would continue to implement erosion and sediment control BMPs as directed in applicable permits and certifications, as during the construction stage of the proposed action (Phase 1). Holtec would continue to mitigate the potential for leaks and spills of fuels and lubricants from construction equipment by implementing BMPs (e.g., earthen berms, sediment fences) and would continue to abide by the requirements of applicable permits and certifications. As additional phases are added, Holtec would implement BMPs appropriate for each size increase in the footprint of the proposed facility and would implement storage pad designs that would adequately direct drainage over impervious surfaces during each phase addition up to full build-out. Holtec's flood analysis included the full build-out of the proposed facility (i.e., including Phases 2-20), so the addition of these phases is unlikely to cause additional flooding at Laguna Gatuna or Laguna Plata. Therefore, the NRC staff concludes that the impacts to surface water and wetlands from Phases 2-20 would be SMALL.

4.5.1.1.1.1 Rail Spur

Construction of the rail spur would disturb an additional 15.9 ha [39.4 ac] of BLM-managed land. The NRC and BLM staff anticipate that impacts to surface water would be limited to soil disturbance and soil erosion associated with the land disturbance, as well as potential soil contamination from leaks and spills of oil and hazardous materials from construction equipment. Similar to those implemented for construction of the CISF, mitigation measures, BMPs, NPDES construction permit requirements and spill prevention and cleanup plans would be implemented by Holtec to limit soil loss, avoid soil contamination, and minimize stormwater runoff impacts. Therefore, the NRC and BLM staff conclude that the potential impacts to surface waters and wetlands from the construction of the rail spur would be SMALL.

4.5.1.1.2 Operations Impacts

For the proposed action (Phase 1) operation stage, the primary impact to surface water would be from runoff. The impervious SNF storage pad would be the primary source of runoff. The robust design and construction of the SNF storage systems and environmental monitoring measures (EIS Chapter 7) make the potential for a release of radiological material from the proposed CISF project unlikely. The SNF canisters do not contain any material in liquid form, and the SNF transportation and storage canisters are sealed to prevent any liquids from contacting the SNF assemblies (Holtec, 2020a). Therefore, during normal operations, there is no potential for a liquid pathway (such as runoff) to become contaminated with radioactive materials and thereby radiologically contaminate nearby surface waters. For information about off-normal accident events, see EIS Section 4.15. Furthermore, Holtec's environmental program would include a two-step process to detect any potential radiological contamination in surface water runoff (Holtec, 2020a). First, all casks would be checked weekly for surface contamination and all storage pads would be checked monthly for surface contamination. Second, soil samples would be collected on a quarterly basis at culverts leading to the proposed CISF project outfalls (i.e., discharge points). If radioactive contaminants exceeding the action levels detailed in the environmental program are detected, an immediate investigation and corrective action would be required, as established in Holtec's written procedures, to protect human health and the environment and prevent future occurrences (Holtec, 2020a).

Holtec would also be required to continue to implement erosion and sediment control BMPs, as well as any BMPs addressing potential leaks or spills of fuels or lubricants from equipment, as directed by applicable permits, plans, and certifications associated with construction. For operation of the proposed CISF project, Holtec would be required to obtain a NPDES permit for industrial stormwater. As part of the NPDES industrial stormwater permit, Holtec would develop a SWPPP for operations that would prescribe BMPs to be employed to reduce impacts to water quality from point-source discharges of stormwater during operations. The NPDES industrial stormwater permit and associated SWPPP would cover all operation activities, including those of the concrete batch plant.

As previously discussed, based on a flooding analysis, Holtec stated that both Laguna Plata and Laguna Gatuna would be able to accept runoff from a 24-hour/19 cm [7.5 in] storm event total with excess freeboard (Holtec, 2020a). The natural drainage at the proposed CISF project directs runoff to Laguna Plata and Laguna Gatuna, both of which serve as retention areas during severe storm events.

In summary, for the proposed action (Phase 1) the design and construction of the SNF storage systems and environmental monitoring measures make the potential for a release of radiological material from the proposed CISF project very low during operations. To minimize potential impacts to surface water from stormwater runoff, Holtec would (i) implement mitigation measures to control erosion, stormwater runoff, and sedimentation; (ii) develop and comply with a SPCC Plan; (iii) obtain a required NPDES permit to address potential impacts of point-source stormwater discharge to surface water; and (iv) develop a SWPPP prescribing mitigation, as needed, to maintain water quality standards. Nearby playa lakes have adequate capacity to accept runoff from severe 1-day storm events, and conditions in these playa lakes are not favorable for development of aquatic or riparian habitat (Holtec, 2020a). Therefore, the NRC staff concludes that the potential impacts to surface waters and wetlands during the operations stage of the proposed action (Phase 1) would be SMALL.

The NRC staff anticipates that Holtec would continue to implement the mitigation measures used in the proposed action (Phase 1) throughout Phases 2-20. Although the amount of impervious surface would increase and would thereby increase surface runoff, the NRC staff expects that the design of the proposed facility is such that the mitigation measures would be scaled appropriately, as would be required by an NPDES permit. Therefore, the NRC staff concludes that the potential impacts to surface waters and wetlands during the operation of Phases 2-20 would be SMALL.

Defueling

Defueling the proposed CISF project would involve removal of SNF from the proposed CISF. Defueling would not result in utilization of any additional surface water resources. Impacts to surface water would be bounded by those evaluated under the construction stage and earlier activities during the operations stage. Therefore, the NRC staff concludes that the surface water impacts from defueling the proposed CISF project would be SMALL.

4.5.1.1.2.1 Rail Spur

During operation of the proposed CISF, the primary impact to surface water from the rail spur would be potential runoff from disturbed areas or from leaks or spills from equipment. To minimize any adverse impacts of runoff during operation of the rail spur, Holtec would implement mitigation measures to control erosion and sedimentation, develop and comply with a SPCC Plan, and develop a SWPPP prescribing mitigation, as needed, to maintain water quality standards. As described previously, the SNF canisters do not contain any material in liquid form, and the SNF transportation and storage canisters are sealed to prevent any liquids from contacting the SNF assemblies (Holtec, 2020a). Thus, there is no potential for a liquid pathway from the SNF (such as runoff from the rail spur) to contaminate nearby surface waters. Based on this, the NRC and BLM staff conclude that the potential impacts to surface waters and wetlands during operation of the rail spur would be SMALL.

4.5.1.1.3 Decommissioning and Reclamation Impacts

At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. Decommissioning activities for the proposed action (Phase 1) and for Phases 2-20 would involve the same activities, but the activities would be scaled to address the overall size of the CISF (i.e., the number of phases completed).

Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area (Holtec, 2020a). Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; erosional control; and restoring and reclaiming disturbed areas. EIS Sections 2.2.1.4 and 2.2.1.7 describe the decommissioning and reclamation activities. Holtec has committed to revegetating all of the proposed CISF site (Holtec, 2020a). These activities would have surface water impacts similar in scale to the construction phase, particularly until disturbed areas are revegetated.

During the decommissioning and reclamation stage for the proposed action (Phase 1) and Phases 2-20, Holtec would implement the mitigation measures described in EIS Section 4.5.1.1.1 to control erosion, stormwater runoff, and sedimentation. Holtec's required NPDES permit and SWPPP would ensure that stormwater runoff would not contaminate surface water. Therefore, the NRC staff concludes that the potential impacts to surface waters and wetlands during decommissioning and reclamation for the proposed action (Phase 1) and Phases 2-20 would be SMALL.

4.5.1.1.3.1 Rail Spur

Decommissioning and reclamation of the rail spur would include dismantlement of rail spur at the discretion of the landowner (BLM). Decommissioning would be based on an NRC-approved decommissioning plan, and all decommissioning activities would be carried out in accordance with 10 CFR Part 72 requirements. Therefore, the NRC and BLM staff conclude that the potential impacts to surface waters and wetlands during decommissioning of the rail spur would be SMALL. If the rail spur is not decommissioned, the potential continued impact to surface water would be primarily from potential runoff from disturbed areas or from leaks or spills from equipment that remains in use.

4.5.1.2 No-Action Alternative

Under the No-Action alternative, the NRC would not license the proposed CISF project. Therefore, impacts to surface water such as erosion, stormwater runoff, sedimentation, and other contamination would not occur. Construction impacts would be avoided because SNF storage modules, buildings, and transportation infrastructure would not be built. Operational impacts would also be avoided because no SNF canisters would arrive for storage. Impacts to surface water and wetlands from decommissioning activities will not occur, because unbuilt SNF storage structures, buildings, and transportation infrastructure require no decontamination and undisturbed areas need no reclamation. The current surface water and wetland conditions on and near the proposed project area would remain essentially unchanged under the No-Action alternative. In the absence of a CISF, the NRC staff assumes that SNF would remain on-site in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue as detailed in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available.

4.5.2 Groundwater Impacts

Impacts to groundwater at the proposed project area may result from pumping water (i.e., use of groundwater resources) to meet required consumptive water demands or from potential contamination because of leaks and spills of fuels and lubricants. Discharges to groundwater could impact groundwater quality; however, as described later in this section, the NRC staff does not anticipate that any groundwater discharges from the CISF project would occur. The SNF contains no liquid component and the SNF storage canisters are sealed to prevent any liquids from contacting the SNF assemblies (Holtec, 2020a). Therefore, there is no potential for radiological contamination of underlying groundwater or aquifers via a liquid pathway (such as a leaking canister).

4.5.2.1 Impacts from the Proposed CISF

As described in EIS Section 3.5.2, major aquifers in the area of the proposed CISF project include the Permian Capitan Aquifer, Permian Rustler Formation, Triassic Dockum Group (Santa Rosa Formation), Tertiary Ogallala Aquifer, and Quaternary alluvial deposits (Quaternary alluvium). As further described in EIS Section 3.5.3, although water samples taken in 1969 near Laguna Gatuna were identified as potable, no potable groundwater is known to currently exist within or in the immediate vicinity of the proposed project area. Potable water for domestic use and stock watering in the vicinity of the site is generally obtained from pipelines that convey water to area potash refineries from the Ogallala Aquifer on the High Plains area of eastern Lea County.

Holtec may need to obtain a groundwater discharge permit from NMED {which has jurisdiction over groundwater with total dissolved solids concentration less than 10,000 mg/L [10,000 ppm]} for any discharges from the proposed CISF that could directly or indirectly impact groundwater (NMAC 20.6.2). The discharge permit, if applicable, would require the proposed CISF to remain in compliance with all criteria of the permit throughout all phases of the proposed project.

4.5.2.1.1 Construction Impacts

As described in EIS Section 3.2.5, the City of Carlsbad Water Department would supply potable water for construction and operation of the proposed CISF project and the concrete batch plant through the existing water supply pipeline currently in-place at the proposed project area or via a new water line installed along the rail spur right-of-way (Holtec, 2020a). Water supplied by the City of Carlsbad Water Department's Double Eagle facility would be withdrawn from the Ogallala Aquifer. For the construction stage of the proposed action (Phase 1), the peak potable water requirements for construction activities of the proposed CISF project would be 76 Lpm [20 gpm] (Holtec, 2020a). Consumptive water use during construction of all phases would result primarily from cement mixing for construction of SNF storage modules and supporting facilities, for dust control, and for workers' consumption {38 Lpm [10 gpm]}, for a peak consumptive use of 114 Lpm [30 gpm] (Holtec, 2020a). Per the Holtec RAI response (Holtec, 2020a, 2019c), this peak water usage accounts for the overlap between operation of initial phases and construction of subsequent phases. Construction of the proposed action (Phase 1) would require the largest volume of water [i.e., maximum use for construction, and maximum workforce (135 workers)] for the proposed CISF project. The bounding value for the total volume of water that may be consumed was calculated by extrapolating over the 2-year construction stage for the proposed action (Phase 1) and is 119,376,746 L [31,536,000 gal]. Holtec received a letter from the Double Eagle water system stating that their system has a supply capacity greater than 7,570 Lpm [2,000 gpm], which more than exceeds the expected construction stage water demands of all support buildings, along with the concrete batch plant (Holtec, 2020a, Double Eagle, 2021).

As described in EIS Section 3.5.2.2, groundwater was encountered in two of the three monitoring wells [B101(MW) and B107(MW)] drilled within the proposed project area. Groundwater was observed in B101(MW), which was screened in the Santa Rosa Formation, at depths ranging from 77.2 to 80.4 m [253.4 to 263.7 ft] (GEI Consultants, 2017). Groundwater was observed in B107(MW), which was screened in the shallow Chinle Formation, at depths ranging from 28.4 to 30 m [93.1 to 100 ft] (GEI Consultants, 2017). These groundwater depths are relatively deep in comparison to the maximum depth of excavation of 7.6 m [25 ft] for the proposed SNF storage modules (EIS Section 4.4.1.1). Thus, the NRC staff does not expect that excavation of site soils and alluvium for construction of the SNF storage modules would encounter groundwater.

Two other monitoring wells [B106(MW) and ELEA-1] installed in the proposed project area did not encounter groundwater (EIS Section 3.5.2.2). B106(MW) was screened in the deeper Chinle Formation at depths ranging from 53.1 to 61.9 m [174.3 to 203 ft] (GEI Consultants, 2017). ELEA-1 was screened at depths ranging from 6.1 to 15.2 m [20 to 50 ft] at the alluvium-Dockum Group interface (Holtec, 2020a). The absence of groundwater in these wells indicates that saturated zones in the alluvium and the Chinle Formation beneath the proposed project area are laterally discontinuous.

The shallowest groundwater within the proposed project area (but outside the footprint of excavation) was encountered in monitoring well ELEA-2 located in the eastern portion of the site (EIS Section 3.5.2.2). ELEA-2 is screened at depths ranging from 17.7 to 29.9 m [58 to 98 ft] in the Dockum Group. Groundwater in ELEA-2 has been measured at depths ranging from 10.4 to 11.49 m [34 to 37.7 ft] indicating that the groundwater is under enough subsurface pressure to produce a water level of about 12.2 m [50 ft] above the ground surface (Holtec, 2020a; GEI Consultants, 2017). Because groundwater in ELEA-2 is highly saline {TDS concentration of 83,000 mg/L [83,000 ppm] (EIS Table 3.5-1)} and because of its proximity to Laguna Gatuna, it has been hypothesized that the water level in the playa lakes controls the near surface water table at the proposed project area (ELEA, 2007; Holtec, 2020a).

During construction of the proposed action (Phase 1), infiltration of stormwater runoff and leaks and spills of fuels and lubricants can potentially affect the groundwater quality of near-surface aquifers. Holtec's required NPDES permit would set limits on the amounts of pollutants entering ephemeral drainages that may be in hydraulic communication with alluvial aquifers at the proposed project. To minimize and prevent spills, Holtec would develop and abide by a SPCC Plan. The NPDES permit and associated SWPPP would specify additional mitigation measures and BMPs that Holtec would implement to prevent and clean up spills. If required, the groundwater discharge permit would further limit the amounts of pollutants allowed to infiltrate into groundwater.

In summary, for the construction stage of the proposed action (Phase 1), potable water would be supplied by a new water line that is capable of supporting the water demands of all support buildings and the concrete batch plant. Excavation of site soils and alluvium for construction of the SNF storage modules is not expected to encounter groundwater, because groundwater is not encountered consistently within the proposed project area and is therefore discontinuous and at sufficient depth below the excavation depth. The NPDES construction permit requirements, groundwater discharge permit requirements (if required), and implementation of the required BMPs would protect groundwater quality in shallow aquifers. Specifically, the NPDES permit requirements would provide controls on the amount of pollutants entering ephemeral drainages and specify mitigation measures and BMPs to prevent and clean up spills. Therefore, the NRC staff concludes that the impacts to groundwater during the construction stage of the proposed action (Phase 1) would be SMALL.

Construction of Phases 2-20 requires less water than construction of the proposed action (Phase 1) because all facilities and infrastructure for the proposed CISF project would already have been built. In addition to consumptive use for construction, concurrent operations consume a small amount of water. This combined demand would not exceed the peak consumptive water demand of 114 Lpm [30 gpm] (Holtec, 2020a). The existing water pipeline has a capacity of over 7,570 Lpm [2,000 gpm], which greatly exceeds the estimated peak water demand. Like the proposed action (Phase 1), the excavation of soils and alluvium to construct Phases 2-20 would not be expected to encounter groundwater or discharge to groundwater, and the NPDES permit and other applicable permits and plans required for the proposed action (Phase 1) would continue to protect the groundwater quality. Therefore, based on the currently applicable requirements and restrictions, the NRC staff concludes that the impacts to groundwater during construction of Phases 2-20 would be SMALL.

As described previously, groundwater was observed in the Santa Rosa Formation at depths ranging from 77.2 to 80.4 m [253.4 to 263.7 ft], while saturated zones in the shallower alluvium and Chinle Formation beneath the proposed project area are laterally discontinuous. To further confirm the characterization of groundwater within the proposed CISF project area, Holtec has committed to conduct a baseline groundwater monitoring, sampling, and testing program prior to construction or significant site disturbance associated with the proposed CISF (Holtec, 2020a,b). The duration of the program will be 18 months; approximately 6 months for well installation and 12 months of groundwater monitoring and sampling. Holtec proposes a total of 14 principal aquifer monitoring wells screened in the Santa Rosa Formation to provide primary baseline groundwater sampling results. These wells would be spaced approximately 305 m [1,000 ft] apart across proposed Phases 1-20 and would be drilled to a depth of approximately 122 m [400 ft]. Holtec proposes a total of six monitoring wells screened in the Chinle Formation to identify potential discontinuous aquifers. These wells would be spaced around the perimeter of proposed Phases 1-20 and would be drilled to a depth of approximately 61 m [200 ft]. Holtec proposes a total of nine shallow monitoring wells screened in soil or the upper Chinle Formation to identity potential connections between shallow groundwater at the site and the playa lakes. Five wells would be located between the proposed CISF and Laguna Gatuna and four wells would be located between the proposed CISF and Laguna Plata. These wells would be drilled to a depth of approximately 30.5 m [100 ft]. Soil sampling and rock coring would be performed in each well.

Water quality sampling and testing would be conducted in all wells that encounter groundwater, including the wells installed during the 2017 Phase I site characterization (GEI Consultants, 2017). Holtec would conduct quarterly groundwater quality sampling and testing and monthly groundwater level measurements for a period of 12 months. During quarterly groundwater sampling events, surface water would also be collected from Laguna Plata and Laguna Gatuna. In addition to major and minor cations, the following parameters would be measured: pH, temperature, specific conductivity, turbidity, oxidation/reduction potential, dissolved oxygen, total dissolved solids, alkalinity, ammonia nitrogen, nitrate, nitrite, and ortho-phosphate. The data collected over 12 months would be used to evaluate seasonal variability in groundwater levels and water quality. Prior to implementation, this program will be finalized and documented in a Baseline Groundwater Monitoring Program Work Plan (Holtec, 2020a).

4.5.2.1.1.1 Rail Spur

During construction of the rail spur, the use of potable water would be limited to consumptive water for dust control. Holtec stated that use of potable water for the construction of the rail spur was included in the estimated peak water requirements for Phase 1, 76 Lpm [20 gpm], and would be adequately supplied by the existing or replaced water pipeline (Holtec, 2020a). The NRC staff does not expect that excavation of soils and alluvium for construction of the rail spur for SNF transfer would encounter groundwater. The aquifers present in the area where the proposed rail spur would be built are the same as those underneath the proposed CISF project area, and excavation for the rail spur would be less than that of the storage pads and modules.

During construction, infiltration of stormwater runoff and leaks and spills of fuels and lubricants could potentially affect the groundwater quality of near-surface aquifers. Holtec's required NPDES construction permit would set limits on the amounts of pollutants entering ephemeral drainages that may be in hydraulic communication with alluvial aquifers at the site of the rail spur. To minimize and prevent spills, Holtec would develop and abide by a SPCC Plan. The NPDES permit and associated SWPPP would specify additional mitigation measures and BMPs to prevent and clean up spills. Holtec would implement all BMPs the SWPPP required and other applicable permits and plans.

Because (i) potable water for the construction of the rail spur would be supplied by an existing water pipeline or by a new water line, both of which would be capable of meeting the expected peak water demands; (ii) the rail spur construction is not anticipated to encounter or discharge to groundwater; (iii) construction of the rail spur the would be under similar permit restrictions as the construction of the proposed action (Phase 1); and (iv) no new construction would be required for Phases 2-20, the NRC and BLM staff conclude, based on the currently applicable requirements and restrictions, that the impacts to groundwater resources from the construction of the rail spur would be SMALL.

4.5.2.1.2 Operations Impacts

During the combined operations stage of the proposed action (Phase 1) and the construction of Phases 2-20, the consumptive water use would be similar to that calculated under the construction stage. However, for the operations stage without overlap of the construction stage, consumptive water use would be considerably less than the construction stage because a limited amount of concrete would be produced and is assumed to be less than that used for the construction of the proposed facility. Therefore, Holtec estimates that the peak potable water requirements would not exceed approximately 114 Lpm [30 gpm] (Holtec, 2020a).

During operation of the proposed action (Phase 1), impacts to groundwater from potential radiological contamination is unlikely because of the design and construction of the SNF storage systems and the geohydrologic conditions of the proposed project area. The SNF canisters do not contain any material in liquid form, and the SNF transportation and storage canisters are sealed to prevent any liquids from contacting the SNF assemblies (Holtec, 2020a). Therefore, there is no potential for radiological contamination of underlying groundwater or aquifers via a liquid pathway (such as a leaking canister).

As previously described, major aquifers in the proposed project area include the Permian Capitan Aquifer, Permian Rustler Formation, Triassic Dockum Group (Santa Rosa Formation), Tertiary Ogallala Aquifer, and Quaternary alluvium. As described in EIS Section 4.5.2.1.1, monitoring wells installed in the proposed action (Phase 1) project area did not encounter groundwater in Quaternary alluvium. The Tertiary Ogallala Aquifer is not present beneath the proposed project area and is not hydraulically connected to groundwater or aquifers beneath the proposed project area (Holtec 2019a; Nicholson and Clebsch, 1961).

As discussed in EIS Section 4.5.2.1.1, hydrologic information collected from monitoring wells at the proposed project area indicates that saturated zones in the alluvium and Chinle Formation of the Triassic Dockum Group beneath the proposed project are laterally discontinuous (Holtec, 2020a; GEI Consultants, 2017). Groundwater observed in well B101(MW), which was screened in the Santa Rosa Formation at depths from 77.2 to 80.4 m [253.4 to 263.7 ft], is interpreted to be the first primary (i.e., laterally continuous) groundwater aquifer beneath the proposed project area (GEI Consultants, 2017).

During operations, infiltration of stormwater runoff and leaks and spills of fuels and lubricants are the primary impacts to groundwater quality of near-surface aquifers. Holtec's required NPDES industrial stormwater permit would set limits on the amounts of pollutants entering ephemeral drainages that may be in hydraulic communication with alluvial aquifers at the site. To minimize and prevent spills, Holtec would develop and implement a SPCC plan. The SPCC Plan, NPDES permit, and associated SWPPP would specify additional mitigation measures and BMPs to prevent and clean up spills. If required, the groundwater discharge permit would further limit the amounts of pollutants allowed to infiltrate into groundwater.

For the proposed action (Phase 1) operations stage, because of the design and construction of the SNF storage systems, the SNF being composed of dry material, geohydrologic conditions, and the depth of groundwater, potential radiological contamination of groundwater is unlikely during operations. NPDES industrial stormwater permit requirements, groundwater discharge permit (if required), and implementation of BMPs would protect groundwater quality in shallow aquifers. Specifically, the NPDES permit requirements provide controls on the amount of pollutants entering ephemeral drainages and specifies mitigation measures and BMPs to prevent and clean up spills. Therefore, based on the currently applicable requirements and restrictions, the NRC staff concludes that the impacts to groundwater during the operation of the proposed action (Phase 1) would be SMALL.

The operations stage of Phases 2-20 would have the same impacts and mitigation measures as the operations stage of the proposed action (Phase 1) and have approximately the same consumptive use water demand. Similarly, because of the design and construction of the SNF storage systems, geohydrologic conditions, and the depth of groundwater, potential radiological contamination of groundwater is unlikely during any phase of the operations stage. The requirements of the NPDES permit, SWPPP, SPCC Plan, groundwater discharge permit (if required), and other necessary plans and permits would protect groundwater quality in shallow aquifers by restricting the amount of pollutants entering ephemeral drainages and specifying mitigation measures and BMPs to prevent and clean up spills. Therefore, the NRC staff concludes, based on the currently applicable requirements and restrictions, that the impacts to groundwater during the operations stage of Phases 2-20 would be SMALL.

Defueling

Defueling the CISF would involve removal of SNF from the CISF. Defueling would not result in using any additional groundwater resources. Impacts to groundwater would be bounded by those resources evaluated under the construction stage or earlier activities of the operations stage. Therefore, the NRC staff concludes that the groundwater impacts from defueling the proposed CISF project would be SMALL.

4.5.2.1.2.1 Rail Spur

Use of the rail spur to transfer SNF to the proposed CISF project from the main rail line would require no further excavation of the surface, and the primary impact to groundwater would be from potential radiological contamination. Because of the design and construction of the SNF transportation casks and the geohydrologic conditions in the proposed project area, potential radiological contamination of groundwater is unlikely. The SNF canisters do not contain any material in liquid form, and the SNF transportation and storage canisters are sealed to prevent any liquids from contacting the SNF assemblies (Holtec, 2020a). Therefore, there is no potential for radiological contamination of underlying groundwater or aquifers via a liquid pathway.

As with the construction stage of the proposed action (Phase 1), infiltration of stormwater runoff and leaks and spills of fuels and lubricants during operations can potentially affect the groundwater quality of near-surface aquifers. Holtec's required NPDES industrial stormwater permit and groundwater discharge permit (if required) would set limits on the amounts of pollutants entering ephemeral drainages that may be in hydraulic communication with near-surface aquifers.

Therefore, impacts from the operations stage of the rail spur are bound by the impacts of the construction stage; thus, the NRC and BLM staff conclude, based on the currently applicable requirements and restrictions, that the impacts to groundwater during the operations stage for the rail spur would be SMALL.

4.5.2.1.3 Decommissioning and Reclamation Impacts

At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. Decommissioning activities for the proposed action (Phase 1) and for Phases 2-20 would involve the same activities, but the activities would be scaled to address the overall size of the CISF (i.e., the number of phases completed).

Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area (Holtec, 2020a). Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; erosional control; and restoring and reclaiming disturbed areas. EIS Sections 2.2.1.4 and 2.2.1.7 describe the decommissioning and reclamation activities.

As with the construction stage, during decommissioning and reclamation, infiltration of stormwater runoff and leaks and spills of fuels and lubricants could potentially affect the groundwater quality of near-surface aquifers. Holtec's required NPDES industrial stormwater permit and groundwater discharge permit (if required) would set limits on the amounts of pollutants entering ephemeral drainages that may be in hydraulic communication with alluvial aquifers at the site. The NRC staff anticipates that to minimize and prevent spills, Holtec would develop and implement a SPCC Plan. The NPDES permit and SWPPP would specify additional mitigation measures and BMPs to prevent and clean up spills. Therefore, the NRC staff concludes, based on the currently applicable requirements and restrictions, that the potential impacts to groundwater during the decommissioning stage for the proposed action (Phase 1) and Phases 2-20 would be SMALL.

4.5.2.1.3.1 Rail Spur

Dismantling of the rail spur may occur at the discretion of the land owner (BLM) and would be based on an NRC-approved decommissioning plan and BLM requirements. All decommissioning activities would be carried out in accordance with 10 CFR Part 72 requirements. These activities would have groundwater impacts similar in scale to the construction stage.

Similar to both the construction and operation stages, during decommissioning and reclamation, infiltration of stormwater runoff and leaks and spills of fuels and lubricants could potentially affect the groundwater quality of near-surface aquifers. Holtec's required NPDES permit and groundwater discharge permit (if required) would set limits on the amounts of pollutants entering ephemeral drainages that may be in hydraulic communication with alluvial aquifers. The NRC staff anticipates that to minimize and prevent spills, Holtec would develop and implement a SPCC Plan. Therefore, the NRC and BLM staff conclude, based on the currently applicable requirements and restrictions, that the potential impacts to groundwater during decommissioning of the rail spur would be SMALL.

If the rail spur is not dismantled, potential impacts would be similar to those of the operations stage. However, with no SNF transport along the rail spur, the potential for radiological contamination, leaks, and spills would be reduced.

4.5.2.2 No-Action Alternative

Under the No-Action alternative, the NRC would not license the proposed CISF project. Therefore, impacts to groundwater such as stormwater runoff and potential radiological contamination would not occur. Construction impacts would be avoided because SNF storage modules, buildings, and transportation infrastructure would not be built. Operational impacts would also be avoided because no SNF canisters would arrive for storage. Impacts to groundwater from decommissioning activities would not occur, because unbuilt SNF storage modules, buildings, and transportation infrastructure require no decontamination, and undisturbed areas need no reclamation. The current groundwater conditions on and near the project would remain essentially unchanged under the No-Action alternative. In the absence of a CISF, the NRC staff assumes that SNF would remain on-site in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue, as detailed in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available.

4.6 Ecological Impacts

4.6.1 Impacts from the Proposed CISF

This section discusses the potential impacts for the proposed action (Phase 1), Phases 2-20, and No-Action alternative from the proposed CISF project. Field studies conducted at the proposed CISF project and the results of consultation activities with the U.S. Fish and Wildlife Service (FWS), BLM, and the New Mexico Game and Fish Department (NMGFD), described in EIS Section 3.6, indicate that no FWS-designated critical habitat for any Federal threatened or endangered plant or animal species is expected to occur at the proposed CISF project area (Holtec, 2020a; FWS, 2022; FWS, 2021a,b; NMDGF, 2018a). Additionally, the proposed CISF project area is not located in a natural vegetation community of concern, according to the New Mexico Crucial Habitat Assessment Tool (NMDGF, 2018a). Based on information the FWS provided, one bird species listed under the Endangered Species Act (ESA), the Northern aplomado falcon (*Falco femoralis septentrionalis)*, and one insect species, the monarch butterfly (*Danaus plexippus*), could be potentially present in the proposed project area or could potentially be impacted by actions occurring in the project vicinity (FWS, 2022; FWS, 2021a). The Northern aplomado falcon is listed as an experimental non-essential population in New Mexico and based on the information provided in EIS Section 3.6.3, the NRC staff determines that this species would not occur at the proposed CISF project. EIS Section 3.6.5 explains that the yellow-billed cuckoo (*Coccyzus americanus occidentalis*), which the FWS also designated as a Federally listed threatened species under the ESA, is not identified by FWS as potentially occurring in the proposed CISF project area or in Lea County (FWS, 2022; FWS, 2021a), but NMED did identify it as potentially occurring within 0.6 km [1 mi] of the proposed CISF project areas. The habitat requirements of the yellow-billed cuckoo are not present in the proposed project area (EIS Section 3.6.5). In the unlikely event of this species visiting Laguna Gatuna when water is present after rain events, the proposed project would not affect this species, because no project disturbances are planned within 400 m [0.25 mi] of Laguna Gatuna (Holtec, 2020a). EIS Section 3.6.5 explains that the monarch butterfly is listed as a candidate species and is thus not afforded protection under the ESA.

As previously noted, the proposed project does not occur on FWS-designated critical habitat for any Federally listed threatened or endangered plant or animal species (FWS, 2021b). Therefore, all stages and phases of the proposed CISF project (Phases 1-20) would have “No Effect” on experimental or Federally listed species and “No Effect” on any existing or proposed critical habitats.

The ER states that there is no viable aquatic habitat or aquatic life at the proposed CISF project area (Holtec, 2020a). As mentioned in EIS Section 3.6.3, studies were conducted during the 1990s at the playa lakes in Eddy and Lea Counties after bird deaths were observed at the playa lakes. One of the more recent studies was conducted in spring 1992 (Davis and Hopkins, 1993), which noted that a small amount of biomass was observed in the sediment at Laguna Gatuna. There is no viable aquatic habitat or aquatic life such as fish or macroinvertebrates in the proposed CISF project area for the facility to impact (Holtec, 2020a). The lack of aquatic invertebrates in Laguna Gatuna eliminates the potential impacts to animals that rely on them for food, such as wintering birds. Holtec proposes to obtain potable water for the proposed CISF project from the City of Carlsbad Water Department, and thus no water depletion impacts would occur to surface water features within or near the proposed CISF project area (Holtec, 2020a).

The NRC staff previously noted that, according to the NMDGF, ephemeral saline lakes provide shoreline habitat for some birds, especially when water is present (NMDGF, 2018b). However, proposed CISF project activities are not planned within 400 m [0.25 mi] of Laguna Gatuna (Holtec, 2020a). Because virtually no vegetation was observed on the portion of the shore of Laguna Gatuna that is included as part of the proposed CISF project area (EIS Section 3.6.2), and because there is no commercial agriculture within 10 km [6 mi] of the proposed CISF project area (EIS Section 3.2.2), it is unlikely that invertebrates such as insects are present in sufficient numbers within the proposed CISF project that could support wintering bird migration populations. In addition, seven species of waterfowl were observed during the spring migration at Laguna Gatuna either flying over, loafing, or on the shore. Davis and Hopkins (1993) recorded 49 individual dead and salt-encrusted waterfowl representing 6 species at Laguna Gatuna that were examined by FWS pathologists. The dead waterfowl species that were observed are identified in EIS Table 3.6-2. The FWS pathologists strongly suspected that the cause of death for the waterfowl was salt poisoning (sodium ion toxicosis). Because the proposed CISF project would not disturb the shoreline of Laguna Gatuna, and because there is no riparian habitat present at Laguna Gatuna and no agricultural fields within 10 k [6 mi] of the proposed CISF project, the NRC staff anticipates that no phase of the proposed project would affect shoreline bird habitat at Laguna Gatuna (Phase 1) or from full build-out (Phases 1-20). Further, because of the short periods of time that water is present in Laguna Gatuna and the high salinity of the water, the NRC staff anticipates that waterfowl would stop over at Laguna Gatuna for short periods and would not take up residency at Laguna Gatuna on a regular basis.

The NMDGF recommended (and the NRC concurred) that this EIS should evaluate potential impacts from the proposed CISF project on the dunes sagebrush lizard (*Sceloporus arenicolus*), a NMDGF-designated endangered species, and the Lesser prairie-chicken (*Tympanuchus pallidicinctus*), a NMDGF-designated species of greatest conservation need (SGCN) (NMDGF, 2019; NMDGF, 2018b). Loss of shinnery oak habitat complexes, the construction of overhead power lines, and other human activities could impact the viability of these species where the species are present. The following sections provide an analysis of potential impacts on these and other species from the proposed CISF project and associated infrastructure.

The potential environmental impacts and related mitigation measures for ecological resources for the proposed project and alternative are discussed in the following sections.

4.6.1.1 Construction Impacts

The most significant construction impacts would occur during the construction stage of the proposed action (Phase 1) when the first storage pad, the site access road, security building, administrative building, parking lot, concrete batch plant, and lay-down area are constructed. Ecological disturbances during construction of the proposed action (Phase 1) would affect approximately 48.3 ha [119.4 ac] of land, of which 15.9 ha [39.4 ac] would be associated with constructing a railroad spur (Holtec, 2020a). Potential ecological disturbances during construction of the proposed action (Phase 1) of the proposed CISF project could include habitat loss from land clearing, noise and vibrations from heavy equipment and traffic, fugitive dust, creation of open trenches and steep-sided pits, increased soil erosion from surface-water runoff, sedimentation of playa lakes and gullies, and the presence of construction personnel.

Construction of the proposed action (Phase 1) would include the excavation of approximately 135,517 m^3 [177,250 yd^3] of native fill material (Holtec, 2020a). Maintenance practices, such as the use of chemical herbicides and roadway maintenance would also disturb vegetative communities. Construction-related disturbances would remove approximately 48.3 ha [119.4 ac] of vegetation within the Apacherian-Chihuahuan mesquite upland scrub ecological systems and, to a lesser extent, other mixed desert and thorn scrub ecological systems (Southwest Gap Analysis Project, 2007). More than 2.5 million ha [6.1 million ac] of land within the Chihuahuan Desert ecoregion, where the proposed project would be located, is classified as the Apacherian Chihuahuan mesquite upland scrub ecological system (USGS, 2020). During the last century, the area these systems occupied has increased through conversion of desert grasslands as a result of drought, overgrazing by livestock, and/or decreases in fire frequency (Southwest Gap Analysis Project, 2007). The dominant shrub species associated with these systems at the proposed CISF project is honey mesquite and snakeweed (NMDGF, 2018b). These systems do not create a unique habitat in the proposed project area. In general, areas affected by construction could experience a loss of shrub species and an increase in annual species, and the colonization of reclaimed areas by species from nearby native communities in this area could be slow (BLM, 2017a). According to the BLM, establishment of mature, native plant communities may require decades. Further, BLM predicts that over the next 20 to 40 years, more plant species in the region will be replaced by species adapted to warmer and drier conditions (BLM, 2017a). A shift in the plant community could also lead to localized changes in the animal community that depends on the plant community for food and shelter.

Erosion of soil from construction activities may cause local changes in the channel morphology downstream of the access road through increased sedimentation or scouring. Holtec would use mitigation measures for soil stabilization and sediment control, including earthen berms, dikes, and silt fences, which would be built prior to land clearing (Holtec, 2020a). During construction of the proposed CISF, the potential exists for the introduction and spread of noxious weeds, particularly in areas where vegetation has been removed or disturbed. During the construction phase, the laydown area {less than the 0.57 ha [1.4 ac]} and other disturbed areas that are not developed by project facilities would be stabilized with native grass species, pavement, and crushed stone to control erosion, and eroded areas would be repaired (Holtec, 2020a).

Holtec would be required to comply with a SWPPP as part of the NPDES permitting process (Holtec, 2020a). These mitigation measures would also benefit ecological resources because they would reduce the potential impacts to surface-water runoff receptors, including Laguna Gatuna and Laguna Plata, by limiting channel siltation and silt deposition, and maintaining State water-quality standards.

Based on the most recent BLM maps (published in 2018), the Lesser prairie-chicken habitat range is present at the proposed CISF project, as shown in Figure 3.6-5 (BLM, 2018a). However, according to the NMGFD, suitable habitat for the Lesser prairie-chicken is not present at the proposed CISF project (NMDGF, 2018b). According to BLM, the last documented Lesser prairie-chicken lek sighting within the Carlsbad field office boundaries was on March 15, 2011 (BLM, 2017b; 2018b). As discussed in EIS Section 3.6, these species have not been reported at the proposed CISF project.

The Western snowy plover (*Charadrius alexandrines nivosus*) is a NMDGF-designated SGCN and a BLM-designated Special Status Species discussed further in EIS Section 3.6.5 that has been reported as nesting at Laguna Plata but has not been reported at the proposed project area (NMGFD, 2016; BLM, 2018a). Bitter Lake and Holloman Lake are the primary breeding areas for this species in New Mexico. The Western snowy plover could be vulnerable to the proposed action (Phase 1) construction activities, because of the potential for surface-water runoff that could change water levels and water quality in the playa lakes near the proposed CISF project and from increased siltation that could degrade nesting habitat around the edges of the playa lakes near the proposed CISF project (New Mexico Partners in Flight, 2007).

Although the western burrowing owl is not a State-listed species, the owl could be vulnerable to construction activities, because of the possibility that its burrows, or birds or eggs present in the burrows, may be destroyed by machinery or structures (Klute et al., 2003). The western burrowing owl is generally tolerant of human activity, provided it is not harassed. Burrowing owls are very site-tenacious, and burrow fidelity is a widely recognized trait of burrowing owls. Although this species was not observed during ecological surveys at the proposed project area, according to private birders that document their findings on the Cornell Lab of Ornithology eBird mapping tool, burrowing owls have been reported within the proposed project area and nearby (The Cornell Lab of Ornithology, 2018). While the proposed CISF project activities could create artificial burrows (i.e., cavities within the riprap material), burrowing owls are not easily attracted to artificial burrows.

EIS Table 3.6-3 identifies that the black-tailed prairie dog could occur within 0.6 km [1 mi] of the proposed project, which is a NMDGF-designated SGCN and a BLM-designated Special Status Species. The presence of the western burrowing owl is strongly associated with prairie dog towns (FWS, 2003) because prairie dogs are a food source for this raptor species, when present. Prairie dogs also serve as a food source for the bald eagle and peregrine falcon, which are State-listed raptor species that could occur in the project area, according to the NMDGF (NMDGF, 2019; Johnson et al., 2006). However, prairie dog towns have not been reported in the proposed project area (Johnson et al., 2006; Holtec, 2020a).

All migratory birds, their feathers and body parts, nests, eggs, and nestling birds are protected by the Federal Migratory Bird Treaty Act (MBTA), making it unlawful to hunt, shoot, wound, kill, trap, capture, or sell birds listed under this convention. With a few exceptions, all bird species that are native to the United States are protected by the MBTA. Eagles are additionally protected by the Bald and Golden Eagle Protection Act (BGEPA) (FWS, 2022; FWS, 2021a). Holtec would be responsible for complying with these acts during all of the proposed project, limiting potential effects on birds from the proposed project.

Overhead power lines to serve the proposed CISF project are expected to be constructed during the proposed action (Phase 1) and extend 1.6 km [1 mi] to the south from the center of the proposed CISF project (Holtec, 2020a). The construction of new overhead power lines could cause raptors to desert nests and cause reproductive failure. Power lines present the potential for collisions and could displace prey species, which may reduce food availability within the area. Migratory birds could temporarily use the proposed CISF project, Laguna Gatuna, and Laguna Plata for a resting ground and may also be vulnerable to proposed CISF project construction activities. The salinity of the playa lakes would limit waterfowl and other avian species, such as the State-listed species discussed in this section, from relying on the playa lakes as a long-term water source. Mitigation measures the NMGFD, FWS, and BLM recommended, described later in this section, would be considered to lessen impacts to avian species.

As noted in EIS Section 3.5.1.1, NMED identified the potential for intermittent circular non-saline playas within and surrounding the proposed project area. The ecological surveys reviewed by the NRC staff did not identify any playas or high concentrations of vegetation that would indicate a circular playa within the proposed project area. However, the ecological surveys characterized the surrounding land area as similar to that of the proposed project area. The NRC staff anticipates that avian or terrestrial species that would use any intermittent non-saline playas present in the proposed project area would migrate to nearby land with similar characteristics. Therefore, the NRC staff concludes that impacts to avian or terrestrial species that might be affected by the loss of these water locations and vegetation would be minor.

Many other species, such as rodents and some reptiles, are small, have limited mobility, occur in habitats that provide concealment, or spend at least a portion of their lives underground. During the proposed action (Phase 1), construction activities may disturb soils to depths of up to 7.6 m [25 ft] deep, and because of use of heavy equipment and excavation, some individuals of these species are likely to be killed, but not in sufficient numbers to affect the local populations of these species. Similarly, a limited number of rodents and larger mammals and reptiles may be killed along access roads by vehicles moving to and from the site. There are many square miles of undeveloped land surrounding the proposed project area, which have native vegetation and habitats suitable for native wildlife species. The proposed action (Phase 1) construction impacts would be expected to contribute to the change in vegetation species' composition, abundance, and distribution within and adjacent to disturbed areas. Per BLM, the establishment of mature, native plant communities may require decades. The construction of the proposed action (Phase 1) would remove about 11 percent of the vegetation within the proposed project area and would affect the ecosystem function of the vegetative communities within and around the proposed project areas due to the expected shift of plant communities and the potential introduction of weeds.

Holtec has committed to implement mitigation measures that would further limit potential construction impacts on ecological resources (Holtec, 2020a). As previously discussed, Holtec would use mitigation measures for soil stabilization and sediment control, comply with a SWPPP, and revegetate disturbed areas with native plant species. Holtec has also committed to additional mitigation measures, to include monitoring leaks and spills of oil and hazardous material from operating equipment, minimizing fugitive dust, and conducting most construction activities during daylight hours (Holtec, 2020a). These mitigation measures would reduce impacts on ecological resources by limiting wildlife exposure to contaminants, limiting dust that may settle on forage and edible vegetation (rendering it undesirable to animals), and limiting the potential mortalities of nocturnal animals.

Therefore, the NRC staff concludes that impacts to vegetation from the proposed action (Phase 1) for construction would be noticeable within the proposed project area, but would not destabilize the vegetative communities at the proposed CISF project, resulting in a MODERATE impact. However, the removal of 48.3 ha [119.4 ac] of vegetation from the more than 2.5 million ha [6.1 million ac] of regional Apacherian-Chihuahuan mesquite upland scrub ecological system would not be noticeable. The NRC staff anticipates that the ecosystem function of vegetative communities found at the proposed CISF project would not be sufficiently altered by the proposed action (Phase 1) construction impacts to destabilize wildlife populations. As discussed in EIS Section 3.6, the species of wildlife present or that could be present are typical of those found in the habitat in the surrounding area. Because (i) the area surrounding the proposed CISF project is largely undeveloped (EIS Section 3.2); (ii) there is abundant suitable habitat in the vicinity of the project to support displaced animals; (iii) the proposed action (Phase 1) construction activities would have "No Effect" on Federally listed species; and (iv) there are no rare or unique communities, habitats, or wildlife on the proposed CISF project, the NRC staff concludes that impacts to wildlife from the proposed action (Phase 1) for construction would be minor and would not noticeably change the population of any species.

NMDGF recommends that Holtec conduct a more thorough biological survey of the project footprint and a 0.8-km [0.5-mi] buffer to better assess the range of wildlife species that may occur within the proposed project area (NMDGF, 2018b). NMDGF also suggests that Holtec consult the Baseline Wildlife Study Guidelines for conducting wildlife presence and diversity inventories (NMDGF, 2010). This guideline presents a matrix of published survey methods and protocols for specific habitats and species. The NRC staff reviewed this guideline and determined that the ecological surveys provided in Holtec's license application do not meet the NMDGF guidelines. For example, the frequency and timing of the surveys conducted for the proposed project do not meet the NMDGF recommended 1-year survey period. Further, the license application ER did not provide the location of raptor nests located within the project area and a 1.6-km [1-mi] buffer around the proposed project area and did not include live-trapping and capture of reptiles and amphibians. The NRC staff supports NMDGF's recommendation for a more thorough biological survey of the project footprint and a 0.8-km [0.5-mi] buffer be conducted for the proposed CISF project. The NRC staff further recommends that Holtec consult with NMDGF to develop an ecological baseline survey plan.

NMDGF also recommends that the playa lakes near the proposed CISF project be protected from disturbance and an adequate buffer zone established but did not specify the size of an appropriate buffer zone (NMDGF, 2018b). Wildlife that could occur at the proposed project area, as well as the BLM-managed land around the proposed facility, is under consideration by BLM for designation as the Salt Playas Area of Critical Environmental Concern (ACEC). The portion of the proposed Salt Playas ACEC that surrounds the proposed CISF project is shown in EIS Figure 4.6-1. The BLM's Draft RMP EIS that evaluates the Salt Playas ACEC identifies mitigations that could reduce potential adverse impacts to the Salt Playas ACEC (BLM, 2018a).

On BLM-managed land, BLM requires a buffer of 200 m [656 ft] from the edges of playas and floodplains where surface disturbances are not allowed as a mitigation measure to protect fish and wildlife resources. While BLM may not decide to designate the Salt Playas ACEC, the NRC staff agrees with establishing a 200 m [656 ft] buffer from the edges of playas and floodplains, and recommends that Holtec establish at least a 200 m [656 ft] buffer around Laguna Gatuna that would be protected from surface disturbances during construction activities. Given the location of the nearest planned disturbance within the proposed project area, which is the proposed rail spur, this buffer distance is reasonable and does not overlap the proposed construction activities.

The NMDGF recommended that this EIS discuss impacts to wildlife that could occur during the construction stage of the proposed project, including ground disturbance and vegetation removal activities that would impact migratory bird nests, eggs, or nestlings (as is NRC common practice). The NMDGF suggested that Holtec implement seasonal restrictions on ground disturbance activities between March 1 and September 1 (NMDGF, 2018b). The FWS further recommends that construction activities avoid active bird nests (FWS, 2022). The NRC staff concurs with the NMDGF and FWS and recommendations (EIS Chapter 6).

NMDGF recommends that the construction and abandonment of power lines follow the practices Avian Power Line Interaction Committee (APLIC) provided, to prevent or minimize risk of avian collision or electrocution of raptors (APLIC, 2006). For example, constructing new overhead power lines and retrofitting old power lines with a 150-cm [60-in] distance between energized conductors or hardware and grounded conductors or hardware limits the risk for birds to be electrocuted (NMDGF, 2007; APLIC, 2006). Holtec could further reduce effects on avian species from construction activities by following FWS's Nationwide Standard Conservation Measures and BLM's recommended disturbance-free dates and spatial buffers to protect raptors and songbirds (FWS, 2018; BLM, 2018a). The NRC staff concurs with the NMDGF and FWS recommendations. Should Holtec choose to follow these additional NMDGF and FWS-recommended power line mitigations, in addition to avoiding construction activities between March 1 and September 1, effects on all birds would be reduced (EIS Chapter 6).

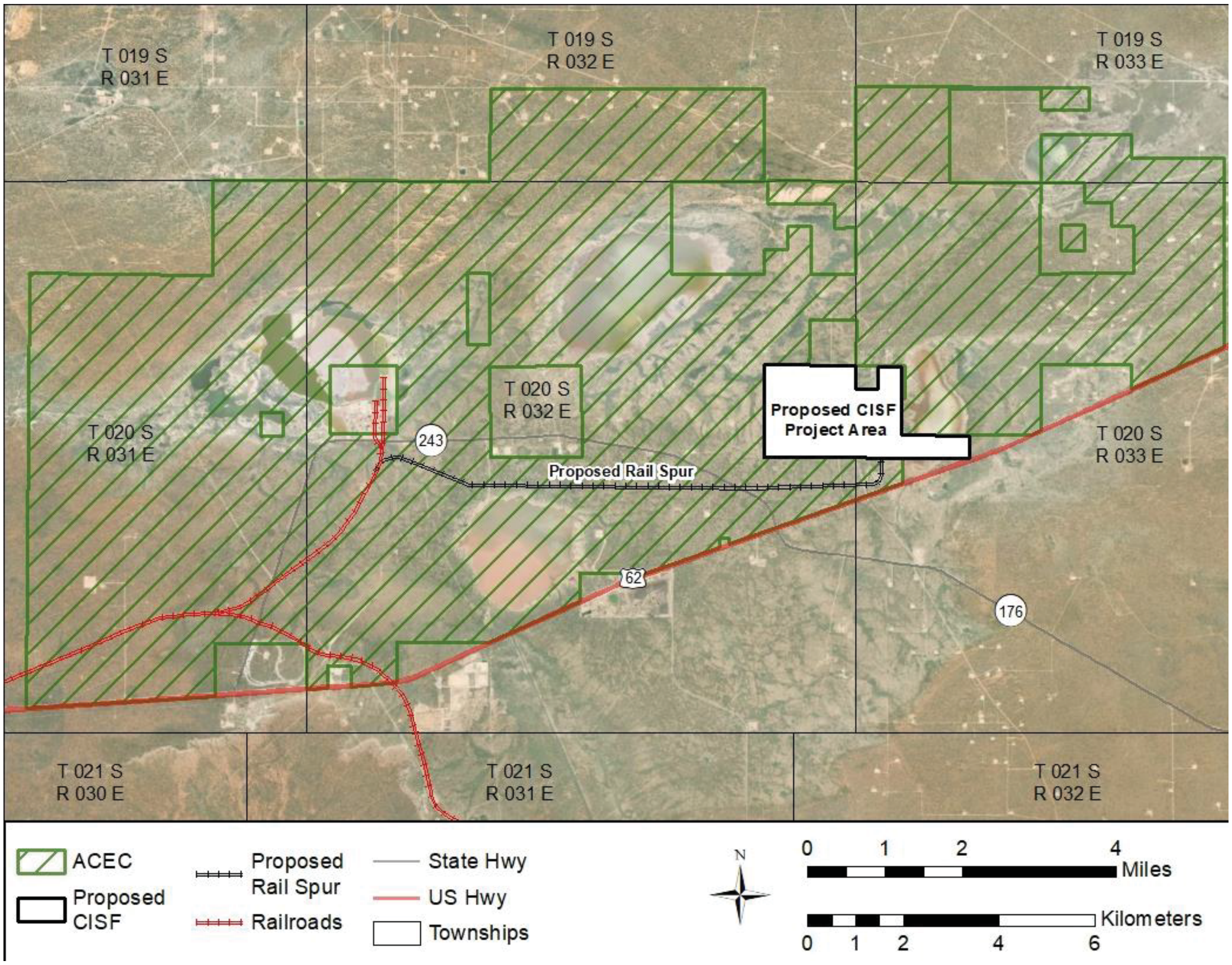

Figure 4.6-1 Proposed Salt Playas Area of Critical Environmental Concern. (Source: Modified from BLM, 2018a)

In response to additional NMDGF comments, the NRC recommends that during the construction stage, Holtec follow NMDGF's trenching guidelines to limit hazards to wildlife from open trenches and steep-sided pits (NMDGF, 2003). NMDGF guidelines recommend that project proponents (i) keep trenching and backfilling activities close together to limit the amount of open trenches at a given time, (ii) conduct trenching activities in cooler months (October to March), and (iii) install escape ramps at least every 90 m [295 ft] at less than a 45-degree slope (NMDGF, 2003). The NRC staff concurs with these NMDGF trenching guidelines and propose them as additional mitigation measures (EIS Chapter 6).

The NRC recommends that Holtec construct wildlife exclusion fencing around the areas under active construction to minimize impediments to game and avian movement that follow NMDGF-provided fence designs that NMDGF deems appropriate to use during the construction activities. NMDGF also recommends that exclusion fence designs be a minimum of 2.4 m [8 ft] high, constructed of chain link or woven or welded wire mesh, secured at the ground or preferably buried to prevent animals digging under, and should be wrapped around the base with a durable finer mesh material to deter small mammals and reptiles and amphibians. Livestock exclusion fences should be designed to minimize the potential for causing injury or death to large wildlife attempting to cross over or under (NMDGF, 2004). Should Holtec choose to follow these NMDGF fencing and trenching design recommendations (with which NRC concurs, per EIS Chapter 6), effects on all wildlife would be reduced.

As previously described in this section, Holtec has committed to mitigation measures, including using temporary sediment-control features during construction that would limit direct impacts, playa disturbances, and spills. EPA requires that Holtec follow provisions in a SWPPP as part of the NPDES permitting process that would address stormwater drainage impacts from erosion and sedimentation during construction activities.

Lastly, the NRC staff recommends that Holtec follow FWS recommendations to educate all employees, contractors, and/or site visitors of relevant rules and regulations that protect wildlife (FWS, 2018).

Ecological disturbances during construction of Phases 2-20 would affect approximately 4.5 ha [11 ac] per year, resulting in the removal of approximately 85.2 ha [210.6 ac] of vegetation, in addition to that of the proposed action (Phase 1) disturbances and vegetation removal. Each subsequent phase of construction would disturb less land compared to the amount of land disturbed during the proposed action (Phase 1). Construction activities from Phases 2-20 would include the excavation of approximately 135,517 m^3 [177,250 yd^3] of native fill material during each phase (Holtec, 2020a). The potential impacts to vegetation and wildlife during each individual subsequent construction phase (2-20) at the proposed CISF project would be similar to or less than those described earlier for the construction of the proposed action (Phase 1) because of fewer earthmoving activities and a lower number of vehicles and people accessing the CISF (supporting buildings and infrastructure would already be in place).

Similar to the proposed action (Phase 1), to mitigate impacts to vegetation disturbance during construction of subsequent phases, Holtec proposes to minimize the construction footprint, to the extent practicable, and use mitigation measures for soil stabilization and sediment control, such as stabilizing disturbed areas with native grass species, pavement, and crushed stone to control erosion; stabilizing disturbed areas with natural and low-water maintenance landscaping; and protecting undisturbed areas with silt fencing and straw bales, as appropriate. During construction of Phases 2-20, Holtec would continue to monitor for and repair leaks and spills of oil and hazardous material from operating equipment, minimize fugitive dust, and conduct most construction activities during daylight hours (Holtec, 2020a). For construction of each individual subsequent phase, because (i) a smaller amount of land would be disturbed during each subsequent construction stage, (ii) fewer vehicles and workers would access the proposed project area, and (iii) Holtec has committed to mitigation measures, the potential impacts on wildlife and vegetation would be similar or less than those during the construction of individual Phases 2-20 compared to the proposed project (Phase 1). However, the combined area of removed vegetation from the construction of full build-out (Phases 1-20) would be approximately 133.5 ha [330 ac] of contiguous land, or about 32 percent of the proposed project area, resulting in a noticeable impact on vegetation. Because construction would occur over a number of years, and there would be abundant habitat available around the proposed facility to support the gradual movement of wildlife, and because the CISF would have no effect on Federally listed threatened or endangered species, the NRC staff concludes that overall ecological impacts during the construction stage for the proposed action (Phase 1) and Phases 2-20 would be SMALL for wildlife and MODERATE for vegetative communities. The removal of 133.5 ha [330 ac] of vegetation within the regional Apacherian-Chihuahuan mesquite upland scrub ecological system would not be noticeable.

Should Holtec choose to continue to follow the NRC staff recommendations during construction of Phases 2-20 that were made for reducing ecological impacts during the proposed action (Phase 1) construction to (i) conduct a more thorough biological survey of the project area and consult with NMDGF to develop an ecological baseline survey plan to better assess the range of wildlife species that may occur within the proposed project area (e.g., provide the location of raptor nests located within the project area and a 1.6-km [1-mi] buffer around the proposed project area, and include live-trapping and capture of reptiles and amphibians), (ii) avoid construction activities between March 1 and September 1, (iii) establish a buffer zone of 200 m [656 ft] around Laguna Gatuna that would not be disturbed by project activities, (iv) follow NMDGF and FWS guidance when constructing new overhead power lines and retrofitting old power lines, (v) follow NMDGF fencing and trenching design guidelines, and (vi) educate employees and visitors on relevant rules and regulations that protect wildlife, effects on ecological resources would continue to be reduced and would remain SMALL for wildlife and MODERATE for vegetative communities.

4.6.1.1.1 Rail Spur

Currently, the land where the proposed rail spur would be located is used for cattle grazing and oil and gas production (EIS Section 3.2). The disturbance of 15.9 ha [39.4 ac] of land would be associated with constructing a rail spur (Holtec, 2020a). Construction of a rail spur for SNF transfer from main rail lines to the proposed CISF project would include similar or fewer potential impacts on ecological resources (e.g., vegetation removal, wildlife displacement and disturbances) that were previously discussed for the construction Phase 1. Potential impacts to vegetation and wildlife from construction activities of the rail spur would result from habitat loss from land clearing, noise and vibrations from heavy equipment and traffic, fugitive dust, creation of open trenches and steep-sided pits, increased soil erosion from surface-water runoff, sedimentation of playa lakes and gullies, and the presence of construction personnel. The proposed rail spur, access road, and rail maintenance would predominantly affect the Apacherian-Chihuahuan mesquite upland scrub ecological system, similar to construction of other proposed action (Phase 1) facilities and infrastructure.

No Federal- or State-listed plant species are known to be present along the rail spur (FWS, 2022; NMDGF, 2018a) (EIS Section 3.6.5). As discussed in EIS Section 4.6.1, the Northern aplomado falcon is listed as an experimental nonessential population, and according to FWS, this species has not been reported in southeastern New Mexico or the local area of the proposed CISF project area (FWS, 2014).

According to BLM, no dunes sagebrush lizard habitat is present along the rail spur (BLM, 2018a). The proposed rail spur is not located within the BLM's Lesser prairie-chicken timing restrictions area discussed in EIS Section 4.6.1.1 (BLM, 2018a). While the proposed rail spur area has a somewhat different proportion of vegetative communities than the proposed storage and operations area, the difference is minor, and the impacts on habitats from the construction of the rail spur would not significantly differ from the potential impacts on habitats from construction of the proposed CISF project. As during construction of the proposed CISF, the potential exists for the introduction and spread of noxious weeds and impacts from soil erosion and sedimentation in ditches along the proposed rail spur, especially during rain events while the rail spur is under construction.

In addition to displacing the animals that inhabit the land where the rail spur would be constructed, linear transportation routes contribute to habitat fragmentation by dividing larger landscapes into smaller patches and converting interior habitat into edge habitat and possibly isolating species within patches (NMDGF, 2005). For example, the reduction of big game use of habitats within 0.8 km [0.5 mi] from roads has been observed. The proposed rail spur would cross existing gravel roads. However, because the design of the proposed rail spur would not prevent wildlife from crossing from one side of the rail spur to the other, the likelihood of isolating wildlife on one side of the rail spur is low. Because the land within 3.2 km [2 mi] of the proposed rail spur is developed with several transportation corridors oil and gas companies use on a regular basis, the NRC staff determines that the potential impacts from the rail spur would not alter the use of habitats or isolate sensitive wildlife species.

Because the proposed rail spur is located on public land, Holtec would be required to comply with the requirements of a BLM permit, including BLM-required mitigation measures. In addition, the rail spur is located within the nominated Salt Playas ACEC previously described. The following proposed mitigations could be imposed for construction of the rail spur, should the BLM approve the Salt Playas ACEC in its final resource management plan EIS (BLM, 2018a). Mitigation measures could include noise level abatement during nesting season; sedimentation control to protect playas; establishing buffers to protect playas for surface-disturbing activities; avoiding Sheer's pincushion cactus (*Coryphantha robustispina* ssp*. scheeri*), if present; use leak detection for storage tanks; and long-term biological inventory and monitoring program.

In addition, BLM may require that raptor nest surveys be conducted, preferably during the same nesting season as construction activities. If nest surveys are not conducted in the same nesting season as construction activities, a pre-construction survey within 7 days of surface disturbance is recommended (BLM, 2019). Since the proposed rail spur will cross State Highway NM 243, a permit for a new railroad right-of-way crossing would be required from the NMDOT (Holtec, 2020a). NMDOT may require a biological report be conducted, and that a specific seed mixture be used for revegetation efforts along the rail spur (NMDOT, 2013; NMDOT, 2017). The NRC and BLM staffs assume that the same mitigation measures Holtec has committed to use for the proposed action (Phase 1) construction, such as soil stabilization and sediment control, use of native grass species to stabilize the ground surface, and use of pavement and stone to control erosion, will also be used for the rail spur area. The potential impacts from the construction of the rail spur are comparable or less than the impacts described for the construction impacts of the proposed action (Phase 1) (SMALL). Therefore, the NRC and BLM staffs conclude that the potential impacts to ecological resources from construction of the rail spur would be SMALL.

4.6.1.2 Operations Impacts

For the operations stage of the proposed action (Phase 1), fewer effects to vegetative communities would occur compared to the construction stage because the only planned land disturbance during the operations stage would be for movement of fences to support staggered construction of storage pads in later phases. Land available for ecological resources would be committed for use by the proposed CISF project for the license term (i.e., 40 years). No noxious weeds have been identified at the proposed storage and operations area; however, invasive plant species and noxious weeds may invade disturbed areas during the operations stage, but Holtec would control weeds with appropriate spraying techniques (Holtec, 2020a). Additionally, material spills from transportation vehicles, maintenance equipment, and gasoline and diesel storage tanks could also occur during the operations stage, which could kill or damage vegetation exposed to the spilled material; however, such spills are anticipated to be few, based on permit requirements and mitigation measures that would continue to be implemented. Thus, the potential impacts to vegetation during operation of the proposed action (Phase 1) for the proposed CISF project would be similar to or less than those described for the construction stage, with respect to earthmoving activities and traffic.

None of the wildlife species at the proposed CISF project discussed in EIS Section 3.6 have established migratory travel corridors, because they are not migratory in this part of their range. In addition, the installation of animal-friendly fencing around the proposed CISF project would minimize the potential for wildlife to access the storage and operations area. Because the operations stage does not require earthmoving activities or significant materials movement, there would be less noise and less traffic during the operations stage of the proposed action (Phase 1) when compared to the construction stage; therefore, the potential to disrupt wildlife populations would be reduced, along with a decrease in the probability of vehicular collisions (Holtec, 2020a). The area to be fenced for security purposes (the protected area) would account for 114.5 ha [283 ac] of the proposed CISF project at full build-out, which would prevent large wildlife such as antelope and cattle from accessing the proposed CISF project.

During the operation stage of the proposed action (Phase 1) and all subsequent phases, the SNF in loaded storage modules under normal operating conditions will emit gamma and neutron radiations to areas in and around the storage and operation area. Wildlife in and around the storage and operation area could be exposed to these types of radiation. Because radiation attenuates with distance, the level of exposure would depend on the proximity of wildlife to the storage modules. Birds and other small animals could find the proposed CISF project attractive during winter months because the proposed CISF project would be a source of heat. There are currently no Federal standards that directly limit radiation doses to wildlife, although related scientific research continues to develop the information base necessary to assess whether such standards are needed.

However, it is well understood that the biological effects of ionizing radiations depend on the intensity of the radiations (both magnitude and energy) and the accumulated dose received by the recipients. Considering available scientific information, the DOE has developed a technical standard that applies a graded approach for evaluating radiation doses to terrestrial biota (DOE, 2019). The DOE technical standard includes impact threshold levels for terrestrial wildlife exposed to continuous direct radiation that the NRC staff found applicable to the exposure conditions at the proposed CISF project. The DOE technical standard states that if the greatest dose rate in the field does not exceed 1 mGy/d [0.1 rad/d], the facility has demonstrated protection and no further action is required. DOE further states that if the greatest dose rate in the field exceeds 1 mGy/d [0.1 rad/d], it does not immediately imply non-compliance and indicates accounting for the possibility of non-continuous exposure and that the maximum dose rates should not exceed 100 mGy/d [10 rad/d] based on a prior International Atomic Energy Agency (IAEA) (1992) report. The IAEA report found that acute dose rates below this level {100 mGy/d [10 rad/d]} were unlikely to produce persistent and measurable deleterious changes in populations or communities of terrestrial plants or animals.

Based on the dose rate estimates documented in Holtec's shielding calculations (Holtec, 2020b), the highest human dose rate on the accessible surface of a loaded storage module was 0.172 mSv/hr [17.2 mrem/hr], or 4.13 mSv/d [0.413 rem/day] at the surface of the closure lid. The Holtec dose rate is a dose equivalent which is based on the product of absorbed dose and a quality factor that accounts for the effectiveness of different radiations in causing biological damage (ICRP, 2007). Considering this general relationship between dose equivalent and absorbed dose, the NRC staff conservatively estimated the absorbed dose (to compare with the DOE technical standard) by dividing the Holtec dose rate by the lowest quality factor of the applicable radiations (gamma radiation, which has a quality factor of 1), resulting in an absorbed dose of 4.13 mGy/d [0.413 rad/d]. Storage cask vents would be covered with appropriately-sized wire mesh to discourage wildlife use and habitation of these areas (Holtec, 2020a).

The NRC staff similarly estimated additional absorbed dose rates from Holtec's estimated human dose equivalent rates at the proposed controlled area boundary of the CISF at 400 m [1300 ft] from the proposed storage pads. During the operation stage of the proposed action (Phase 1), this dose rate was 0.0961 mSv/yr [9.61 mrem/yr] or 0.26 μSv/d [0.026 mrem/d] which resulted in an NRC staff estimated absorbed dose rate of 0.26 μGy/d [0.026 mrad/d]. At full build-out, this boundary dose rate would be 0.532 mSv/yr [0.0532 rem/yr] or 1.46 μSv/d [146 μrem/d], which resulted in an NRC staff estimated absorbed dose rate of 1.46 μGy/d [146 μrad/d].

In comparing the estimated absorbed dose rates at the proposed CISF with the DOE technical standard, the NRC staff concludes that during any phase of the proposed project, the dose rate at the surface of the closure lid for a loaded storage module of 4.13 mGy/d [0.413 rad/d] exceeds the DOE initial threshold for demonstrated protection of wildlife but is below the DOE threshold of 100 mGy/d [10 rad/d] for persistent deleterious changes in populations or communities. Therefore, some individual organism impacts are possible if there is sustained exposure to wildlife within close proximity to a storage module, but the NRC staff expect this level of sustained close proximity of wildlife to storage modules would be unlikely; therefore, such effects would be minor. Additionally, the comparison to the DOE thresholds indicates that population effects would not be expected. The comparison of dose rates at the facility boundary for the proposed action (Phase 1) and full build-out (Phases 1-20) are below both of the DOE thresholds; therefore, the NRC staff concludes that radiation levels at the controlled area fence and beyond during any phase of the proposed CISF project would be generally protective of wildlife.

Holtec would continue the mitigation measures implemented during construction discussed in EIS Section 4.6.1.1; these would limit potential effects on wildlife during the proposed action (Phase 1) operations stage. These mitigations include revegetating disturbed areas and soil stockpiles with native vegetation species, monitoring leaks and spills of oil and hazardous material from operating equipment, minimizing fugitive dust, and restricting the use of heavy trucks and earth-moving equipment during daylight hours (Holtec, 2020a). In addition to the mitigations that would be used during the construction stage, Holtec would place fencing around the protected area and stated that security lighting for all ground-level facilities and equipment would be down-shielded to keep light within the boundaries of the proposed CISF project during the operations stage, helping to minimize the potential for impacts on wildlife (Holtec, 2020a). Due to the absence of an aquatic environment and Holtec's commitment to implement stormwater management practices, the impacts to aquatic systems would be limited. In addition, Holtec stated that above-ground storage tanks would be constructed with secondary containment structures (e.g., concrete berms and floor sumps) to stop fluids from spilling on the ground immediately around the tank or fuel pump, or potentially impacting downstream environments. The operations stage would continue to alter noticeably, but not destabilize, the vegetative communities within the proposed project area. However, effective wildlife management practices, additional surveys of the proposed CISF project, would identify the potential for long-term nesting, and mitigation would prevent permanent nesting and lengthy stay times of wildlife that may potentially attempt to reside at the proposed CISF project. Thus, the impacts to wildlife from the proposed action (Phase 1) operations would be minor and would not noticeably change the population of any species.

The NRC staff recommends, as an additional mitigation measure, that Holtec develop a wildlife inspection plan to identify animals that may be present at the proposed CISF project and take action to remove animals found within the proposed action (Phase 1) storage and operations area, if present. To prevent permanent nesting and lengthy stay times of wildlife that may potentially attempt to reside at the proposed CISF project, the NRC staff recommends that Holtec consult with BLM and NMDGF to determine appropriate mitigation measures to discourage wildlife use and habitation of the proposed project area for the proposed action (Phase 1), particularly near cask vents. If these additional mitigation measures are implemented, the impacts to wildlife from the proposed action (Phase 1) operations would continue to be minor and would not noticeably change the population of any species.

As for Phase 1, the operations stage of Phases 2-20 would not create additional vegetation or wildlife disturbances beyond those impacts experienced to vegetation and wildlife during construction of Phases 2-20. Although construction impacts of subsequent phases would occur concurrently with operation impacts of prior phases, operation impacts are not anticipated to significantly increase those experienced from construction. Once construction activities for all phases are complete, ecological impacts because of noise, vehicles, structures, and the presence of humans would be significantly reduced because limited or no earthmoving activities would occur. During the operations stage of Phases 2-20, as described in the preceding analysis, some individual organism impacts are possible from exposure to direct radiation if there is sustained exposure to wildlife within close proximity to storage modules, but this would not be expected to affect populations. The radiation levels at the controlled area fence and beyond during Phases 2-20 of the proposed CISF project would be generally protective of wildlife. Similar to the proposed action (Phase 1) operations stage, to mitigate impacts to vegetation and wildlife during operations, Holtec proposes to revegetate disturbed areas, control invasive plant species and noxious weeds, fence the protected area to prevent large animals such as antelope and cattle from accessing the proposed CISF project, use down-shielded lighting, cover cask vents with wire mesh, and implement stormwater management practices (Holtec, 2020a). Continued monitoring of leaks and spills of oil and hazardous material from operating equipment would reduce the potential impact to terrestrial species and stormwater receptors. Fencing the CISF would further limit large wildlife access to cask storage pads. Because no additional land would be disturbed during the operations stage of Phases 2-20 at the proposed CISF project, and because of Holtec's commitment to mitigation measures, the potential impacts on ecology would be SMALL to MODERATE during the operations stage of individual Phases 2-20.

The NRC staff anticipates that there would be essentially no detectible difference to impacts on ecology from the combined operations of the proposed action (Phase 1) and Phases 2-20; therefore, the NRC staff concludes that overall ecological impacts during operation of the fully built proposed CISF would be SMALL to MODERATE.

Defueling

Defueling the CISF would involve removal of SNF from the CISF. Activities would be similar in scale and nature to those earlier in the operations stage to emplace the fuel. Potential ecological impacts could include habitat fragmentation from presence of the rail spur; the potential for the establishment of invasive weeds along the disturbed edges of the rail spur; noise, lights, and vibrations of the trains that could disturb wildlife; and direct animal mortalities. However, removing the SNF would reduce the potential for wildlife to be exposed to radiation doses. Therefore, the NRC staff concludes that defueling would have SMALL to MODERATE impacts on ecological resources.

4.6.1.2.1 Rail Spur

For the rail spur, as with the construction stage, the primary impact to ecological resources would be from habitat fragmentation, the potential for the establishment of invasive weeds along the disturbed edges of the rail spur, and from the noise and vibrations of the trains. Lights on the trains at night could also disturb wildlife along the rail spur, and direct animal mortalities could also occur. Because of the design and construction of the SNF storage and transportation canisters, potential radiological exposure to wildlife is highly unlikely. The SNF canisters do not contain any material in liquid form, and the SNF transportation and storage canisters are sealed to prevent any liquids from contacting the SNF assemblies (Holtec, 2020a). Therefore, there is no potential for material releases, such as a leaking canister, to contaminate soil or vegetation along the rail spur.

Land within 3.2 km [2 mi] of the proposed rail spur has already been developed with several transportation corridors oil and gas companies use on a regular basis; therefore, the NRC staff anticipates that the potential impacts from operation of the rail spur would not alter the use of habitats near the rail spur or isolate sensitive wildlife species in the area. Holtec would be required to comply with the ESA, the MBTA, the BGEPA, the NPDES, and would follow mitigation measures BLM requires to limit potential effects on wildlife described for construction of the rail spur in EIS Section 4.6.1.1. To further limit the potential impacts on wildlife from the presence of the rail spur, the NRC staff recommends that Holtec (i) periodically inspect the rail spur, roads, and rights-of-way for invasion of noxious weeds; (ii) train maintenance staff to recognize weeds, and report locations to the local weed specialist; and (iii) maintain an inventory of weed infestations and schedule them for treatment on a regular basis. Therefore, the NRC and BLM staff conclude that the potential impacts from operation of the rail spur to ecological resources would be SMALL.

4.6.1.3 Decommissioning and Reclamation Impacts

At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. During the decommissioning stage of the proposed action (Phase 1) and all subsequent phases, wildlife in and around the storage and operation area could be exposed to radiation at levels less than during the operations stage when SNF is emplaced at the proposed CISF. Decommissioning activities for the proposed action (Phase 1) and for Phases 2-20 would involve the same activities, but the activities would be scaled to address the overall size of the CISF (i.e., the number of phases completed).

Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area (Holtec, 2020a). Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; erosional control; and restoring and reclaiming disturbed areas. EIS Sections 2.2.1.4 and 2.2.1.7 describe the decommissioning and reclamation activities.

Replanting the disturbed areas with native species after completion of the decommissioning and reclamation activities would restore the site to a condition similar to the preconstruction condition. Impacts on vegetation during decommissioning and reclamation of the proposed CISF project would include removal of existing vegetation from the area required for equipment laydown and disassembly. However, the area disturbed would be bounded by the construction stage activities. While vegetation becomes established, potential impacts to surface-water runoff receptors, including Laguna Gatuna and Laguna Plata, could occur by channel siltation and silt deposition and could potentially impact the wildlife located in those areas. As is the case during operations, the playas are not expected to support permanent aquatic communities, because they do not permanently hold sufficiently deep water and maintain the quality of water to support aquatic species. Thus, there would not be aquatic communities present to impact during decommissioning.

Holtec would return the landscape to its natural gradient and would reduce the ecological impact by removing buildings and associated infrastructure (Holtec, 2020a). Holtec would use the same mitigation measures during dismantling activities as those used during construction, described in EIS Section 4.6.1.1.1, to limit impacts on ecological resources. These include soil stabilization and sediment control, use of native grass species to stabilize the ground surface, and use of pavement and crushed stone to control erosion, compliance with a SWPPP, minimizing fugitive dust, and restricting the use of heavy trucks and earth-moving equipment during daylight hours (Holtec, 2020a). Holtec would also have a continued legal obligation to comply with the ESA, the MBTA, and the BGEPA, as well as mitigation measures BLM and NMDOT require to limit potential effects on wildlife. For these reasons, the NRC staff concludes that the impact on ecological resources from decommissioning (Phase 1) would be MODERATE until vegetation is reestablished in reseeded areas and then would be SMALL thereafter.

Reclamation of the proposed facility for Phases 2-20 would include activities necessary to return the CISF to its previous land use. These activities would be similar to those activities under]taken for constructing the proposed CISF project for individual Phases 2-20, and dismantling buildings would have potential ecological impacts similar in scale to the construction stage for the proposed action (Phase 1) (e.g., vegetation removal, wildlife displacement, and disturbances). The amount of disturbed land that would require revegetation from dismantling all of Phases 2-20 would be larger compared to the amount of disturbed land that required revegetation from the construction stage of Phase 1, and there would be potential impacts to surface-water runoff receptors until vegetation is established in reseeded areas. The NRC staff anticipates that the same mitigation measures described for the dismantling of the proposed action (Phase 1) previously discussed would be used during dismantling for Phases 2-20. For these reasons, the NRC staff concludes that impacts on ecological resources from decommissioning for the proposed CISF project for Phases 2-20 would be MODERATE until vegetation is reestablished in reseeded areas. The establishment of mature, native plant communities may require decades. The NRC staff concludes that the impact on ecological resources from decommissioning Phases 2-20 would be MODERATE until vegetation is reestablished in reseeded areas and then would be SMALL thereafter.

4.6.1.3.1 Rail Spur

At the end of decommissioning, all lands associated with the rail spur would be returned to their preoperational land use, unless the landowner (BLM) approves an alternative use, and wildlife would be able to use the land. Dismantling the rail spur would have impacts on ecology similar in nature and scale to those impacts experienced during construction of the rail spur (e.g., vegetation removal, wildlife displacement and disturbances). The establishment of mature, native plant communities may require decades. However, due to the relatively small disturbed area of the rail spur and because Holtec commits to reseed all disturbed areas, the NRC and BLM staff conclude that ecological impacts on the rail spur area from decommissioning would be SMALL.

If the rail spur is not decommissioned, the rail spur would continue to be a source of habitat fragmentation and present the potential for establishment of invasive weeds along the disturbed edges of the rail spur. However, with no SNF shipments along the rail spur, there would no longer be disturbance to wildlife from these shipments or direct animal mortalities, and impacts on ecological resources would be reduced. Therefore, the NRC and BLM staff conclude that ecological impacts on the rail spur area would be SMALL if the rail spur were not removed.

4.6.2 No-Action Alternative

Under the No-Action alternative, the NRC would not license the proposed CISF project, and the land would continue to be available for other uses. Therefore, impacts such as habitat loss from land clearing, noise and vibrations from heavy equipment and traffic, fugitive dust, creation of open trenches and steep-sided pits, increased soil erosion from surface-water runoff, sedimentation of playa lakes and gullies, and the presence of personnel would not occur. Construction impacts would be avoided because SNF storage modules, buildings, and transportation infrastructure would not be built. Operational impacts would also be avoided because no SNF canisters would arrive for storage. Impacts to ecological resources from decommissioning activities would not occur because there would be no facility to decommission. The proposed project areas would continue to support wildlife and habitats that occur on and near the proposed project area. In the absence of a CISF, the NRC staff assumes that SNF would remain on-site in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue, as detailed in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available.

4.7 Air Quality

This section considers the potential impacts to air quality from nonradiological emissions, including non-greenhouse gases, greenhouse gases, and climate change, for the proposed action (Phase 1), Phases 2-20, and the No-Action alternative. EIS Section 4.13 (Public and Occupational Health) addresses potential impacts from radiological airborne emissions.

4.7.1 Non-Greenhouse Gas Impacts

Impacts from non-greenhouse gases to air quality from the proposed CISF project activities may result primarily from combustion emissions from mobile sources as well as fugitive dust.

4.7.1.1 Impacts from the Proposed CISF

The following sections assess the potential environmental impacts on air quality from construction, operation, and decommissioning of the proposed project. This section also addresses the environmental impacts from the peak year of activity, which accounts for when stages (i.e., construction, operation, and decommissioning) of various phases occur simultaneously or overlap. Peak-year emissions represent the highest emission levels associated with the proposed CISF project in any one year and therefore also represent the greatest potential impact to air quality.

The NRC staff characterizes the magnitude of air effluents from the proposed CISF project, in part, by comparing the emission levels to the State of New Mexico screening thresholds for determining whether an air permit is needed (i.e., thresholds for a "no permit required" status). These thresholds are 4.53 kilograms per hour [10 pounds per hour] (20 New Mexico Administrative Code Chapter 2 Part 72) and 9.07 metric tons per year [10 short tons per year] (20 New Mexico Administrative Code Chapter 2, Part 73) for any of the New Mexico or National Ambient Air Standards pollutants and are specific to stationary sources. The NRC's analysis will (i) provide context for understanding the magnitude of the proposed CISF project air effluents, which are predominantly from mobile and fugitive dust rather than stationary sources; and (ii) identify what emissions the analysis in this EIS will focus on for evaluating potential environmental effects. The comparison of pollutant concentrations to thresholds in this EIS is for the NRC's impact evaluation only and does not document or represent a formal determination for air permitting or regulatory compliance.

4.7.1.1.1 Peak-Year Impacts

The peak-year emissions represent the highest emission levels associated with the proposed action (Phase 1) for each individual pollutant in any one year and therefore also represent the greatest potential impact to air quality. Specifically, peak-year emissions account for any overlap in stages (i.e., construction, operation, and decommissioning). For the proposed action (Phase 1) no stages overlap. This means the peak year for each pollutant occurs during the stage with the highest emission levels in tons per year for that pollutant. Details describing the emissions associated with each individual stage for the proposed action (Phase 1) are provided in the following subsections. For the proposed action (Phase 1), the construction and decommissioning stages generate the same emission levels (EIS Table 2.2-1). The proposed action (Phase 1) operations stage generates the peak-year emission levels for carbon dioxide, carbon monoxide, and hazardous air pollutants. For the proposed action (Phase 1), the individual construction and decommissioning stages generate the peak-year emission levels for nitrogen dioxide, particulate matter $PM_{2.5}$, particulate matter PM_{10}, sulfur dioxide, and volatile organic compounds.

Key factors in assessing impacts to air quality include the following: the existing air quality, the proposed action (Phase 1) peak-year emissions levels, and the proximity of the emission sources to the receptors. As described in EIS Section 3.7.2.1, the proposed facility would be located in a region characterized with good air quality. EIS Table 2.2-1 contains the estimated peak-year emission levels for Phase 1. Holtec stated that these emission estimates did not include any mitigation measures (Holtec, 2019b). The proposed action (Phase 1) peak-year emission levels for all of the pollutants are below the New Mexico "no permit required thresholds," except for particulate matter PM_{10}, which is about 1.7 times this threshold. The NRC staff concludes that pollutants with emission levels below this New Mexico "no permit required threshold" would be minor. Determination of the project-level PM_{10} impacts requires additional consideration by the last key factor: proximity between the emission sources and receptors. EIS Figure 3.7-2 shows the locations of nearby receptors to the proposed CISF project area. The nearest resident to the proposed CISF project area is located about 2.4 km [1.5 mi] to the north. U.S. Highway 62 would be located closer to the proposed CISF project area than the nearest resident. U.S. Highway 62 would be adjacent to the southeast corner of the proposed CISF project area; however, the key factor is the distance between an emission source and the receptor. This highway would be about 0.7 km [0.43 mi] from the proposed concrete batch plant which would be nearest air emission source within the proposed CISF project area (EIS Figure 2.2-2). In addition, heavier particles (i.e., the particulate matter PM_{10}) from the type of fugitive emissions the proposed action generated tend to settle out of the air quickly as the dust plume disperses from the source (Countess, 2001). The distance between the proposed CISF emission sources and these receptors, along with the nature of the PM_{10}, reduces the potential for impacts because pollutants disperse as distance from the source increases, and in the case of particulate matter PM_{10}, settle out of the air quickly. Therefore, the NRC staff concludes that the potential impacts to air quality from peak-year emission levels would be minor.

As described in EIS Section 3.7.2.1, the closest Class I area to the proposed project area is Carlsbad Caverns National Park, located about 75.0 km [46.6 mi] to the southwest. Federal land managers responsible for managing Class I areas developed guidance that recommends a screening test be applied to proposed sources greater than 50 km [31 mi] from a Class I area to determine whether analysis for air quality-related values (e.g., visibility and atmospheric deposition) is warranted (National Park Service, 2010). The screening test considers the project's distance to the Class I area and the project's emission levels. If the combined annual mass emission rate (i.e., tons per year) for nitrogen oxides, particulate matter PM_{10}, sulfur dioxide, and sulfuric acid divided by the distance in kilometers from the Class I area is 10 or less, then this source is considered to have negligible impacts with respect to air quality-related values, and further analysis is not warranted. Based on the proposed action (Phase 1) peak-year emission estimates in EIS Table 2.2-1, the screening test result is 0.3, which is well below the threshold of 10. Based on the screening test results, the estimated proposed action (Phase 1) peak-year emissions for the proposed CISF project would have negligible impacts on air quality-related values for Carlsbad Caverns National Park.

In summary, the proposed action (Phase 1) generates low levels of air emission criteria pollutants within an attainment area (40 CFR 81.332) with good existing air quality. In addition, the distance between the proposed CISF project area and the receptors reduces the potential for impacts because pollutants disperse with distance from the source or in the case of heavier fugitive dust (i.e., particulate matter PM_{10}), settle out of the air quickly. Therefore, the NRC staff concludes that the potential impacts to air quality from the peak-year emission levels for the proposed action (Phase 1) would be SMALL.

EIS Table 2.2-2 contains the Phases 2–20 estimated emission levels for the various project stages and the peak year. The peak-year emissions for Phases 2–20 account for when any stages (regardless of phase) overlap. None of the subsequent expansion phase construction stages overlap with the construction stage from other phases. Operations overlap with the construction stages of individual phases; however, the operations stage emissions are independent of the number of operating phases (Holtec, 2020a). For Phases 2-20, the overlapping construction and operation stages generate the peak-year emission levels for carbon dioxide, carbon monoxide, and hazardous air pollutants, and the decommissioning stage generates the peak-year emission levels for the other pollutants identified in EIS Table 2.2-2. The description of the key factors (existing air quality, project-level emissions, and proximity of emission sources to receptors) for Phases 2-20 peak-year impact assessment are comparable to the description of the key factors for the proposed action (Phase 1) peak-year impact assessment (SMALL); therefore, the impacts would also be the same. The NRC staff concludes that the potential impacts to air quality from the peak-year emission levels for Phases 2-20 (full build-out) would be SMALL.

The description of the key factors for Phases 1-20 peak-year impact assessment are the same as the description of the key factors for the Phases 2-20 peak-year impact assessment; therefore, the impacts would also be the same. The NRC staff concludes that the potential impacts to air quality from the peak-year emission levels for Phases 1-20 (full build-out) would be SMALL.

4.7.1.1.2 Construction Impacts

The proposed action (Phase 1) construction consists of building the storage modules and pad for 500 SNF canisters. In addition, the proposed action (Phase 1) construction includes building all of the infrastructure needed to support the proposed CISF, including a site access road, cask transfer building, security building, administration building, and parking lot. These activities primarily generate combustion emissions from mobile sources as well as fugitive dust from clearing and grading of the land, and vehicle movement over unpaved roads. The description of the key factors for the proposed action (Phase 1) construction stage are either the same as or bounded by the description of the key factors for the Phase 1 peak-year impact assessment (i.e., SMALL). Therefore, the NRC staff concludes that the potential impacts to air quality for the proposed action (Phase 1) construction would be SMALL.

Construction of Phases 2-20 consists of building the storage modules and concrete pad for each subsequent phase. Construction stage emission levels for Phases 2-20 are 15 percent of the proposed action (Phase 1) construction stage emission levels because emissions for Phases 2-20 do not include the emissions associated with building all of the infrastructure needed to support the proposed CISF project. The description of the key factors for Phases 2-20 construction stage are either the same as or bounded by the description of the key factors for the Phases 2-20 peak-year impact assessment (SMALL). Therefore, the NRC staff concludes that the potential impacts to air quality during Phases 2-20 construction would be SMALL.

For full build-out (i.e., Phases 1-20) construction, the key factors are the same as for the Phases 2-20; therefore, the NRC staff concludes that the potential impacts to air quality during Phases 1-20 would be SMALL.

4.7.1.1.2.1 Rail Spur

Construction of the rail spur would generate fugitive dust from disturbing the land and combustion emissions from equipment used to build the rail spur. For the rail spur, proximity of emission sources to receptors as well as the emission levels are different than those for the peak year proposed action (Phase 1) impact assessment.

Construction of the rail spur is included as part of the proposed action (Phase 1) construction stage. The rail spur is located closer to receptors than the proposed action (Phase 1) emission sources (i.e., the proposed CISF project facilities and SNF storage area). As depicted in EIS Figure 3.7-2, the nearest residence to the proposed rail spur would be located about 2.92 km [1.81 mi] to the south; however, another facility would be located closer to the proposed rail spur than the nearest residence. The Intrepid Potash North offices would be located about 0.7 km [0.43 mi] from the western end of the proposed rail spur and would be the nearest facility that NRC staff consider would be regularly occupied. U.S. Highway 62 would pass within about 0.18 km [0.11 mi] from the eastern end of the proposed rail spur, and New Mexico State Highway 243 actually crossed the proposed rail spur near the southwest corner of the proposed CISF project. EIS Table 2.2-1 contains the estimated emission levels for the proposed action (Phase 1) construction. Rail spur construction emissions composes only a portion of the total proposed action (Phase 1) construction emissions. The NRC and BLM staffs anticipate the rail spur construction emission levels to be below the thresholds identified in EIS Section 4.7.1.1. The NRC and BLM staffs conclude that the potential impacts to air quality during the rail spur construction would be SMALL because the of the low emission levels.

4.7.1.1.3 Operations Impacts

For the proposed action (Phase 1) operations stage, the primary activity is receiving and loading SNF into modules. Combustion emissions from equipment used to conduct this activity are the main contributors to air quality impacts. The description of the key factors for the Phase 1 operations stage are either the same as or bounded by the description of the key factors for the Phase 1 peak-year impact assessment (SMALL). Therefore, the NRC staff concludes that the potential impacts to air quality for the proposed action (Phase 1) operations stage would be SMALL.

Similar to the proposed action (Phase 1), the Phases 2-20 operations stage primarily consists of receiving SNF at the proposed CISF project and loading it into modules for each subsequent phase. Combustion emissions from equipment used to conduct this activity are the main contributors to air quality impacts. The description of the key factors for Phases 2-20 operations stage are either the same as or bounded by the description of the key factors for the Phases 2-20 peak-year impact assessment (SMALL). Therefore, the NRC staff concludes that the potential impacts to air quality during Phases 2-20 operation would be SMALL.

For the full build-out (i.e., Phases 1-20) operations stage, the key factors are the same as for Phases 2-20; therefore, the NRC staff concludes that the potential impacts to air quality during Phases 1-20 would be SMALL.

Defueling

Defueling the CISF would involve removal of SNF from the proposed CISF. Defueling activities would generate levels of combustion emissions on a scale similar to emplacement of the SNF earlier in the operations stage. In addition, the description of existing air quality, proximity of the emission sources to the receptors, and mitigation for emplacement of the SNF earlier in the operations stage also applies to defueling. Therefore, the NRC staff concludes that the potential impacts to air quality during defueling would be SMALL.

4.7.1.1.3.1 Rail Spur

The operations stage for the rail spur primarily consists of transferring SNF from the main rail line to the proposed CISF project. Combustion emissions from SNF transportation along the rail spur are the main contributors to air quality impacts. The rail spur is located closer to receptors than the proposed action (Phase 1) emission sources (i.e., the proposed CISF project facilities and SNF storage area). As depicted in Figure 3.7-2, the rail spur crosses State Highway 243. However, the nature of the air emissions associated with SNF transport along the rail spur is important when analyzing potential impacts. Transportation of SNF on the rail spur occurs intermittently over the 8.9 km [5.5 mi] length of the rail spur rather than continuously generating emissions from a specific stationary location, such as operation of the CISF. Because of the intermittent and widespread nature of these emissions, the NRC and BLM staffs conclude that the potential impacts to air quality during rail spur operations would be SMALL.

4.7.1.1.4 Decommissioning and Reclamation Impacts

At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. Decommissioning activities for the proposed action (Phase 1) and for Phases 2-20 would involve the same activities but the activities would be scaled to address the overall size of the CISF (i.e., the number of phases completed).

Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area (Holtec, 2020a). Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; erosional control; and restoring and reclaiming disturbed areas. EIS Sections 2.2.1.4 and 2.2.1.7 describe the decommissioning and reclamation activities.

The NRC staff anticipates that if decommissioning activities generate any air emissions (e.g., combustion emissions from mobile sources associated with transporting people for conducting surveying), the levels would be much less than those Phases 2-20 construction stages generate. The description of the other key factors (air quality and proximity of emission sources to receptors) for decommissioning the proposed (Phase 1), Phases 2-20, and Phases 1-20 are the same as the description of the key factors for the Phases 2-20 construction impact assessment (i.e., SMALL); therefore, the impacts would also be the same. Similarly, the description of the key factors for reclamation for the proposed action (Phase 1), Phases 2-20, and full build-out (Phases 1-20) are comparable to the description of the key factors for the proposed action (Phase 1) construction impact assessment (i.e., SMALL); therefore, the impacts would also be the same. Therefore, the NRC staff concludes that the potential impacts to air quality from the decommissioning and reclamation stage for the proposed action (Phase 1), Phases 2-20, and Phases 1-20 would be SMALL.

4.7.1.1.4.1 Rail Spur

At the end of the license term, the proposed CISF project would be decommissioned such that the rail spur area could be released and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating (if necessary) (EIS Section 2.2.1.4). The NRC and BLM staff anticipate that if decommissioning activities generate any air emissions (e.g., combustion emissions from mobile sources associated with transporting people for conducting surveying), the levels would be much less than those generated by Phases 2-20 construction. The description of the other key factors (air quality and proximity of emission sources to receptors) for decommissioning the rail spur for Phase 1, Phases 2-20, and Phases 1-20 are the same as the description of the key factors for the Phases 2-20 construction impact assessment (SMALL); therefore, the impacts would also be the same. The NRC and BLM staffs conclude that the potential impacts to air quality from decommissioning the rail spur for the proposed action (Phase 1), Phases 2-20, and Phases 1-20 would be SMALL.

Reclamation activities would include the dismantling of the rail spur (EIS Section 2.2.1.4). The description of the key factors for reclamation of the rail spur area for Phase 1, Phases 2-20, and Phases 1-20 are the same as the description of the key factors for the construction of the rail spur (SMALL); therefore, the impacts would also be the same. The NRC and BLM staffs conclude that the potential impacts to air quality from reclamation of the rail spur for Phase 1, Phases 2-20, and Phases 1-20 would be SMALL.

4.7.1.2 No-Action Alternative

Under the No-Action alternative, the NRC would not license the proposed CISF project. Therefore, impacts on existing air quality would not occur because the generation of emissions from activities and sources associated with the proposed CISF project would not occur. Construction impacts would be avoided because SNF storage pads, buildings, and transportation infrastructure would not be built. Operational impacts would also be avoided because no SNF canisters would arrive for storage. Decommissioning impacts would be avoided because there are no facilities to dismantle or SNF to relocate to a permanent repository. Under the No-Action alternative, impacts to air quality at the proposed CISF site would be attributed to existing sources but would not include the proposed CISF project. In the absence of a CISF, the NRC staff assumes that SNF would remain onsite in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue, as detailed in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available.

4.7.2 Greenhouse Gas and Climate Change Impacts

4.7.2.1 Impacts from the Proposed CISF

Climate change effects are considered the result of overall greenhouse gas emissions from numerous sources rather than an individual source. In addition, there is not a strong cause-and-effect relationship between where the greenhouse gases are emitted and where the impacts occur. Because of these two factors, the NRC staff addressed the contribution of greenhouse gases from the proposed CISF project to the overall atmospheric greenhouse gas levels and the relevant climate change effects in EIS Section 5.7.2 on air quality cumulative effects rather than in this section, which addresses the air quality effects specifically attributed to the proposed CISF project.

4.7.2.2 No-Action Alternative

Under the No-Action alternative, the NRC would not license the proposed CISF project, and the CISF would not be constructed, operated, or decommissioned. Therefore, there would be no contribution from the proposed CISF project to the overall greenhouse gas levels and no need to assess the impacts of climate change to or in conjunction with the proposed CISF project. In the absence of a CISF, the NRC staff assumes that SNF would remain onsite in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue as detailed in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available.

4.8 Noise Impacts

This section considers the potential noise impacts from the construction, operation, and decommissioning of the proposed action (Phase 1), Phases 2-20, and the No-Action alternative.

4.8.1 Impacts from the Proposed CISF

Noise impacts would result from earthmoving activities and the associated machinery, as well as from additional traffic associated with the construction, operation, and decommissioning stages of the proposed CISF project and access roads.

4.8.1.1 Construction Impacts

Construction activities at the proposed CISF project would require the use of heavy equipment, such as excavators, front loaders, bulldozers, dump trucks, and materials-handling equipment (e.g., cement mixers and cranes). These activities can generate noise levels up to 95 decibels (dBA) and that typically range from 80–95 dBA at distances of approximately 15 m [50ft] from the source. Noise levels decrease by about 6 dBA for each doubling of distance from the source, although further reduction occurs when the sound energy has traveled far enough to have been appreciably reduced by absorption into the atmosphere (NRC, 2001). Most of the construction activities would occur during weekday daylight hours; however, construction could occur during nights and weekends, if necessary. Large trucks would produce noise levels around 85 dBA at approximately 15 m [50 ft] (Holtec, 2020a).

For the proposed action (Phase 1), the proposed CISF project would be built approximately 411 m [1,350 ft] from either U.S. Highway 62/180 or State Highway NM 243. As a result, the highest noise level predicted at either road during construction would be expected to be within the range of 44 dBA to 59 dBA. Additional noise would be created while constructing the associated building structures and is anticipated to decrease as buildings are nearing completion. Sound levels would be expected to dissipate to near-background levels by the time the sound reaches the proposed project area boundaries (Holtec, 2020a).

For the proposed action (Phase 1), some increased traffic associated with construction activities (EIS Section 4.3) could increase noise levels. While the proposed project area is undeveloped, the land is currently used for mineral extraction and grazing, and associated transportation activities are already occurring, particularly associated with oil and gas development. Additionally, there are no sensitive noise receptors located within the proposed project area (Holtec, 2020a), and the nearest resident is located approximately 2.4 km [1.5 mi] away. Due to the dissipation of sound with increasing distance, the current vehicular traffic rates, and the fact that construction activities would occur predominantly during the day, the NRC staff concludes that noise impacts from the proposed action (Phase 1) construction stage would be SMALL.

For Phases 2-20, there would be concurrent construction and operation stages. Construction noise for subsequent phases would not exceed the proposed action (Phase 1) construction noise because these phases would not include the construction of facility buildings and the access road. Therefore, the NRC staff concludes that noise impacts from Phases 2-20 would be less than the initial construction stage noise and would be SMALL.

4.8.1.1.1 Rail Spur

Construction for the rail spur option would disturb approximately 15.9 ha [39.4 ac] of BLM-owned land (Holtec, 2020a). Noise impacts associated with the construction of the rail spur and associated infrastructure would include similar construction activities as those described for the CISF pads and infrastructure, but on a smaller scale. Therefore, the NRC and BLM staff conclude that overall noise impacts during the construction stage of the rail spur would be SMALL.

4.8.1.2 Operations Impacts

For both the proposed action (Phase 1) and Phases 2-20, noise from the operation of the proposed CISF project would primarily be generated from the delivery of casks (train or truck); operation of cranes and other loading equipment; and site vehicles (e.g., commuter vehicles or supply transfers). In addition, noise point sources would include rooftop fans, air conditioners, and transformers, and other sources associated with the site infrastructure. Once each phase is complete and a pad is fully loaded, operation noise at the storage pad would be very limited because the pad is a passive system. The ambient background noise sources in the area would include vehicle traffic along U.S. Highway 62/180 and New Mexico State Highway 243, and low-flying aircraft from the Hobbs Regional Airport (Holtec, 2020a). As discussed in EIS Section 4.8.1.1, construction of Phases 2-20 would occur concurrently with operation of earlier phases (starting with Phase 1), but because the noise associated with operation is expected to be very limited, and construction of individual Phases 2-20 is less than that of Phase 1, the noise associated with full build-out of the proposed CISF is bounded by noise levels of the proposed action (Phase 1). Further, the noise impacts associated with the operations stage for all subsequent phases are anticipated to be less than those from the construction stage of the proposed action (Phase 1). Therefore, the NRC staff concludes that the noise impacts from operation of Phase 1, Phases 2-20, and at full build-out would be SMALL.

Defueling

Defueling the CISF under either the rail spur or heavy haul truck option would involve removal of SNF from the proposed CISF. With regard to noise levels, defueling would be similar to the loading of SNF canisters onsite under operations. Activities would include noise from machinery and transport trucks or rail cars. Because noise sources and levels would be similar to those of emplacement of the SNF earlier in the operations stage, the NRC staff concludes that noise impacts from defueling the proposed CISF project would be SMALL.

4.8.1.2.1 Rail Spur

During the operations stage of all phases of the CISF, use of the rail spur would generate noise from trains operating on the spur. For brief periods of train acceleration during movement of a cask, outdoor sound levels at distances of up to about 1.6 km [1 mi] might occasionally exceed the 55-dBA level the EPA recommended. Additionally, the train whistle from the onsite rail switch would be audible. However, due to the dissipation of sound with increasing distance, it is not expected that the outdoor noise would be typically noticeable at the nearest residence. These noise levels are not anticipated to exceed those generated during the construction stage of the rail spur and would be anticipated to be less than those experienced during the construction stage of the proposed CISF project. In addition, train traffic associated with the rail spur would be expected to operate only during the day and for a few hours per week (EIS Section 4.3). Therefore, due to the similarity with noise impacts with the proposed project and Holtec’s commitment to operate only during daylight hours, the NRC and BLM staffs conclude that overall noise impacts during the operations stage for the rail spur would be SMALL.

4.8.1.3 Decommissioning and Reclamation Impacts

At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. Decommissioning activities for the proposed action (Phase 1) and for Phases 2-20 would involve the same activities, but the activities would be scaled to address the overall size of the CISF (i.e., the number of phases completed).

Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area (Holtec, 2020a). Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; erosional control; and restoring and reclaiming disturbed areas. EIS Sections 2.2.1.4 and 2.2.1.7 describe the decommissioning and reclamation activities.

Noise sources (e.g., heavy equipment and trucks) and impacts would be similar to those associated with the construction stage; therefore, the NRC staff concludes that the noise impacts from the decommissioning stage for the proposed action (Phase 1) and Phases 2-20 would be SMALL.

4.8.1.3.1 Rail Spur

The rail spur would be dismantled at the discretion of the land owner (BLM). Noise sources and levels associated with the dismantling of the rail spur would be similar to those incurred during the construction stage of the rail spur. Activities would include removal of the rail line, grading the land surface, reestablishing vegetation, and removal of waste. Because these activities are similar in nature and noise level as those included under the construction stage, the NRC and BLM staffs conclude that the noise impacts from dismantling the rail spur would be SMALL.

4.8.2 No-Action Alternative

Under the No-Action alternative, the NRC would not license the proposed CISF project, and the CISF would not be constructed, operated, or decommissioned. Therefore, there would be no additional contribution from the CISF to the existing noise levels of the area. In the absence of a CISF, the NRC staff assumes that SNF would remain onsite in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue as detailed in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available.

4.9 Historic and Cultural Impacts

This section describes potential environmental impacts to historic and cultural resources at the proposed project during each phase of the facility lifecycle, for both the proposed action (Phase 1) and Phases 2-20. The impacts to historic and cultural resources associated with the No-Action alternative are also evaluated in this section.

4.9.1 Impacts from the Proposed CISF

Impacts to historic and cultural resources could result from the various stages of the proposed CISF. These impacts could result from the loss of or damage to eligible archaeological and cultural resources, as discussed throughout this section.

4.9.1.1 Construction Impacts

The construction of the proposed action (Phase 1) would include multiple areas where excavation would be required to accommodate and install the underground facilities. The proposed action (Phase 1) construction stage would disturb approximately 48.3 ha [119.4 ac], including approximately 2.5 ha [6.2 ac] for a site access road; 0.57 ha [1.4 ac] for the security building, administration building, parking lot, and concrete batch plant/laydown area; and 29.3 ha [72.4 ac] that would be associated with constructing the initial SNF storage modules and pad, cask transfer building, and associated infrastructure. For the proposed action (Phase 1), the CISF construction activities would include excavating a pit that would contain the SNF canisters in the vertical ventilated modules (VVMs) with a total excavation depth of approximately 7.6 m [25 ft].

The indirect APE for the proposed CISF project would consist of areas potentially impacted by visual effects and noise sources arising from the project. Due to the low profile of the proposed project, the extent of the visual APE (i.e., indirect APE) includes areas within a 1.6 km [1 mi] radius extending from the proposed project boundary. Temporary construction impacts would result from increased dust, noise, and traffic in the direct and indirect APEs.

As detailed in EIS Section 3.9, several surveys have been conducted over the proposed project area to investigate potential historic and cultural resources. Based on the information available to date (Holtec, 2020a, 2019c,d) and the site visit in February 2020, the NRC recommended that Site LA 187010 is not eligible for listing in the NRHP because that the site does not convey any historic or cultural value and integrity in sufficient quality to meet the eligibility criteria. The NRC staff received the NM SHPO's concurrence on its eligibility determination on December 15, 2020. Because the NRC staff has found that site does not meet the eligibility criteria (and the SHPO concurred), impacts from construction and operation of the proposed CISF and rail spur are not anticipated to be significant and, therefore, it is reasonable to anticipate that no historic properties will be affected in accordance with 36 CFR 800.4(d)(1). The direct APE is also devoid of any standing structures, so the proposed project would not result in a direct impact to any non-archaeological historic resources. There are no historic resources 45 years or older (dating to 1974 or earlier) within the 1.6-km [1-mi] indirect APE that are commended to the NM SHPO as potentially eligible for the NRHP.

Holtec provides its inadvertent discovery procedures in ER Section 4.7.1. In the event archaeological resources or human remains are discovered during building-related activities, Holtec would stop work and notify the appropriate agency (New Mexico BLM Field Office or NM SHPO). Because no historic resource is located within the direct APE, the NRC staff concludes that historic and cultural resources would not be impacted by the proposed action (Phase 1), and impacts would be SMALL. Based on the completion of consultation under NHPA Section 106 (EIS Section 3.9.3), the NRC staff concludes that the construction of the proposed project would have no effect on historic properties.

Construction of Phases 2-20 would disturb an additional 85.2 ha [210.6 ac] of land for additional SNF storage modules and pads. Within the protected (i.e., fenced) area, Holtec estimates that construction of the concrete pads once all 20 phases are completed (i.e., full build-out), would disturb approximately 44.5 ha [110 ac] of land. Historic resources present within the APE for Phases 2-20 construction include HCPI 42195, the same segment of earthen and caliche gravel two-track road that the proposed action (Phase 1) construction would impact. However, as noted in EIS Section 3.9.2, the NRC staff will recommend that the resource is not eligible for the NRHP because it does not constitute a historic property. This property does not have any historic value or significance. In addition to the road segment, 17 isolated occurrences are located within the direct APE for Phases 2-20 of the proposed CISF; however, isolated occurrences do not constitute archaeological sites (as discussed in EIS Section 3.9), and, therefore, do not constitute historic properties. Because no historic or cultural resources of significance to the historic value of the area have been identified in the direct APE that the construction of the proposed Phases 2-20 could disturb, the NRC staff concludes that for the construction of Phases 2-20, impacts would be SMALL. Based on the completion of consultation under NHPA Section 106, the NRC staff concludes that the construction of the proposed project would have no effect on historic properties.

While the probability for encountering human remains in this area is low, the applicant has committed to an inadvertent discovery plan for human remains during construction as required by the Native American Graves Protection and Repatriation Act and the New Mexico Cultural Properties Act. Under such a plan, work would cease immediately upon discovery within an area of 30 m [100 ft], and the area would be protected from further disturbance. The appropriate agency, based on land ownership (either the local BLM field office or NM SHPO), would be notified within 24 hours. The agency would then determine how to treat the remains, and any necessary identification, consulting, and excavation would be completed to the agency requirements before construction could resume. In addition to the Holtec commitment to an inadvertent discovery plan for human remains, the NRC staff recommends that all workers at the proposed Holtec CISF, including all contractors, be trained in the protocols of the inadvertent discovery plan for cultural resources and that the training be documented. The NRC staff also recommends that workers, including contractors, be trained regarding the deterrence of artifact hunting and vandalism.

4.9.1.1.1 Rail Spur

Construction of the proposed action (Phase 1) would include ground disturbance over 15.9 ha [39.4 ac] for a railroad spur to connect the proposed project area to the main rail line, which is approximately 6.1 km [3.8 mi] west of the proposed project area with a length of 8 km [5 mi]. As discussed in EIS Section 3.9, one historic resource, HCPI 42196, is within the APE for direct effects associated with the western end of the proposed rail spur. HCPI 42196 is a mid-twentieth-century rail segment, portions of which are still in use. Both SRI and APAC recommended that HCPI 42196 (LA 149299) is not eligible for the NRHP and therefore would not constitute a historic property. The rail site does not offer any historic value to the area. At the eastern end of the rail spur, Site LA 89676 is no longer within the APE for direct effects because of design changes. Because no historic or cultural resources are being recommended as eligible within the direct APE for the rail spur and the rail site does not offer historic value, the NRC and BLM staffs conclude that the impacts from the construction of the rail spur on historic and cultural resources would be SMALL. Based on the completion of consultation under NHPA Section 106, the NRC and BLM staffs' conclusion is that the construction of the proposed rail spur would have no effect on historic properties.

4.9.1.2 Operations Impacts

During operations, SNF in shipping casks would arrive at the proposed CISF via rail car, be transported into the cask transfer building for inspection, and then transferred to the proposed CISF storage pad. No new ground disturbance is anticipated during operations beyond that associated with maintenance and traffic around the facility. Because no ground-disturbing activities would occur and no recommended eligible historic or cultural resources are present within the direct APE of proposed action (Phase 1) or Phases 2-20, the NRC staff concludes that the impacts from the operation of the proposed CISF for either the proposed action (Phase 1) or Phases 2-20 on historic and cultural resources would be SMALL. Based on the completion of consultation under NHPA Section 106, the NRC and BLM staffs' conclusion is that the operation of the proposed project would have no effect on historic properties.

4.9.1.2.1 Rail Spur

No additional ground-disturbing activities would occur and no historic or cultural resources are present within the APE of the rail spur for the operations stage of either the proposed action (Phase 1) or Phases 2-20. Therefore, the NRC and BLM staffs conclude that the impacts from operation of the rail spur for either the proposed action (Phase 1) or Phases 2-20 on historic and cultural resources would be SMALL. Based on the completion of consultation under NHPA Section 106, the NRC and BLM staffs' conclusion is that the operation of the proposed rail spur would have no effect on historic properties.

4.9.1.3 Decommissioning and Reclamation Impacts

At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating (if necessary). Decommissioning activities for the proposed action (Phase 1) and for Phases 2-20 would involve the same activities, but the activities would be scaled to address the overall size of the CISF (i.e., the number of phases completed).

Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area (Holtec, 2020a). Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; erosional control; and restoring and reclaiming disturbed areas. EIS Sections 2.2.1.4 and 2.2.1.7 describe the decommissioning and reclamation activities.

As previously noted in EIS Section 3.9, the NRC staff recommended that Site LA 187010 is not eligible for listing on the NRHP, and the NM SHPO and Hopi Tribe Cultural Preservation Office concurred with the eligibility recommendation. No additional land would be disturbed as a result of decommissioning and reclamation than that disturbed during the construction stage, so the proposed project would not result in a direct impact to any non-archaeological historic resources. Because no historic resource is located within the direct APE, and based on completion of NHPA Section 106 activities, the NRC staff concludes that historic and cultural resources impacts from decommissioning and reclamation of the proposed action (Phase 1) and Phases 2-20, would be SMALL.

4.9.1.3.1 Rail Spur

No historic or cultural resources that constitute historic properties are present within the direct APE for the rail spur on BLM-managed land; therefore, no historic and cultural impacts would result from decommissioning and reclamation of those areas. The NRC and BLM staffs conclude that decommissioning of the rail spur would not affect historic and cultural resources, and therefore, impacts would be SMALL.

4.9.2 No-Action Alternative

Under the No-Action alternative, the NRC would not license the proposed CISF project. Therefore, impacts such as damage to or destruction of historic and cultural resources would not occur. Construction impacts would be avoided because SNF storage pads, buildings, and transportation infrastructure would not be built. Operational impacts would also be avoided because no SNF canisters would arrive for storage. Impacts to cultural resources from decommissioning activities would not occur, because unbuilt SNF storage pads, buildings, and transportation infrastructure would require no decontamination, and land surfaces would need no reclamation. The current historic and cultural resources on and near the project, including archaeological sites and historic transportation features, remain essentially unchanged under the No-Action alternative. In the absence of a CISF, the NRC staff assumes that SNF would remain on-site in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue as detailed in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available.

4.10 Visual and Scenic Impacts

This section describes the potential impacts to visual and scenic resources associated with the proposed action (Phase 1), Phases 2-20, and the No-Action alternative.

4.10.1 Impacts from the Proposed CISF

Impacts to visual and scenic resources from the construction stage would be associated with the machinery used to excavate the site and to build the concrete pads, storage modules, and stockpiled material. Additional vehicle traffic and fugitive dust would occur during all stages of the proposed CISF project. In addition to the vehicle traffic and fugitive dust, the visual and scenic resource impacts during operations would include the buildings and pads that would have been constructed. Impacts to visual and scenic resources from the decommissioning stage to dismantle the proposed CISF would include similar activities and equipment as used during the construction stage.

4.10.1.1 Construction Impacts

As part of the proposed action (Phase 1), the most visible structure would be the cask transfer building constructed for the proposed project and would be approximately 18 m [60 ft] high. Because of the relative flatness of the proposed CISF project {i.e., within the proposed project area an elevation of approximately 12 m [20 ft]}, the structure may be observable from nearby highways and properties. For the remaining structures of the proposed CISF project, visibility would be restricted to east and west traffic on U.S. Highway 62/180. The proposed CISF project would not be visible to any city or township with an identifiable population center. Other than the support buildings (including the cask transfer building), the proposed facility is predominantly subgrade, meaning the majority of the storage structure would be below ground surface. The proposed CISF project has been determined to be in the Class IV BLM visual resource inventory class, which means that the level of change allowable to the characteristic landscape can be high (EIS Section 3.10). In addition, the proposed CISF project would be located in a sparsely populated area used predominantly for cattle grazing and oil and gas exploration. The commuting construction workforce (i.e., 80 workers) would add an increase of

160 vehicles per day (80 vehicles each way) along the 1.6-km [1-mi] site access road to the proposed CISF project (Holtec, 2020a). The addition of these workers along a gravel access road would increase the amount of fugitive dust in the viewshed. Holtec has committed to implementing dust suppression on the access road. Any lighting used for construction activities after daylight, would create temporary visual impacts, even if down-shielded, because of the contrast with the darkness of the surrounding landscape. Although the proposed CISF project would alter the natural state of the landscape, the NRC concludes that due to the absence of regional or local high quality scenic views in the area, lack of a unique or sensitive viewshed, the subgrade design of the facility, the remote locale, and the dust suppression mitigation, the impact to visual and scenic resources from the proposed action (Phase 1) would result in a SMALL impact.

For Phases 2-20, the additional impact to visual and scenic resources would be from the addition of storage modules and the equipment used to load the casks. Although the addition of storage pads would increase the footprint of the facility overall, the subgrade design of these pads is expected to result in lesser visual impacts than those under the proposed action (Phase 1). Therefore, the NRC staff concludes that the impact to visual and scenic resources as part of Phases 2-20 (and at full build-out) would be SMALL.

4.10.1.1.1 Rail Spur

Construction of the rail spur would include similar activities as those associated with construction of the proposed CISF project facility. For example, material would be stockpiled, the ground surface would be graded, and construction materials and equipment would be brought to the site. The rail spur is expected to be at or very near ground surface level and less visible than the other structures associated with the proposed CISF project. Because of the low profile of the rail spur, the visual and scenic impacts from construction of the rail spur would be less than those for the proposed CISF project. Therefore, NRC and BLM staffs conclude that visual and scenic resource impacts from the construction of the rail spur would be SMALL.

4.10.1.2 Operations Impacts

For both the proposed action (Phase 1) and Phases 2-20, the facilities built during the construction stage would continue to impact the visual and scenic resources, particularly the cask transfer building. The cask transfer building would be approximately 18 m [60 ft] high, and because of the relative flatness of the proposed CISF project, the structure may be observable from nearby highways and properties. The majority of the storage facility is subgrade and therefore would have only limited visibility from outside the proposed project area. However, the use of security lights at the proposed CISF project would create visual impacts at night because of the contrast with the darkness of the surrounding landscape. Holtec has committed to down-shielding all security lighting for all ground-level facilities and equipment to keep light within the proposed project area to help minimize the potential impacts (Holtec, 2020a). Additional impacts would occur because of the generation of fugitive dust from vehicle traffic from the operation workforce (i.e., 55 workers) as they commute to and from the proposed CISF project. Because buildings associated with the proposed CISF project would have already been constructed, the storage of SNF would be subgrade, and lighting associated with security would be mitigated to minimize impacts, the NRC staff concludes that the visual and scenic resource impacts from the operations stage of the proposed action (Phase 1) and Phases 2-20 would be SMALL.

Defueling

Defueling for the proposed action (Phase 1) and Phases 2-20 would include removal of SNF from the proposed CISF. The impacts to visual and scenic resources would be similar to those of loading SNF during the fuel emplacement operations at the proposed CISF project. Therefore, the NRC staff concludes that the impact to visual and scenic resources during defueling would be SMALL.

4.10.1.2.1 Rail Spur

The operation of the rail spur would result in minimal visual and scenic impacts. The impacts would be associated with rail shipments of SNF to and from the proposed CISF project and any associated vehicle traffic along the access road from rail maintenance. The presence of trains on the rail spur would create a temporary visual impact that is consistent with normal train operations, which already occurs in the area on the existing main rail line. Operation of the rail spur would occur further than the existing rail line to the nearest resident (Holtec, 2020a). Any additional visual and scenic impacts from the operation of the rail spur would be less than or similar to impacts associated with construction of the rail spur; therefore, the NRC and BLM staffs conclude that the impact to visual and scenic resources for the operations stage of the rail spur would be SMALL.

4.10.1.3 Decommissioning and Reclamation Impacts

At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released, and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. Decommissioning activities for the proposed action (Phase 1) and for Phases 2-20 would involve the same activities, but the activities would be scaled to address the overall size of the CISF (i.e., the number of phases completed).

Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area (Holtec, 2020a). Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; erosional control; and restoring and reclaiming disturbed areas. EIS Sections 2.2.1.4 and 2.2.1.7 describe the decommissioning and reclamation activities.

Decommissioning and reclamation activities would be similar in impact to those occurring during the construction stage; therefore, the NRC staff concludes that impacts to visual and scenic resources from decommissioning for the proposed action (Phase 1) or Phases 2-20 (including at full build-out) would be SMALL.

4.10.1.3.1 Rail Spur

Dismantling of the rail spur would include similar activities as those associated with construction of the rail spur. Materials would be removed from the rail spur location, and stockpiled material would be used, as necessary, to return the land to preoperational conditions. Visual and scenic impacts would occur from vehicle traffic and waste hauling. Impacts would be anticipated to be similar to those evaluated as part of the construction stage. The land owner may determine to retain the rail spur, in which case the presence of rail cars would intermittently persist, as during the operations stage. Therefore, the NRC and BLM staffs conclude that visual and scenic resource impacts from the decommissioning of the rail spur would be SMALL.

4.10.2 No-Action Alternative

Under the No-Action alternative, the NRC would not license the proposed CISF project, and the proposed CISF project would not be constructed, operated, or decommissioned. Therefore, there would be no additional impacts from the proposed CISF project to the visual and scenic resources of the area. In the absence of a CISF, the NRC staff assumes that SNF would remain onsite in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue as detailed in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available.

4.11 Socioeconomic Impacts

This section presents the potential socioeconomic impacts from the construction, operation, and decommissioning of the proposed action (Phase 1), Phases 2-20, and the No-Action alternative on employment and economic activity, population and housing, and public services and finances within the 4-county ROI. The effects of the proposed project on land use, including use of public lands and rights-of-way, recreational and tourism sites, wilderness areas, and visual and scenic resources in the area are assessed in EIS Sections 4.2 and 4.10, respectively. The basis for NRC's selection of the socioeconomic ROI and the existing socioeconomic and community resources in the ROI are explained in EIS Sections 3.11 through 3.11.5 and in Appendix B.

4.11.1 Impacts from the Proposed Facility

4.11.1.1 Construction Impacts

Impacts to socioeconomic and community resources from the construction stage of the proposed action (Phase 1) are primarily associated with workers who might move into the area and tax revenues that the proposed project would generate, which would influence resources available for the community. The socioeconomic issues that fall within the scope of this socioeconomic analysis include the direct and indirect economic effects on employment, taxes, residential and commercial development, and public services in the ROI. EIS Table 4.11-1 describes the level of potential socioeconomic impacts that could be experienced from the proposed CISF project. These levels are based on the NRC's staff's past experience in evaluating the potential impacts to socioeconomic and community resources (NRC, 1996).

To fully evaluate the potential socioeconomic impacts, the NRC staff conducted a bounding analysis for the potential economic impact, which includes the NRC staff assumption that, for Phase 1, construction and operation stages are concurrent. Holtec estimates that the proposed action (Phase 1) construction activities would require up to 80 construction workers per year. Holtec also estimates that during the operations phase at full build-out, additional workforce of less than 40 workers and 15 security personnel per year would be needed (Holtec, 2020a). Therefore, the NRC staff conservatively assumes that for the concurrent construction and operation stages of the proposed action (Phase 1) that the peak number of workers would be 135 per year (i.e., 80 construction workers, 40 operations personnel, and 15 security guards).

Table 4.11-1 Impact Definitions to Socioeconomic and Community Resources	
Category and Significance Level of Potential Impact	**Description of Affected Resources**
Employment and Economic Activity Impacts	
Small	Less than 0.1 percent increase in employment
Moderate	Between 0.1- and 1.0-percent increase in employment
Large	Greater than 1 percent increase in employment
Population and Housing Impacts	
Small	Less than 0.1 percent increase in population growth and/or less than 20 percent of vacant housing units required to house workers moving into the ROI
Moderate	Between 0.1- and 1.0-percent increase in population growth and/or between 20 and 50 percent of vacant housing units required to house workers moving into the ROI
Large	Greater than 1 percent increase in population growth and/or greater than 50 percent of vacant housing units required to house workers moving into the ROI
Impacts on Public Services and Finances	
Small	Less than 1-percent increase in local revenues
Moderate	Between 1- and 5-percent increase in local revenues
Large	Greater than 5-percent increase in local revenues
Source: NRC,1996; NRC, 2005a	

From this bounding assumption of 135 workers, EIS Table 4.11-2 depicts a range of the resulting workforce that the NRC staff anticipates would move into the ROI, as well as family and workforce retention characteristic assumptions. Appendix B provides additional details. These projections are used throughout this EIS analysis.

In 2019, construction and mining employment provided approximately 84 percent of all non-service employment in the ROI (EIS Table 3.11-4, “Employment by Industry”). These are two of the largest employment sectors in the ROI. As provided in EIS Table 4.11-2, the NRC staff estimates that between 30 to 57 new construction and non-construction (operation) workers would move into the 4-county ROI, which represents the peak employment that would occur with concurrent construction and operation stages. The precise distribution of workers moving into the ROI would be determined by a number of factors, including proximity to the proposed project area and the availability of housing and public services. The NRC staff estimates that the addition of 30 to 57 direct workers to the workforce within the ROI would result in less than a 0.1-percent increase in the workforce within the ROI. As provided in EIS Table 4.11-1, the NRC staff determines that a less than 0.1-percent increase in employment would result in a small impact.

New workers (i.e., workers moving into the ROI and those previously unemployed) would have an additional indirect effect on the local economy because these new workers would stimulate the regional economy by their spending on goods and services in other industries. The U.S. Department of Commerce Bureau of Economic Analysis (BEA), Economic and Statistics Division, uses an economic model called RIMS II. This modeling software incorporates buying and selling linkages among regional industries and uses a multiplier specific to an industry to estimate the economic impact within the region. The multiplier is the number of times that the final increase in consumption exceeds the initial dollar spent.

Table 4.11-2 Assumptions for Workforce Characterization During Peak Employment (Concurrent Construction and Operation Stages)	
Peak number of onsite workers (80 construction workers, 40 operations personnel, 15 security guards)*	135
Percentage of construction workers who may move into the ROI†‡§	10-30%
Percentage of non-construction workers who may move into the ROI†‡§	40-60%
Range of construction workers that may move into the ROI during construction peak	8-24
Range of non-construction workers that may move into the ROI	22-33
Range of all workers moving into the ROI‖. This is also the range of new households.	30-57
Percentage of workers who are likely to bring families† ‡§	50-70%
Range of number of families moving into the ROI	15-40
Average family size in the ROI	3.3
Range of total number of workers and family members moving into ROI	64-148
Number of school-aged children per family (all workers) †‡§	0.8
Range of school-aged children of workers moving into ROI	12-32
Percentage of moved-in workers that may leave the ROI after the construction phase†§	50-60%
Range of moved-in workers that may leave the ROI post-construction	15-35
Range of moved-in workers and family members that may leave the ROI post-construction	30-57
Range of school-aged children of moved-in workers that may leave the ROI, post-construction phase	6-19
Employment multiplier for construction workers moving into the ROI (BEA, 2021)	1.562
Range of indirect jobs resulting from construction workers moving into the ROI	5-14
Employment multiplier for non-construction workers moving into the ROI (BEA, 2021)	1.4746
Range of indirect jobs resulting from non-construction workers moving into the ROI	11-16

*Assumptions from Holtec's environmental report (Holtec, 2020a)
†Malhotra and Manninen, 1981
‡NRC, 2001
§NRC, 2012
‖USCB, 2010
Note: There are slight variations in the calculations because of rounding

In this analysis, the NRC staff uses BEA's Type II multiplier for the construction industry in the ROI to estimate the number of indirect jobs that would result from the new direct workers associated with the peak employment that would occur with concurrent construction and operation stages. According to the BEA, Type II multipliers not only account for the effects realized between all industries in the ROI, but they also account for the induced impacts within the region (BEA, 2013). Based on the RIMS II analysis and using the worker-characteristic assumptions provided in EIS Table 4.11-2, the NRC staff predicts that the new direct workers associated with the peak employment that would occur during the overlapping construction and operation stages of the proposed action (Phase 1) would create between 16 and 30 indirect jobs (EIS Table 4.11-2). Indirect jobs are often non-technical and non-professional positions in the retail and service sectors. The NRC staff determines that the 16–30 indirect jobs that would be created would likely be filled by ROI residents. If the maximum number of indirect jobs (30) were filled by unemployed individuals in the ROI, those workers would represent less than 1 percent of the unemployed labor force in the ROI between the period of 2015 and 2019 (USCB, 2019) and less than 0.1 percent of the estimated 2019 employed persons provided in EIS Figure 3.11-5. A less than 0.1-percent increase in employment would result in a small impact. However, the combined maximum of up to 57 direct workers and 30 indirect workers (87 total) would represent 0.1 percent of the average 2019 labor force of 85,483 within the ROI

(BLS, 2019). As provided in EIS Table 4.11-1, the NRC staff determines that an increase of 0.1 to 1 percent in employment would result in a moderate impact.

The mining industry provides most of the jobs in the region, and less than 4 percent of jobs are related to agriculture and farming (EIS Section 3.11.1). A lease agreement between Holtec and Intrepid could be established that restricts potash mining beneath the footprint of the proposed CISF project area and a 305-m [1,000-ft] buffer, which is approximately 421 ha (1.6 mi^2). No mineral extraction or mining activities have occurred within this area (Intrepid, 2018). Currently, Intrepid employs approximately 450 people in the Carlsbad area for the operations at the West Mine and East Mine, and the Intrepid North storage and processing facility, which is located closest to the proposed CISF project area (Intrepid, 2018). Intrepid controls the rights to mine approximately 55,847 ha [138,000 ac] of land in the Carlsbad area (Intrepid, 2018). Prior to 2016, Intrepid employed almost 1,000 people, but in January 2014, the company undertook workforce reductions, and in May 2016, the Intrepid West Mine operations were put on hold, and 300 employees were laid off because of low potash mineral prices (Intrepid, 2014, 2018). While the NRC staff cannot predict potash commodity pricing and when activities at the West Mine could resume, Intrepid predicts that existing potash mineral reserve life of their mineral rights could extend up to 100 years (Intrepid, 2018). Further, the restriction of the minerals at the proposed Holtec facility is a fraction of the potential reserves available from Intrepid leases. Therefore, the NRC staff concludes that the removal of the 421 ha (1.6 mi^2) of lease area associated with the proposed CISF project area would have a minor effect on the potential jobs and economic benefits in the region from this lease agreement. If no agreement is made, then Intrepid could potentially expand mining operations under the proposed CISF project area. However, because of the relatively small lease area, the socioeconomic impact from this mining activity would have a minor effect in the region.

As presented in EIS Section 3.11.1.1, the population in the ROI in 2019 was approximately 166,751 people. In EIS Table 4.11-2, the NRC estimates that between 64 and 148 new residents would move into the 4-county ROI, including 12 to 32 new school-age children, during the peak employment of the proposed CISF project [i.e., concurrent construction and operation stages for the proposed action (Phase 1)]. The precise distribution of workers moving into the ROI would be determined by a number of factors, including proximity to the site and the availability of housing and public services. The NRC staff estimates that the approximate 64 to 148 new residents would represent an increase of less than 0.1 percent to the 2019 population of approximately 166,751 in the ROI [EIS Table 3.11-1 and Appendix B (Socioeconomic Information)]). As provided in EIS Table 4.11-1, the NRC staff determines that a less than 0.1-percent increase in population growth would result in a small impact.

Holtec estimates that it would spend approximately $233,719,816 as part of the proposed action (Phase 1) on capital construction costs (EIS Table 8.3-3). For the proposed action (Phase 1), CISF construction would last 2 years. According to the RIMS II analysis, the NRC staff estimates that $233,719,816 of estimated construction expenditures over 2 years would generate an additional annual economic benefit (output) of approximately $175,300,000 and labor earnings of approximately $56,900,000 within the ROI (BEA, 2021). The estimate for the annual value added, or gross domestic product [GDP], generated in the region is approximately $91,875,000. Real estate taxes on the proposed CISF would be determined based on the assessed value of the property, but Holtec has not provided an estimate for that value (Holtec, 2020a). Holtec's estimates include personal income taxes and New Mexico gross receipts taxes. Additionally, because Holtec would have an industrial revenue bond with Lea County, some expenditure would be exempt from gross receipts taxes. The NRC staff compared the annual taxes revenues of the 4 counties within the ROI 2019 dollars to the annual total taxable value (EIS Table 3.11-6) and determined that between 0.5 and 1.5 percent of the tax values in the 4 counties are collected. The NRC staff determines that it is unlikely that the annual tax values created from the construction phase of proposed action (Phase 1) would exceed $943,481,266 of taxable value in the ROI; thus, the revenue from the tax values would not exceed 5 percent of annual county revenues within the ROI. Although tax revenues may fluctuate year to year and may be distributed on the local level among municipalities in ways that cannot be easily quantified, the NRC staff determines that this example of comparing tax values on the county level to the tax revenues generated in the ROI is reasonable for estimating the potential impact on local revenues from peak employment of the proposed CISF project [i.e., concurrent construction and operation stages for the proposed action (Phase 1)]. As provided in EIS Table 4.11-1, the NRC staff determines that a 1- to 5-percent increase in local revenues would result in a moderate impact.

Expenditures for goods and services to support the peak employment of the proposed CISF project [i.e., concurrent construction and operation stages for the proposed action (Phase 1)] would occur both inside and outside the ROI. The NRC staff estimates that applicants purchase approximately 10 percent of their construction materials locally (NRC, 2016); however, Holtec did not provide a detailed estimate of the types and quantities of materials or where materials would be purchased or sourced; therefore, a detailed analysis of the sources for these materials and supplies has not been conducted, and the estimated tax implications from these purchases are not evaluated in this EIS. The NRC staff did contact the Lea County Economic Development Corporation (LCED) for information on local source materials (Gobat, 2019). The LCED provided the NRC staff with a list of development service providers and suggested that many of the materials needed for the proposed action (Phase 1) should be available for purchase within Lea County, including concrete, steel, gravel/sand, electrical components, and fencing (Gobat, 2019).

Direct and indirect workers would spend a portion of their earnings on housing, goods, and services within the ROI. Affordable housing and housing capacity in the ROI are discussed in EIS Section 3.11.3. The estimated median worker income within the ROI ranges from $29,300 to $40,900 (EIS Section 3.11.2). The median gross rent in the ROI between the period of 2015 and 2019 ranged between $718 and $1,000 (Economic Profile System, 2021a). Based on the median gross rent and median worker income in the ROI, workers that earn $29,300 could spend less than 30 percent of their income on rental housing in the ROI. Compared to the vacancy of housing units for sale and for rent in the ROI between the period of 2015 and 2019, the 30 to 57 new households that would be added to the ROI during peak employment of the proposed CISF project [i.e., concurrent construction and operation stages for the proposed action (Phase 1)] would fill between 0.3 to 0.6 percent of the housing vacancies (Economic Profile System, 2021a). The NRC staff expects that the housing market in the county would be able to absorb the influx of workers, and rental rates and housing prices would not suffer a perceptible increase because of this influx. As provided in EIS Table 4.11-1, because less than 20 percent of vacant housing units would be needed to house workers moving into the ROI, the impact on housing during peak employment with concurrent construction and operation stages of the proposed action (Phase 1) would be small.

In addition to the impacts from direct and indirect revenue and job generation, socioeconomic impacts may include impacts to existing resources. Comparing the estimated number of school-aged children that would move into the ROI (12–32 children as shown in Table 4.11-2) to the total amount of students at public schools in the ROI during the 2019–2020 school year (approximately 34,000 students, as discussed in EIS Section 3.11.5), the addition of up to 32 school-aged children in the ROI would represent an increase of less than 0.1 percent. The proposed CISF project would be located within the area served by the Hobbs Municipal School district. Given that the ROI includes 4 counties and workers have the option to live in several communities in those counties, the NRC staff determines that it would be unlikely that all school-aged children who move into the ROI would attend schools of the same school district, or that the increase of school-aged children would exceed 0.1 percent in any public school district within the 4-county socioeconomic ROI. As provided in EIS Table 4.11-1, the NRC staff determines that an increase of less than 0.1 percent population growth would result in a small impact. The NRC staff applied this concept to the school districts to estimate potential impact from the addition of new students moving into the ROI during peak employment with concurrent construction and operations for the proposed action (Phase 1), which would be small.

All potable, process, and fire-suppression water needed during the construction of the proposed CISF project would be provided by the City of Carlsbad that withdraws water from the Ogallala Aquifer. During peak employment of the proposed action (Phase 1), up to 148 people (EIS Table 4.11-2) would relocate to the ROI and likely find housing within an area that a public water utility services. Future water demand in the region is a concern that planners regularly assess and manage (State of New Mexico, 2016). No potable groundwater is known to currently exist within or in the immediate vicinity of the proposed CISF project (EIS Section 4.5.2). Potable water for domestic use and stock watering in the vicinity of the site is generally obtained from pipelines that convey water to area potash refineries from the Ogallala Aquifer on the High Plains area of eastern Lea County. An existing electrical service along the southern border of the proposed project location would be used to provide electrical power for the proposed CISF project (Holtec, 2020a). The NRC staff determines that it would be unlikely that the amount of water and electricity used during peak employment with concurrent construction and operations for the proposed action would exceed 1 percent of the available water and electricity in the ROI due to the limited number of additional workers and the volume of water being consumed for the proposed project, compared with the large amount of oil and gas activities and development in the region. Therefore, the NRC staff determines that a less than 1-percent increase in water and electricity usage would result in a small impact on public utilities.

The NRC staff concluded in EIS Section 4.3.1.1 that the increase of traffic from the proposed CISF project construction would have a SMALL impact on daily traffic on U.S. Highway 62/180 near the proposed CISF project. Potential impacts to traffic further away from the proposed CISF, (e.g., near Carlsbad), would represent a smaller percentage of existing traffic in that area and thus, transportation impacts would be less noticeable and SMALL (EIS Section 4.3.1.1). Impacts to other transportation routes should be minimal. Moreover, the impacts during subsequent construction stages would be less than during the proposed action (Phase I) (about 24 months), when most of the equipment and material and the largest number of construction workers would be using U.S. Highway 62/180. EIS Section 4.3.1.1 states that when added to traffic necessary for peak construction, [including traffic for transportation of materials, water, and construction workers (80 workers)], and traffic resulting from operations workers (40 workers), the total traffic during the peak period of construction would not adversely affect traffic safety or cause road degradation relative to existing conditions.

As stated in this section, up to 148 new residents in the ROI would increase the population in the ROI by less than 0.1 percent and would result in filling less than 1 percent of the housing vacancies. According to Holtec's ER, 18 police departments and 22 fire departments serve the 4 counties in the ROI, the vast majority of which are located in Eddy and Lea Counties (Holtec, 2020a). The NRC staff expects that there would not be a detectable increase in the demand for fire protection or law enforcement services and that existing fire protection and law enforcement personnel, facilities, and equipment would be sufficient to support the population increase. Similarly, the NRC staff expects that a ROI population increase of less than 0.1 percent would not measurably increase the demand for hospital and physician services. However, as provided in EIS Table 4.11-1, and based NRC's staff's past experience, when local revenues increase between 1- to 5-percent, there could be moderate impacts to public services because some additional personnel may be needed to administer existing service programs (NRC, 2013). As provided in EIS Table 4.11-1, the NRC staff determines that an increase of 1- to 5-percent of local revenues would also result in a moderate impact on public services.

In summary, the NRC staff concludes that economic impacts could be experienced throughout the 80-km [50-mi] ROI surrounding the proposed project area, as a result of peak employment of the proposed CISF project [i.e., concurrent construction and operation stages for the proposed action (Phase 1)]. While the NRC staff anticipates that impacts on population, and housing would be SMALL, and impacts on employment, public services, and local finance would be MODERATE and beneficial, the NRC staff also recognizes that not all individuals in the ROI are likely to be affected equally. For instance, not all residents utilize community services such as schools, fire, police, and health benefits at the same rate. However, most community members would share, to some degree, in the economic growth that the proposed CISF project is expected to generate. The NRC staff have not conducted additional analyses to determine how the benefits are likely to be distributed among persons or potential beneficiaries in the ROI.

As described at the beginning of this section, the NRC staff assume that peak employment with concurrent construction and operations of the proposed action (Phase 1) is 135 workers per year. Holtec anticipates that no additional construction or operations workers would be expected to be hired during Phases 2-20 (including full build-out) (Holtec, 2020a). Therefore, 135 workers per year represents the bounding potential economic impact from the proposed action (Phase 1) and Phases 2-20 (including full build-out). Based on the NRC assessments previously stated from the results of the bounding analysis, the NRC staff concludes that socioeconomic impacts resulting from construction of the proposed action (Phase 1) and Phases 2-20 (including full build-out) would be SMALL for population and housing, and MODERATE and beneficial for employment, public services, and local finance.

4.11.1.1.1 Rail Spur

Construction of the rail spur will occur during construction of Phase 1, prior to any concurrent construction and operation. Thus, the NRC and BLM staffs assume that labor and costs to construct a rail spur to support the proposed action (Phase 1) would be significantly less than what would be required for peak employment of the proposed action (Phase 1). Specifically, no additional construction workers would be expected to be hired beyond those considered in EIS Section 4.11.1.1 (Holtec, 2020a). Because the peak employment (i.e., concurrent construction and operation) will not yet have occurred, the 40 operation workers and 15 security guards would not yet be hired during the construction of the rail spur, and, thus, the indirect jobs created from a smaller workforce that may move into the ROI would be less than the indirect jobs created during peak employment. The NRC and BLM staffs determine that the employment impacts from the rail spur construction would be less than those impacts previously summarized from peak employment during the concurrent construction and operation stages for the proposed action (Phase 1). Therefore, the NRC and BLM staffs conclude that the potential impacts to socioeconomics from construction of the rail spur would be SMALL.

4.11.1.2 Operations Impacts

Economic effects, such as job and income growth, were evaluated in the 4-county socioeconomic ROI. After peak employment, the workforce would decline, thereby producing a decline in related payrolls, leading to a corresponding decline in economic impacts. Once all concurrent construction and operation activities are complete, the fully constructed operating CISF would require the fewest number of workers. The loss of construction-related jobs would also lead to a decrease in indirect jobs through the "multiplier effect." Holtec estimates that the proposed action (Phase 1) operations stage of the proposed CISF project would require an estimated workforce of less than 40 personnel and less than 15 security force personnel (Holtec, 2020a). The NRC staff assumes that the proposed CISF project would directly employ 55 workers per year during the operations stage (Appendix B). Using the same assumptions for the workforce characteristics in EIS Table 4.11-2, the NRC staff assumes that up to 57 people, including workers and their families, would move out of the ROI during the operations stage when construction is complete (i.e., during operation only). Up to 32 of those 57 people would be school-aged children. With the decrease of jobs during the operations stage, there would also continue to be the presence of people that moved into the ROI during the previous construction stage but did not move out after construction was complete. As provided in EIS Table 4-11.1, the NRC staff estimates that between 15 and 35 workers would move out of the ROI after the construction stage, leaving an estimated 72-52 workers, which would represent less than 0.1 percent of the average 2019 labor force of 85,483 within the ROI (BLS, 2019). As provided in EIS Table 4.11-1, the NRC staff determines that an increase of less than 0.1 percent in employment would result in a small impact. Therefore, the operations stage would have a minor impact on employment and population in the ROI.

There would be fewer remaining households in the ROI occupied by direct workers at the proposed CISF project during the operations stage. EIS Table 4.11-1 indicates that there would be a small impact on housing during peak employment when construction and operation stages overlap; therefore, the potential impact from remaining households to the ROI during the operations stage (with no overlap of stages) would have a small impact on housing. The continuation of the proposed action (Phase 1) operations stage jobs would require continued demands for public services such as police, fire, education, and health care. However, because there would be a smaller workforce than during the construction stage or peak of construction and operation, the NRC staff determine that there would not be a noticeable impact on public services during the operations stage. Water demand would decrease compared to the construction stage because it would not be needed for making concrete, and only a minimal amount would be needed for dust suppression and worker consumption. Because the proposed CISF is a passive system, electrical utility demand would also decrease compared to the construction stage. Thus, the overall amount of water and electricity consumption would be less during the operations stage of the proposed action (Phase 1) compared to the construction stage for proposed action (Phase 1), and the difference would therefore be minor.

Operations stage impacts would include traffic impacts from shipping equipment, supplies, and produced wastes, and from workers commuting while the proposed CISF project would be operating. Because there would be less traffic than when construction and operation stages overlap (i.e., at peak), the NRC staff determined that there would be a SMALL transportation impact during the operations stage (EIS Section 4.3.1.2).

Holtec estimates that the annual cost of operations and maintenance activities for the proposed action (Phase 1) would be $27,892,625 (EIS Section 8.3.2). Based on the RIMS II analysis, the NRC staff estimates that the operations stage of the proposed CISF project would generate

$39,077,568 of annual output and labor earnings of $16,353,446 within the ROI (BEA, 2020). During the operations stage, Holtec may pay annuity payments in the range of $15 million to $25 million to Lea County, Eddy County, and the cities of Hobbs and Carlsbad over the life of the proposed action, and the NRC staff does not anticipate that these payments would make a noticeable difference in the State and local revenues in a single year (Holtec, 2019a). Based on the NRC staff's comparison of county financial reports against the estimated revenues in the 4 counties in the ROI in fiscal year 2019, the NRC staff does not anticipate that annual tax values created during the operation stage of the proposed action (Phase 1) would exceed $188,696,200 of all taxable values in the ROI per year; thus, the revenue from the tax values would not exceed 1 percent of annual revenues within the ROI. The NRC staff determines that it is reasonable that annual county tax revenues would increase over time based on new businesses and residents moving into the ROI, and that the percentage of revenues that the proposed action (Phase 1) would contribute to the ROI could potentially decrease to (i.e., an amount below 1 percent). As provided in EIS Table 4.11-1, the NRC staff determines that a less than 1-percent increase in local revenues would result in a small impact.

Although the NRC staff determines that the anticipated change in population during operations would result in a small impact on public services, , the NRC staff also recognize that the presence of a facility that stores nuclear materials may require additional preparedness of first responders in the event of an incident requiring fire, law enforcement, and health service support. Holtec did not provide a detailed estimate of the additional training and equipment that would be necessary to respond to an incident at the proposed CISF project that are not currently available to first responders, and no studies have been conducted by local agencies or officials with this type of information. Therefore, a detailed analysis of the costs associated with these potential additional resources are not evaluated in detail in this EIS, but NRC has considered first-responder training further in the following paragraphs.

Carriers and shippers are required to prepare emergency response plans and provide assistance and information to emergency responders under ANSI N14.27-1986(R1993). The DOT, together with its counterparts in Canada and Mexico, published the "2016 Emergency Response Guidebook," (DOT, 2016) for carriers and State and local first responders to use during the initial phase of an accident involving hazardous materials. The guidebook sections that apply to SNF include instructions on potential hazards, public safety measures, and emergency response actions. Additionally, DOT requires driver training, including crew training for emergency situations and contacting and assisting first responders. States are recognized as responsible for protecting public health and safety during transportation accidents involving radioactive materials. Federal agencies are prepared to monitor transportation accidents and provide assistance, if States request them to do so. Eight Federal Regional Coordinating Offices, DOE-funded, are maintained throughout the U.S. Personnel in these offices, are on 24-hour call, and are capable of responding to such emergencies with equipment and experts that could advise on recovery and removal of the cask and site remediation (DOT, 2016). Additionally, any event involving NRC-licensed material that could threaten public health and safety or the environment would trigger special NRC procedures.

Affected communities may be able to obtain emergency response financial assistance necessary for training and equipment from other sources or Federal programs or other sources. Nationwide, there are numerous shipments of Federally controlled or licensed radioactive material each year, for which the States and some municipalities already provide capable emergency response. Significant additional costs to States would likely not be incurred related to unique or different training to respond to potential transportation accidents involving SNF as compared to existing radioactive materials commerce. However, the NRC staff recognize that if

SNF is shipped to a CISF, some States, Tribes, or municipalities along transportation routes may incur costs for emergency response training and equipment that would otherwise likely be eligible for funding under NWPA Section 180(c) provisions if the DOE shipped the SNF from existing sites to a repository. Because needs of individual municipalities along transportation routes and the costs of this training and equipment vary widely, quantification of such would be speculative. Furthermore, how the States may distribute funding for first-responder training and equipment to local municipalities is not within NRC's authority and is beyond the scope of this EIS.

The operations stage of Phases 2-20 would require workers to carry out operation and maintenance activities commensurate to those as part of the proposed action (Phase 1). Holtec stated in their ER that no additional workers would need to be hired for these tasks (Holtec, 2020a); therefore, population, employment, housing, utilities, and community services previously evaluated for the proposed action (Phase 1) operations stage would not change. Holtec assumes that the operation costs would be the same for each phase, regardless of how many phases were active during an individual project year (EIS Section 8.3.2). Therefore, the NRC staff concludes that the annual socioeconomic impacts associated with operations of CISF Phases 2-20 would be SMALL.

Defueling

Defueling would involve removal of the SNF from the proposed CISF. Defueling the CISF would involve a similar workforce as that used to load and emplace the SNF during the operations stages previously evaluated for Phase 1 and Phases 2-20. Thus, defueling would be expected to have similar impacts for both direct (e.g., traffic, public services) and indirect (e.g., consumer goods) effects within the socioeconomic ROI compared to the earlier portion of the operations stage. Therefore, the NRC staff concludes that the potential impacts to socioeconomics during defueling would be SMALL.

4.11.1.2.1 Rail Spur

Holtec did not provide an estimate for the workforce needed for the rail spur operations stage, but the operation of the rail spur mostly involves offsite transportation of SNF; therefore, the socioeconomic impacts from operating the rail spur are addressed in the socioeconomic impact analysis in EIS Section 4.11.1.2 (Operations Impacts). Specifically, the NRC and BLM staffs conclude that maintenance activities on the rail spur would require fewer than the 40 operations workers, considered in EIS Section 4.11.1.2. In addition, the NRC and BLM staffs anticipate that the same train operators that are currently operating trains nationwide would be used to operate the trains used to transport SNF to the proposed CISF, and that they and their families would not move into the 4-county ROI from their current places of residence. Therefore,

population, employment, wages, and community services previously evaluated in EIS Section 4.11.1.2 would not change. Therefore, the NRC and BLM staffs conclude that the overall socioeconomic impacts associated with operations for the rail spur would be SMALL.

4.11.1.3 Decommissioning and Reclamation Impacts

At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. Decommissioning activities for the proposed action (Phase 1) and for Phases 2-20 would involve the same activities, but the activities would be scaled to address the overall size of the CISF (i.e., the number of phases completed).

Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area (Holtec, 2020a). Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; erosional control; and restoring and reclaiming disturbed areas. EIS Sections 2.2.1.4 and 2.2.1.7 describe the decommissioning and reclamation activities.

Potential environmental impacts on socioeconomics could result from hiring additional workers compared to the operations stage of the proposed action (Phase 1) to conduct radiological surveys; dismantle and remove equipment, materials, buildings, roads, rail, and other onsite structures; clean up areas; dispose of wastes; and reclaim disturbed areas. However, Holtec anticipates that the workforce needed for dismantling the proposed action (Phase 1) would not exceed the number of workers needed for the construction of the proposed CISF project (Holtec, 2020a). If no additional workers are hired beyond the number that were directly employed during the construction stage of the proposed action (Phase 1), then the NRC staff expects that there would be no increased demand for housing and public services during the decommissioning stage of the proposed action (Phase 1). There would be similar demands on resources such as roads (traffic) and water and other public services. Holtec estimates that the total decommissioning costs for the proposed action (Phase 1) would be $24,822,656 (EIS Table 8.3-3), which is less than the annual costs for the operation phase and would therefore have a small impact on the economy within the socioeconomic ROI.

Holtec estimates that the costs for decommissioning Phases 1-20 (full build-out) would be $496,453,127 (EIS Table 8.3-3). Based on the RIMS II analysis and the same multipliers used to estimate construction impacts (BEA, 2021), the NRC staff estimates that decommissioning the CISF project would generate $744,700,00 of annual output and $362,600,000 of labor earnings within the ROI, resulting in a MODERATE and beneficial impact. There is uncertainty regarding socioeconomic conditions in the ROI at license termination. Technological progress and improvements in our understanding of best practices would play an important role at the end of the license term of the proposed CISF project by changing both the type of services available in the region and the manner in which they are delivered. The development of a final closure plan would occur in accordance with 10 CFR Part 72 requirements closer to the date of actual decommissioning. The NRC staff would take into consideration the likely socioeconomic environment in which the closure would take place and draw upon other closure experiences in the region, including strategies used and lessons learned.

The NRC staff anticipates that the potential socioeconomic impacts from dismantling the proposed CISF project Phases 1-20 would not exceed the estimated socioeconomic impacts determined in EIS Section 4.11.1.1.1 for construction of proposed action (Phase 1) during peak employment. Thus, the NRC staff concludes that the socioeconomic impacts from decommissioning and reclamation of the proposed CISF project would be SMALL to MODERATE.

4.11.1.3.1 Rail Spur

Dismantling the rail spur would include activities necessary to release the proposed rail spur location for unrestricted use, in accordance with BLM requirements. The workforce would be similar to or less than that used to construct the rail spur. Activities would include radiological and site surveys, dismantling and removing any equipment and the rail line (unless BLM determines to keep the infrastructure), and recontouring and reseeding disturbed areas. There would not be detectable changes in the potential socioeconomic impacts during dismantling of the rail spur. Therefore, the NRC and BLM staffs conclude that the potential socioeconomic impacts of decommissioning the rail spur would be SMALL.

4.11.2 No-Action Alternative

Under the No-Action alternative, the NRC would not license the proposed CISF project. Within the 4-county socioeconomic ROI for the proposed CISF project, socioeconomic impacts from the proposed project would be avoided because no workers or materials would be needed to build the CISF, and no tax revenues from the CISF would be generated. Operational impacts would also be avoided because no workers would be needed to operate the proposed CISF project, and no tax revenues would be generated. Socioeconomic impacts from decommissioning activities would not occur because there would be no facility to decommission. The proposed CISF project property would continue to be privately owned, and existing land uses would continue. The current socioeconomic conditions on and near the project would remain essentially unchanged under the No-Action alternative. In the absence of a CISF, the NRC staff assumes that SNF would remain onsite in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue, as detailed in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available.

4.12 Environmental Justice

4.12.1 Impact from the Proposed CISF

Environmental justice refers to the Federal policy established in 1994 by Executive Order 12898 (59 FR 7629) that directs Federal agencies to identify and address disproportionately high and adverse human health and environmental effects of its programs, policies, and activities on minority or low-income populations. As an independent agency, the Executive Order does not automatically apply to the NRC. But as reflected in its subsequent Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions (69 FR 52040), the NRC strives to meet the goals of EO 12898 through its normal and traditional NEPA review process.

Appendix B to this document provides additional information on the NRC staff's methodology for addressing environmental justice in environmental analyses. This environmental justice review includes an analysis of the human health and environmental impacts on low-income and minority populations resulting from the proposed action (Phase 1), Phases 2-20, and the No-Action alternative. EIS Section 3.11.1.3 explains why the NRC staff use block groups for evaluating census data and defines and identifies the minority and low-income populations within the 80-km [50-mi] radius of the proposed CISF project. EIS Section 3.11.1.3 also explains the NRC staff's 50 percent or greater than 20 percent criteria in NUREG–1748 Appendix C (NRC, 2003), and the more inclusive criteria applied to this analysis (i.e., including census block groups with a percentage of Hispanics or Latinos at least as great as the statewide average) for identifying potentially affected environmental justice populations. There are 115 block groups that fall completely or partially within the 80-km [50-mi] radius of the proposed project area. Of the 115 block groups, 67 have minority populations that meet one of the above criteria. The majority of the 67 block groups are located in Lea County in and around the City of Hobbs. Of the 115 block groups within 80 km [50 mi] of the proposed CISF project, 14 block groups have potentially affected low-income families and low-income individuals. The locations of these block groups that represent environmental justice populations are shown on EIS Figures 3.11-4 and 3.11-5. Appendix B provides additional detail about the minority populations in the 115 block groups.

4.12.1.1 Construction Impacts

For each of the areas of technical analysis presented in this EIS, a review of impacts to the human and natural environment was conducted to determine if any minority or low-income populations could be subject to disproportionately high and adverse impacts from the proposed action. The primary resource areas that construction could affect are land use, transportation, soil, groundwater quality, groundwater quantity, air quality, ecology, socioeconomics, and radiological health. The following discussion summarizes proposed project impacts on the general population and addresses whether or not minority and low-income populations would experience disproportionately high and adverse impacts during the construction stage for the proposed action (Phase 1) and Phases 2-20. The NRC staff considered the CEQ's Environmental Justice Guidance under the National Environmental Policy Act, NRC's general guidelines on the evaluation of environmental analyses in "Environmental Review Guidance for Licensing Actions Associated with NMSS (Nuclear Material Safety and Safeguards) Programs" (NUREG–1748), and NRC's final policy statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions (69 FR 52040) in determining potential environmental justice impacts (CEQ, 1997; NRC, 2003). A more detailed list of the impacts from the proposed project, as evaluated in other sections of this EIS, is provided in Appendix B.

In summary, the NRC staff considered the potential physical environmental impacts and the potential radiological health effects from constructing the proposed CISF project (full build-out) to identify means or pathways for the proposed action to disproportionately affect minority or low-income populations including through shallow aquifers. The NRC staff evaluated well data for shallow groundwater wells within an 80-km [50-mi] radius of the proposed site and determined the locations of all active shallow groundwater wells that may serve potential environmental justice populations. The NRC staff determined that those wells that are used for purposes other than oil and gas, commercial, or industrial are located upgradient from the proposed project, and the alluvium in the area is discontinuous; thus, potentially affected environmental justice populations are unlikely to be affected by water infiltration that may occur at the proposed project area. In addition, as stated in EIS Appendix B, there are no credible accident scenarios for the proposed CISF project, and therefore there are no potential for releases of radionuclides to air or ground (including to water resources) that could result in significant effects to any offsite populations. Thus, the NRC staff did not identify any means or pathways for the proposed action to disproportionately affect minority or low-income populations. No commercial crop production takes place within the proposed project area. Also, as stated in EIS Section 4.6.1, there is no adequate habitat within the proposed project area to support aquatic life (e.g., fish); therefore, no analysis was performed for subsistence consumption of fish. Because land access restrictions would limit hunting, and no fish or crops on the land are available for consumption, the NRC staff concludes that there is minimal, if any, risk of radiological exposure through subsistence consumption pathways. Moreover, adverse health effects to all populations, including minority and low-income populations, are not expected under the proposed action, because Holtec is expected to maintain current access restrictions (EIS Section 2.2); comply with license requirements, including sufficient monitoring to detect radiological releases (EIS Chapter 7); and maintain safety practices following a radiation protection program that addresses the NRC safety requirements in 10 CFR Parts 72 and 20 (EIS Section 4.13.1.2).

After reviewing the information presented in the license application and associated documentation, considering the information presented throughout this EIS including site visits and historic and cultural consultations, and considering any special pathways through which environmental justice populations could be more affected than other population groups, the NRC staff did not identify any high and adverse human health or environmental impacts and conclude that no disproportionately high and adverse impacts on any environmental justice populations would exist.

Because all phases are located within the proposed project area, the construction of the proposed action (Phase 1) would affect the same minority and low-income populations as the construction of Phases 2-20. As determined for the proposed action (Phase 1) construction stage impacts on environmental justice populations, the NRC staff did not identify any special pathways during construction of Phases 2-20 through which environmental justice populations could be more affected than other population groups. Therefore, the NRC staff determines that no disproportionately high and adverse impacts from the proposed action (Phase 1) or Phases 2-20 on any environmental justice populations would exist.

4.12.1.1.1 Rail Spur

For each of the areas of technical analysis presented in this EIS, a review of impacts to the human and natural environment was conducted to determine if any minority or low-income populations could be subject to disproportionately high and adverse impacts from the proposed action. The construction of the proposed rail spur would affect the same minority and low-income populations within an 80-km [50-mi] radius around the proposed CISF project as the construction of proposed action (Phase 1) and Phases 2-20. The primary resource areas that construction of the rail spur could be affected are land use, transportation, soil, groundwater quality, groundwater quantity, air quality, ecology, socioeconomics, and human (radiological) health. The potential impacts from construction of the proposed action (Phase 1) and Phases 2-20 on land use, soils, groundwater quality, groundwater quantity, air quality, ecology, and human health would be SMALL, and SMALL to MODERATE for socioeconomics. After reviewing the information presented in the license application and associated documentation, considering the information presented in related sections of this EIS, and considering any special pathways through which environmental justice populations could be more affected than other population groups, the NRC staff did not identify any high and adverse human health or environmental impacts and conclude that no disproportionately high and adverse impacts on any environmental justice populations would exist. Therefore, the NRC and BLM staffs determine that no disproportionately high and adverse impacts on any environmental justice populations would exist.

4.12.1.2 Operations Impacts

The primary environmental resources that the operation of the proposed action (Phase 1) could affect are the same as those discussed in EIS Section 4.12.1.1.1. The NRC evaluated the proposed action (Phase 1) operations stage impacts in this EIS for land use (Section 4.2.1.2), transportation (Section 4.3.1.2), soils (Section 4.4.1.2), groundwater quality (Section 4.5.2.1.2), groundwater quantity (Section 4.5.2.1.2, air quality (Section 4.7.1.1.3), ecology (Section 4.6.1.2), and socioeconomics (Section 4.11.1.2). In each of these sections, the NRC concluded that the impacts from the proposed action (Phase 1) operations would be SMALL, with the exception of a SMALL-to-MODERATE impact on ecological resources.

For human health, the proposed action (Phase 1) operations stage of the proposed facility would require shipment of SNF to and from the facility and hazardous, mixed, and low-level radioactive waste (LLRW) to disposal facilities. Potential accident scenarios associated with rail transportation could result in members of the general public being exposed to additional levels of radiation beyond those associated with normal operations (EIS Section 4.15); however, minority and low-income populations would not be more obviously at risk than the general population because during normal operations and off-normal conditions, the requirements of 10 CFR Part 20 must be met. The NRC staff concludes in EIS Section 4.13 that impacts from the operations stage of the proposed action (Phase 1) on public and occupational health would be SMALL. The NRC staff further concluded that because the annual occupational radiation doses would be limited by regulation and administratively controlled in accordance with applicable radiation protection plans, the radiological impact to workers from incident-free transportation of SNF to and from the proposed CISF project would be SMALL.

In summary, in this EIS, the NRC staff concluded that the impacts of the proposed action (Phase 1) operations stage on the resources evaluated would be SMALL for most resources, with the exception of a SMALL to MODERATE impact on ecological resources. The NRC staff found no activities, resource dependencies, preexisting health conditions, or health service availability issues resulting from normal operations at the proposed CISF project that would cause a health impact for the members of minority or low-income communities within the study area. Therefore, it is unlikely that normal operations of the proposed action (Phase 1) would disproportionately and adversely affect any minority or low-income population.

For Phases 2-20, the potential impacts would affect the same minority and low-income populations within an 80-km [50-mi] radius of the proposed CISF project as the operations stage of the proposed action (Phase 1). The NRC staff determined that adverse health effects to all populations, including minority and low-income populations, are not expected during the operations stage of the proposed action (Phase 1) or for Phases 2-20. Similarly, the NRC staff concludes that there would be no disproportionately high and adverse impacts on low-income and minority populations from the operations stage for Phases 2-20.

Defueling

The NRC staff determined that radiological exposure to workers and the public during the proposed action (Phase 1) and Phases 2-20 activities would not exceed exposures experienced when SNF is emplaced at the proposed CISF project. Because the NRC staff determined that adverse health effects to all populations, including minority and low-income populations, are not expected during the proposed action (Phase 1) and Phases 2-20, the NRC staff concludes that there would be no disproportionately high and adverse impacts on low-income and minority populations from defueling.

4.12.1.2.1 Rail Spur

The operations stage of all phases would utilize a rail spur to transfer SNF from the main rail lines to the proposed CISF. Holtec would conduct routine monitoring of the rail line. The maintenance of the rail spur is anticipated to have a minimal impact on the natural or physical environment. Additionally, the NRC and BLM staffs have not identified any potential impacts on the natural or physical environment from using the rail spur that would significantly and adversely affect a particular population group. Therefore, the NRC and BLM staffs conclude that the rail spur would have no disproportionately high and adverse impacts on any group, including minority and low-income populations.

4.12.1.3 Decommissioning and Reclamation Impacts

At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. Decommissioning activities for the proposed action (Phase 1) and for Phases 2-20 would involve the same activities, but the activities would be scaled to address the overall size of the CISF (i.e., the number of phases completed).

Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area (Holtec, 2020a). Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; erosional control; and restoring and reclaiming disturbed areas. EIS Sections 2.2.1.4 and 2.2.1.7 describe the decommissioning and reclamation activities.

The NRC staff's examination of the various environmental pathways reveals that there would be no disproportionately high and adverse impacts on low-income and minority populations from decommissioning the proposed facility.

Reclamation activities, including dismantling, would be similar to the construction activities for the proposed action (Phase 1). The additional impacts on low-income and minority populations from dismantling the proposed CISF project Phases 2-20 are not expected to significantly change the estimated impacts low-income and minority populations experience from decommissioning the proposed action (Phase 1). Therefore, the NRC staff's examination of the various environmental pathways reveals that there would be no disproportionately high and adverse impacts on low-income and minority populations from decommissioning Phases 2-20.

4.12.1.3.1 Rail Spur

Decommissioning of the proposed rail spur would affect the same minority and low-income populations within an 80-km [50-mi] radius of the proposed CISF project as the construction and operation of the proposed project. The primary resource areas that decommissioning the rail spur could affect are land use, soil, groundwater quality, groundwater quantity, air quality, ecology, socioeconomics, and human (radiological) health, and the potential impacts would be SMALL. After reviewing the information presented in the license application and associated documentation, considering the information presented in the referenced sections of this EIS, and considering any special pathways through which environmental justice populations could be more affected than other population groups, the NRC and BLM staffs did not identify any high and adverse human health or environmental impacts and conclude that no disproportionately high and adverse impacts on any environmental justice populations would exist.

4.12.2 No-Action Alternative

Under the No-Action alternative, the NRC would not license the proposed CISF project. Therefore, impacts from the CISF on land use, transportation, soils, water resources, air quality, ecological resources, socioeconomics, and human health would not occur. Construction impacts would be avoided because CISF storage pads, buildings, and transportation infrastructure would not be built. Operational impacts would also be avoided because no SNF canisters would arrive for storage. The current physical environmental conditions on and near the project would remain essentially unchanged under the No-Action alternative and thus there would be no high and adverse impact on minority or low-income populations. In the absence of a CISF, the NRC staff assumes that SNF would remain onsite in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue as detailed in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available.

4.13 <u>Public and Occupational Health</u>

The potential radiological and nonradiological effects from the proposed CISF project may occur during all stages of the project life cycle. Additionally, the potential hazards and associated effects can be either radiological or nonradiological. Therefore, the analysis in this section evaluates the potential radiological and nonradiological public and occupational health and safety effects for normal conditions for each stage of the proposed CISF project. Normal conditions refers to proposed activities that are executed as planned. The impacts of potential accident conditions, when unplanned events can generate additional hazards, are evaluated in EIS Section 4.15.

4.13.1 Impacts from the Proposed Facility

The environmental impacts on public and occupational health and safety for the proposed action (Phase 1), Phases 2-20, and the No-Action alternative are described in the following sections.

4.13.1.1 Construction Impacts

Construction activities at the proposed CISF would include clearing and grading for roads; excavating soil, building foundations, and assembling buildings; constructing the rail spur, and laying fencing. Workers and the public could be exposed to nonradiological emissions during the construction stage. Nonradiological exposures may result from inhalation of combustion emissions and fugitive dust from vehicular traffic and construction equipment. Holtec has proposed implementing standard dust control measures, such as water application or chemical dust suppression compounds, to reduce and control fugitive dust emissions (Holtec, 2020a). Therefore, the NRC staff estimates that the inhalation of fugitive dust would not result in an increased hazard to workers and the general public during the construction stage of the proposed action (Phase 1) and Phases 2-20 of the proposed CISF project.

The construction stage of the proposed action (Phase 1) would be conducted without the presence of project-related radioactive materials; therefore, there would be no worker radiation exposure from stored SNF. As construction proceeded to Phases 2 and beyond, loaded storage casks would be present at the proposed action (Phase 1) pad, and on-going adjacent construction activities would result in the installation of additional subsurface storage casks near the existing loaded storage casks. Therefore, the Phase 2 excavation would remove the shielding provided by soil, and occupational exposure to radiation [e.g., emitted laterally from the subsurface proposed action (Phase 1) modules] would occur. This circumstance was previously accounted for in the NRC certification of the Holtec HI-STORM UMAX cask system to ensure that suitable shielding was provided on the subsurface casks and an adequate buffer distance was defined to limit the dose rate to construction workers at an adjacent excavation to acceptable levels (Holtec, 2016).

Nonradiological impacts to construction workers during the construction stage of the proposed action (Phase 1) and Phases 2-20 of the proposed CISF project would be limited to the normal hazards associated with construction (i.e., no unusual situations would be anticipated that would make the proposed construction activities more hazardous than normal for an industrial construction project). The proposed CISF project would be subject to Occupational Safety and Health Administration (OSHA's) General Industry Standards (29 CFR Part 1910) and Construction Industry Standards (29 CFR Part 1926). These standards establish practices, procedures, exposure limits, and equipment specifications to preserve worker health and safety.

Occupational hazards within the construction industry, typically including overexertion, falls, or being struck by equipment (NSC, 2018), can result in fatal and nonfatal occupational injuries. To estimate the number of potential injuries for the construction stage of the proposed action (Phase 1) and Phases 2-20 of the proposed CISF project (as well as for the operation and decommissioning stages), the NRC staff considered the National Safety Council (NSC, 2018) annual data on fatal and nonfatal occupational injuries. This includes Bureau of Labor Statistics (BLS) and OSHA compiled data. BLS and OSHA data applicable to construction were used to estimate the occupational injuries for construction and decommissioning. The data applicable to the trucking and warehousing industry were used to estimate the occupational injuries for the operations stage. EIS Table 4.13-1 presents the expected number of potentially fatal and nonfatal occupational injuries for each stage of the proposed CISF project. Over the 2-year duration of the construction stage of the proposed action (Phase 1), the estimated fatalities are less than one, and the total number of estimated construction injuries is five. Over the proposed 19-year duration of construction of Phases 2-20, the fatality estimate is also less than one, and the total number of estimated construction injuries is 49. Because the construction activities at the proposed CISF during any phase would be typical and subject to applicable occupational health and safety regulations, there would be only minor impacts to worker health and safety from construction-related activities. Therefore, the NRC staff concludes that the nonradiological occupational health effects of the construction stage of the proposed action (Phase 1) and the construction stage of Phases 2-20 would be minor.

Further reduction in the estimated occupational safety hazards from construction may be possible by following established safety practices, such as those OSHA recommended (OSHA, 2016).

The potential nonradiological air quality impacts from fugitive dust and diesel emissions, including comparisons with health-based standards, are evaluated in EIS Section 4.7.1.1. Fugitive dust emissions would occur primarily from travel on unpaved roads and wind erosion. Construction equipment would be diesel powered and would emit diesel exhaust, which includes small particles (PM_{10}) and a variety of gases. In EIS Section 4.7.1.1, the NRC staff concluded that construction stage air emissions would have a SMALL impact on air quality because the pollutant concentrations would be low compared to the National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration (PSD) thresholds. Additionally, Holtec's compliance with Federal and State occupational safety regulations would limit the potential nonradiological effects of fugitive dust and diesel emissions to levels acceptable for workers. Based on the foregoing analysis, the NRC staff concludes that overall impacts on workers and the general public from the construction stage of the proposed action (Phase 1) and the construction stage of Phases 2-20 would be SMALL.

Table 4.13-1 Estimated Fatal and Non-Fatal Occupational Injuries for the Proposed CISF Project by Work Activity and Project Phase						
Activity	**Number of Full-time Workers***	**Duration (years)**	**Fatal Injury Rate***	**Estimated Fatalities**	**Non-Fatal Injury Rate†**	**Estimated Non-Fatal Injuries**
Construction–proposed action (Phase 1)	80	2	9.8×10^{-5}	0.016	3.2×10^{-2}	5
Construction–Phases 2-20	80	19	9.8×10^{-5}	0.15	3.2×10^{-2}	49
Operation–proposed action (Phase 1)	40	1	1.3×10^{-4}	0.0052	4.5×10^{-2}	1.8
Operation–Phases 2-20	40	19	1.3×10^{-4}	0.099	4.5×10^{-2}	34
Decommissioning proposed action (Phase 1)	80	2	9.8×10^{-5}	0.016	3.2×10^{-2}	5
Decommissioning–Phases 2-20	80	2	9.8×10^{-5}	0.016	3.2×10^{-2}	5
Total				0.30		100

*The number of operational workers does not include security staff who would not be directly involved in the proposed project activities evaluated for injuries and fatalities.
†Source: NSC, 2018. The fatal and nonfatal injury rates are the number of reported occupational deaths and nonfatal medically consulted occupational injuries per annual worker full-time equivalent for construction and transportation and warehousing industries.

4.13.1.1.1 Rail Spur

For the rail spur, construction activities could contribute to radiological and nonradiological impacts to workers and the public. However, the construction activities conducted for the rail spur would be significantly less than the construction activities for the proposed CISF project and therefore would be expected to result in fewer occupational injuries and fatalities. Because the proposed CISF has not involved prior use of radioactive materials, the radioactive materials present in the proposed project area would be naturally occurring. Therefore, the NRC and BLM staffs conclude that the public and occupational health impacts of constructing the rail spur, which would be completed as part of the construction stage of the proposed action (Phase 1), would be SMALL.

4.13.1.2 Operations Impacts

Operational activities at the proposed CISF would include the receipt, transfer, handling, and storage of canistered SNF. During these activities, the radiological impacts would include expected occupational and public exposures to low levels of radiation. The nonradiological impacts would include the potential for typical occupational injuries and fatalities during the proposed CISF operations.

The radiological impacts from normal operations involve radiation doses to workers and members of the public. Operational worker doses would occur as a result of the proximity of workers to SNF casks and canisters during receipt, transfer, handling, and storage operations. Public radiation doses from normal operations occur from offsite exposure to low levels of direct radiation from the stored SNF casks. Holtec would monitor and control both occupational and public radiation exposures by following a radiation protection program that addresses the NRC safety requirements in 10 CFR Parts 72 and 20. The following detailed evaluations of the radiological effects to workers and the public from normal operations at the proposed CISF is based on the NRC staff's site-specific review.

Holtec estimated occupational radiation exposures during proposed operations involving the receipt and inspection of the shipping cask, transfer of the canister from the shipping cask to the transfer cask (the HI-TRAC CS), movement of the transfer cask to the storage pad, and loading the canister into the HI-STORM cask at the storage pad (Holtec, 2020b). Holtec's estimated dose rate values included both neutron and gamma contributions for fuel compositions considered to be representative of typical SNF. Detailed dose estimates for each step of the process are documented in Holtec's SAR Table 11.3-1 (Holtec, 2020b). Per individual canister, the collective dose estimate for the entire crew was 0.0082 person-Sv [0.82 person-rem]. The person-Sv (person-rem) is an expression of the collective dose equivalent exposure to a number of individuals doing different tasks. These estimates were conservative because they did not account for shielding. Holtec provided additional estimates in the ER, based on actual experience loading over 800 storage systems at other sites (Holtec, 2020a). This loading experience resulted in a collective dose for a crew of 20 workers of 0.2 person-rem (200 person-mrem) for loading a canister over a week's time; therefore, Holtec estimated a single worker's annual dose would be 500 mrem (i.e., 200 person-mrem/week × 50 weeks/yr/20 workers).

The NRC staff's review of Holtec's worker dose estimate found that it did not account for the amount of work Holtec planned to be completed within a year based on the schedule provided in the ER (Holtec, 2020a). The NRC considered Holtec's reported duration of these handling operations in SAR Table 11.3-1, of approximately 20 hours per canister, and the total annual number of canisters expected to be received and processed (500) during the operations stage of the proposed action (Phase 1), and the operations stage of any single phase of Phases 2-20, and scaled the Holtec single worker dose estimate to accomplish this amount of work in a year. The resulting single worker annual dose estimate for processing 500 canisters during any single phase was 0.025 Sv [2.5 rem] (i.e., 500 mrem/yr × 1 year/50 origin canisters × 1 origin canister loaded/week × 1 week/2 Holtec canisters loaded × 500 Holtec canisters loaded/yr × 1 rem/1000 mrem). This estimated dose, applicable to the most highly exposed group of workers, is below the 0.05 Sv/yr (5 rem/yr) occupational dose limit specified in 10 CFR 20.1201(a) for occupational exposure. Because these exposures do not exceed NRC dose limit for workers, the NRC staff concludes that the radiological impacts to workers during the operations stage of the proposed action (Phase 1) and the operations stage of Phases 2-20 would be minor.

To assess the radiological impacts to the general public from normal operation of the proposed CISF project, the NRC staff evaluated Holtec's estimates of the potential dose to a hypothetical maximally exposed individual located at the boundary of the proposed CISF project controlled area (i.e., protected area), as well as to nearby residents. Holtec defined the hypothetical maximally exposed individual as the individual that, because of proximity, activities, or living habits, could receive the highest possible dose of radiation. They placed the hypothetically maximally exposed individual at the closest publicly accessible site boundary location. Because the direct radiation emitted from the storage modules under normal operations decreases with distance, the nearest publicly accessible location is the location where the radiation dose rate is the highest for a member of the public.

The potential exposure pathways at the proposed CISF include direct exposure to radiation (neutrons and gamma rays), including skyshine, emitted from the storage casks.
Exposure pathways that would require a release of radioactive material from the casks

(e.g., environmental transport to air, water, soil, and subsequent inhalation or ingestion) are not applicable to normal operations. The potential for release of radioactive material is addressed separately in the EIS accident analysis (Section 4.15). Factors that contribute to the containment of SNF during normal operations include the use of sealed (welded closure) canisters that would remain closed for the duration of storage, the engineered features of the cask system, and plans to reject and return canisters that have unacceptable external contamination (Holtec, 2020b).

Holtec calculated dose rates for locations at the boundary of the CISF for the HI-STORM cask design (Holtec, 2020a). The location of the maximum dose to an individual at the proposed controlled area (i.e., protected area) boundary of the CISF is at the nearest fence line 400 m [1,300 ft] from the proposed storage pads. Holtec provided dose estimates that assumed that the proposed CISF was fully loaded and consisted of an array of 500 HI-STORM storage casks for the operations stage of the proposed action (Phase 1) and any single phase of Phases 2-20, as well as 10,000 HI-STORM storage casks for full build-out (Holtec, 2020a,b). Holtec assumes each cask array contained 45 Gigawatt-Day/MTU [GWD/MTU] burnup, 8-year cooled, and 3.2 weight percent enriched PWR SNF (Holtec, 2020b). Holtec derived these SNF characteristics by modifying the design-basis fuel (that was used in the NRC certification of the HI-STORM storage casks) to meet the thermal limit of the HI-STAR 190 transportation cask that Holtec plans to use for the transportation of the SNF to the CISF (Holtec, 2020a). The NRC staff considers this an acceptable adjustment because the SNF would have to comply with the design specifications (including the thermal limit) in the certificates of compliance for both the storage and transportation casks and in this case the transportation cask thermal limit would bound the characteristics of SNF that could be shipped in the transportation cask to the CISF.

For the operations stage of the proposed action (Phase 1) and any single phase of Phases 2-20, Holtec estimated an annual dose of 0.022 mSv [2.2 mrem] to a hypothetical individual that spends 2,000 hours at the fence line 400 m [1,300 ft] from the proposed CISF (Holtec, 2020b). Doses to actual individuals further away from the proposed CISF project or who spend less than 2,000 hours at the proposed project boundary would be smaller. The estimated 0.022 mSv [2.2 mrem] dose is less than the 0.25 mSv [25 mrem] regulatory limit specified in 10 CFR 72.104 for the maximum permissible annual whole-body dose to any real individual. Additionally, the 0.022 mSv [2.2 mrem] dose is less than 1 percent of the annual average natural background radiation dose in the United States of 3.1 mSv [310 mrem] (EIS Section 3.11.1.1).

For the full build-out (Phases 1-20) of 10,000 loaded canisters, Holtec estimated an annual dose of 0.122 mSv [12.2 mrem] to a hypothetical individual that spends 2,000 hours at the fence line 400 m [1,300 ft] from the proposed CISF (Holtec, 2020a). Doses to actual individuals further away from the proposed CISF project or who spend less than 2,000 hours at the boundary would be smaller. The estimated 0.122 mSv [12.2 mrem] dose is less than the 0.25 mSv [25 mrem] regulatory limit specified in 10 CFR 72.104 for the maximum permissible annual whole-body dose to any real individual. Additionally, the 0.122 mSv [12.2 mrem] dose is less than 4 percent of the annual average natural background radiation dose in the United States of 3.1 mSv [310 mrem].

The nearest current resident is Salt Lake Ranch, 2.4 km [1.5 mi] north of the proposed CISF (Holtec, 2020a). Additional residences exist at the Bingham Ranch 3.2 km [2 mi] south and at the R360 complex, 3.2 km [2 mi] southwest. At large distances, absorption and attenuation of radiation in the air significantly reduces the dose. Holtec calculated the dose to residents assuming 8,760 hours (an entire year) were spent at a location 1 km from the CISF without shielding by a residence or other structures. The calculated 0.00089 mSv [0.089 mrem] annual dose assuming 500 loaded storage casks for the operations stage of the proposed action (Phase 1) and any single phase of Phases 2-20 (Holtec, 2020b) and the calculated 0.018 mSv [1.8 mrem] annual dose based on full build-out (Holtec, 2020a) are both smaller than the 0.25 mSv [25 mrem] regulatory limit specified in 10 CFR 72.104 for the maximum permissible annual whole body dose to any real individual. The 0.00089 mSv [0.089 mrem] annual dose and the 0.018 mSv [1.8 mrem] annual dose are less than 0.03 percent and 0.6 percent of the annual average natural background radiation dose in the United States, respectively.

The NRC staff reviewed Holtec's public dose calculation methods, assumptions, and parameters and found them to be technically acceptable. The NRC staff also found that the calculated dose estimates were within expectations based on prior ISFSI public dose estimates (NRC, 2009; 2005b,c; 2001). Because Holtec's public dose estimates are a small fraction of the NRC public dose limit as well as the natural background radiation dose, the NRC staff concludes that the radiological impacts to the public from the operations stage of the proposed action (Phase 1), Phases 2-20, and full build-out would be minor.

Nonradiological impacts to operations workers would be limited to the normal hazards associated with CISF operations. The proposed CISF would be subject to OSHA's General Industry Standards (29 CFR Part 1910). These standards establish practices, procedures, exposure limits, and equipment specifications to preserve worker health and safety.

To estimate the number of potential injuries for operation of the proposed CISF project for the operations stage of the proposed action (Phase 1), Phases 2-20, and full build-out, the NRC staff considered annual data on fatal and non-fatal occupational injuries the National Safety Council (NSC, 2018) reported. This includes data the Bureau of Labor Statistics (BLS) and OSHA compiled. BLS and OSHA data applicable to the trucking and warehousing industry were used to estimate the occupational injuries for the active portion of the operations stage (e.g., receipt, transfer, and loading of casks), based on similarities to proposed activities (e.g., transfer of heavy objects, crane operations). EIS Table 4.13-1 presents the expected number of potentially fatal and nonfatal occupational injuries for each stage and by phase of the proposed CISF project. For the operations stage of the proposed action (Phase 1), the operations stage of Phases 2-20, and operations to full build-out, the estimate of fatalities is less than one, and the number of estimated injuries is 1.8, 34, and 100 respectively. Because the operation activities at the proposed CISF project would be typical and subject to applicable occupational health and safety regulations, there would be only small impacts to nonradiological worker health and safety from operations-related activities. Therefore, the NRC staff concludes that the nonradiological occupational health impacts of the operations stage of the proposed action (Phase 1), Phases 2-20, and full build-out would be minor.

Overall, based on the preceding analysis that considers occupational dose estimates for operations that are below applicable NRC standards, public dose estimates from CISF storage operations that are well below NRC standards, a small fraction of background radiation exposure, and small occupational injury estimates, the NRC staff concludes that the radiological and nonradiological public and occupational health impacts from the operations stage of the proposed action (Phase 1), Phases 2-20, and full build-out would be SMALL.

Defueling

Removal of the SNF from the proposed CISF project, or defueling, would involve reversing the activities conducted at the start of operations to receive, handle, and transfer SNF that arrived at the CISF from nuclear power plants and ISFSIs. Therefore, the public and occupational health impacts would be bounded by the impacts evaluated for receiving, handling, and transferring the SNF at the proposed CISF and would be SMALL.

4.13.1.2.1 Rail Spur

For the rail spur, the operation of the rail spur mostly involves offsite transportation; therefore, the additional impacts to workers and the public from operating the rail spur are addressed in the transportation impact analysis in EIS Section 4.3.1.2. The operation of the rail spur within the proposed CISF boundary is associated with the receipt of shipments, which is addressed in EIS Section 4.13.1.2. Therefore, the NRC and BLM staffs conclude that the public and occupational health impacts of the rail spur as part of the operations stage of the proposed action (Phase 1), Phases 2-20, and at full build-out would be SMALL.

4.13.1.3 Decommissioning and Reclamation Impacts

At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. Decommissioning activities for the proposed action (Phase 1) and for Phases 2-20 would involve the same activities, but the activities would be scaled to address the overall size of the CISF (i.e., the number of phases completed).

Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area (Holtec, 2020a). Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; erosional control; and restoring and reclaiming disturbed areas. EIS Sections 2.2.1.4 and 2.2.1.7 describe the decommissioning and reclamation activities.

Radiological safety during decommissioning activities would be maintained as required by the existing NRC-approved 10 CFR Part 20 compliant radiological protection plan and an NRC-approved decommissioning plan. The decommissioning plan would identify any areas of the facilities or grounds or materials where surveys may be needed to evaluate the radiological status prior to unrestricted release or disposal, in accordance with NRC regulations or guidelines.

As discussed in EIS Section 4.13.1.2, no radiological contamination of the facility, the storage casks, or storage pads is expected under normal operations. The removal of storage pads and related facilities during reclamation would involve activities similar to construction. The NRC assumes the same duration and number of workers would be needed to complete the reclamation activities as would be needed originally to construct the facility. Because the SNF would have been moved offsite to a permanent geologic repository prior to the start of decommissioning, no further exposures to workers or the public from SNF would occur.

The radiological exposures of workers to naturally occurring radioactive materials during reclamation of the proposed CISF project would be equal to or less than those evaluated for the construction stage in EIS Section 4.13.1.1. The nonradiological worker and public impacts during reclamation of the CISF would also be expected to be similar to construction. Thus, the estimates of worker fatalities and injuries for Phase 1 of construction are expected to be applicable to reclamation, as shown in EIS Table 4.13-1. Consequently, for the decommissioning and reclamation stage of the proposed action (Phase 1), the decommissioning and reclamation stage of Phases 2-20, and decommissioning and reclamation of full build-out, 5 nonfatal occupational injuries are anticipated, and 0.016 (i.e., less than one) fatal injury is anticipated. These estimates for Phases 2-20 or full build-out could increase if the number or workers or time needed to complete the reclamation work were increased; however, the overall number of expected fatalities and injuries would not be expected to exceed the occupational fatalities and injuries estimated for constructing full build-out of the CISF (less than one fatality and 54 injuries). Additionally, the impacts to workers and the public from nonradiological emissions of dust and equipment exhaust would be small and similar to construction impacts based on low pollutant concentrations, compared to the NAAQS and PSD thresholds.

Overall, based on the effective containment of SNF during operations under normal conditions, the existing radiological and nonradiological controls and decommissioning planning, and the similarity of reclamation activities and impacts to construction, the public and occupational health impacts for the decommissioning and reclamation stage of the proposed action (Phase 1), the decommissioning and reclamation stage of Phases 2-20, and decommissioning and reclamation of full build-out would be SMALL.

4.13.1.3.1 Rail Spur

For the rail spur, decommissioning activities could contribute to radiological and nonradiological impacts to workers and the public. However, the decommissioning activities conducted for the rail spur would be significantly less than the decommissioning activities for the proposed CISF project, and therefore would be expected to result in fewer occupational injuries and fatalities. Because of the radiological protection program and the containment of the casks and canisters, the NRC and BLM staffs do not anticipate the rail spur to have radiological contamination. Therefore, any radioactive materials present in the proposed project area would be naturally occurring. Therefore, the NRC and BLM staffs conclude that the public and occupational health impacts of decommissioning the rail spur as part of the decommissioning stage of the proposed action (Phase 1), decommissioning stage of Phases 2-20, and decommissioning of full build-out would be SMALL.

4.13.2 No-Action Alternative

Under the No-Action alternative, the NRC would not license the proposed CISF project. Therefore, public and occupational impacts such as typical construction hazards and the occupational and public radiation exposures from the proposed storage of SNF would not occur. Construction impacts would be avoided because SNF storage pads, buildings, and transportation infrastructure would not be built. Operational impacts would also be avoided because SNF receipt, transfer, or storage at the proposed CISF would not occur. Public and occupational impacts from the proposed decommissioning and reclamation activities would not occur, because unbuilt SNF storage pads, buildings, and transportation infrastructure would require no decommissioning and reclamation. The current public and occupational health conditions on and near the project would remain unchanged by the proposed CISF under the No-Action alternative. In the absence of a CISF, the NRC staff assumes that SNF would remain on-site in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue, as detailed in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available.

4.14 Waste Management

This section describes the potential impact to waste management for the proposed action (Phase 1), Phases 2-20, and the No-Action alternative.

4.14.1 Impacts from the Proposed CISF

EIS Section 2.2.1.6 provides a description of various waste streams the proposed CISF project generated. EIS Table 2.2-3 describes the quantities of waste the various CISF stages (construction, operation, and decommissioning and reclamation) generate for the waste streams analyzed in this EIS. The proposed CISF project generates two waste streams for which the impacts are analyzed elsewhere in the EIS: stormwater runoff impacts are analyzed in EIS Section 4.5.1 (Water Resources – Surface Water) and excavated soil impacts are analyzed in EIS Section 4.4 (Geology and Soils).

As described in EIS Section 2.2.1, at full build-out, the proposed CISF project would be constructed in 20 phases over a 21-year period (Holtec, 2020a). Holtec has proposed constructing an access road and rail spur to access the proposed CISF project, which would be constructed during the proposed action (Phase 1) (Holtec, 2020a). The following sections analyze the potential impacts on waste management from the construction, operation, and decommissioning and reclamation stages of the proposed CISF project, including the railroad spur.

4.14.1.1 Construction Impacts

For the proposed action (Phase 1), the construction stage would consist of building the storage modules and pad, as well as all of the infrastructure and facilities needed to support the proposed CISF project (e.g., cask transfer building, security building, administration building, access road, and concrete batch plant). The proposed action (Phase 1) would generate a volume of 5,080 metric tons [5,600 short tons] of nonhazardous solid waste over the 2-year construction stage (Holtec, 2020a), which is about 5.4 percent of the annual volume of waste disposed at the Sandpoint Landfill (EIS Section 3.13). Should the waste be disposed at the Lea County Solid Waste Authority Landfill, this percentage would be 5.8 (EIS Section 3.13).

Construction of the proposed action (Phase 1) would not generate hazardous waste such that Holtec expects to be classified as a Conditionally Exempt Small Quantity Generator (CESQG) (EIS Section 4.14.1.2). The proposed CISF project would store and dispose any hazardous waste produced during any phase of the proposed project in accordance with applicable State and Federal requirements.

Additionally, the proposed action (Phase 1) would generate 11,360 liters (L)/day [3,000 gal/day] of sanitary liquid waste. Sanitary liquid waste would be collected onsite using sewage collection tanks and underground digestion tanks and then disposed at an offsite treatment facility (Holtec, 2020a). Holtec has committed to (i) storage of waste in designated areas until the waste would be shipped offsite; (ii) use and regular maintenance of portable systems for handling sanitary wastes during construction; (iii) implementing procedures and practices for collection, temporary storage, processing, and disposal of categorized solid waste in accordance with regulatory requirements; and (iv) recycling of debris to the extent possible.

Furthermore, as described in EIS Section 2.2.1.6, the sanitary waste management systems would be designed and operated in accordance with all applicable NMED regulations (e.g., NMAC 20.6.2) and Federal standards. The NRC staff consider the amount of nonhazardous solid waste and sanitary liquid water the proposed action (Phase 1) construction stage generated to be minor in comparison to the capacity of the landfills and offsite disposal of sanitary waste.

For construction of Phases 2-20, the total nonhazardous solid waste the proposed CISF project generated over the project schedule described in EIS Section 2.2.1.6 would be 96,525 metric tons [106,394 short tons] (Holtec, 2020a). This would be about 3.3 percent of the remaining capacity of the Sandpoint Landfill, based on multiplying the annual volume of waste disposed at this landfill by the projected lifespan of this landfill (Holtec, 2020a). Should the waste be disposed at the Lea County Solid Waste Authority Landfill, this percentage would be 3.0 (Holtec, 2020a). The NRC staff anticipates that all mitigation measures implemented as part of the proposed action (Phase 1) would also apply for Phases 2-20. The NRC staff considers that the amount of nonhazardous solid waste the construction stage for Phases 2-20 generated would be minor in comparison to the capacity of the landfills to dispose of such waste.

Construction of Phases 2-20 would generate limited volumes of hazardous waste such that Holtec expects to be classified as a CESQG. The proposed CISF project would store and dispose any hazardous waste in accordance with applicable State and Federal requirements.

For Phases 2-20, the proposed project would also generate 11,360 L/day [3,000 gal/per day] of sanitary liquid waste, which is the same as for the proposed action (Phase 1) with the same disposal and mitigation for liquid waste. For Phases 2-20 (i.e., 19 years) the total sanitary liquid waste produced, as determined by multiplying daily waste production {i.e., 11,360 L/day [3,000 gal/per day]} by 365 days/year and 19 years, would be approximately 78,781,600 L [20,805,000 gal] in total. The NRC staff considers the amount of liquid sanitary waste the proposed CISF construction stage generated to be relatively minor in comparison to the capacity of publicly owned treatment works to process such waste. Therefore, the NRC staff concludes that the impact for waste streams for both the proposed action (Phase 1) and for Phases 2-20 would be SMALL.

4.14.1.1.1 Rail Spur

Small quantities of nonhazardous waste (e.g., rail construction waste) are anticipated to be generated from construction of the rail spur. In addition, the NRC and BLM staffs assume that a minor quantity of sanitary waste would be generated during construction of the rail spur (Holtec, 2020a). The amounts of waste generated would be much less than those generated during the construction of the proposed CISF storage pads, buildings, and other infrastructure; therefore, the NRC and BLM staffs conclude that the potential impacts to waste management for the construction stage of the rail spur would be SMALL.

4.14.1.2 Operations Impacts

As described in EIS Table 2.2-3, the operations stage generates hazardous waste, sanitary liquid wastes, nonhazardous solid waste, and LLRW.

The proposed action (Phase 1) would involve limited activities that generate hazardous waste, such as the use of solvents or other chemicals during operations (Holtec, 2020a). Holtec estimates that the operations stage would generate up to 1.2 metric tons [1.32 short tons] per year of hazardous waste. Based on this volume of waste, Holtec expects to be classified as a Conditionally Exempt Small Quantity Generator (CESQG) (Holtec, 2020a). The proposed CISF project would store and dispose of the hazardous waste in accordance with applicable State and Federal requirements. The NRC staff considers the amount of hazardous waste that the operations stage for the proposed action (Phase 1) would generate to be minor in comparison to the capacity for disposing of such waste.

The proposed action (Phase 1) would generate 11,360 L/day [3,000 gal/day] of sanitary liquid waste. As during the construction stage, Holtec would dispose of sanitary liquid waste using sewage collection tanks and underground digestion tanks which, as described in EIS Section 2.2.1.6, would be designed and operated in accordance with all applicable NMED regulations (e.g., NMAC 20.6.2) and Federal standards (Holtec, 2020a). The NRC staff considers the amount of liquid sanitary waste that the CISF operations stage would generate to be minor in comparison to the capacity of publicly owned treatment works to process such waste.

The amount of nonhazardous solid waste the proposed action (Phase 1) would generate during the operations stage would be 91.1 metric tons [100.4 short tons] per year. (Holtec, 2020a). The amount of this type of waste the operations stage generates would be commensurate with typical office and personnel waste the work force produced at the proposed CISF project. The nonhazardous solid waste the proposed action (Phase 1) generated would be relatively minor in comparison to the capacity of the landfills.

The operations stage for the proposed action (Phase 1) would generate limited amounts of LLRW, consisting of contamination survey rags, anti-contamination garments, and other health physics materials (Holtec, 2020a). Per EIS Section 2.2.1.6, there are two different facilities (i.e., Waste Control Specialists and Energy*Solutions*) that could receive the LLRW from the proposed project, both of which have significant available disposal capacity. The operations stage would generate a volume of 0.45 metric tons [0.50 short tons] of LLRW (Holtec, 2020a). Historically, private industry has met the demand for LLRW disposal capacity. The NRC expects that this trend would continue into the future. The NRC staff considers the amount of LLRW that the operations stage of the proposed action (Phase 1) would generate to be minor.

The NRC staff does not expect that hazardous, nonhazardous, and sanitary waste volumes that would be generated during operations would be greater than waste volumes produced during the construction stage. A small amount of LLRW would be generated during the operations stage. Holtec estimates that the operations stage for Phases 2-20 would generate 1.2 metric ton per year [1.32 short tons] of hazardous waste (e.g., solvents or other chemicals) (Holtec, 2020a). As with the proposed action (Phase 1) given this volume of waste, Holtec expects to be classified as a Conditionally Exempt Small Quantity Generator (Holtec, 2020a). For nonhazardous waste for Phases 2-20, 3,460 metric tons [3,814 short tons] would be generated as the result of the waste generation from the proposed facilities (e.g., administration building) as a function of square feet over the operations stage of Phases 2-20 (i.e., 38 years). The total LLRW waste the operations stage of Phases 2-20 generated would be 8.61 metric tons [9.49 short tons], which is based on the additional 9,500 casks loaded as part of Phases 2-20 build-out. Liquid sanitary waste generated during the operations stage of Phases 2-20 would be 11,360 liters/day [3,000 gallons/day]. The NRC staff anticipates that all mitigation measures implemented as part of the proposed action (Phase 1) also apply to the operations stage of Phases 2-20. Therefore, the NRC staff consider the impact from all waste streams for Phases 2-20 for the operations stage to be SMALL.

Defueling

The removal of the SNF from the proposed CISF project would generate nonhazardous solid waste, LLRW, hazardous solid waste, and sanitary liquid wastes. The NRC staff expects that the amounts of the various wastes, as well as the associated impacts, would be similar to that of the SNF emplacement activities that occur earlier in the operations stage and are included in the total amounts discussed for operations. Therefore, the NRC staff concludes that the potential impacts to waste management during defueling of the proposed project would be SMALL.

4.14.1.2.1 Rail Spur

The use of the rail spur to transfer SNF to the proposed project would require the operation of a rail line across BLM land. Similar to the construction stage, the NRC and BLM staffs assume that limited quantities of nonhazardous, hazardous waste, and sanitary waste would be generated during operations of the rail spur (Holtec 2019a). These impacts would be bounded by those under the construction stage; therefore, the NRC and BLM staffs conclude that the potential impacts to waste management for the operations stage of the rail spur would be SMALL.

4.14.1.3 Decommissioning and Reclamation Impacts

At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. Decommissioning activities for the proposed action (Phase 1) and for Phases 2-20 would involve the same activities, but the activities would be scaled to address the overall size of the CISF (i.e., the number of phases completed).

Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area (Holtec, 2020a). Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; erosional control; and restoring and reclaiming disturbed areas. EIS Sections 2.2.1.4 and 2.2.1.7 describe the decommissioning and reclamation activities.

The decommissioning and reclamation stage generates nonhazardous solid waste, LLRW, hazardous solid waste, and sanitary liquid wastes. As part of decommissioning and reclamation of the proposed CISF, additional nonhazardous demolition waste would be the majority of decommissioning waste generated. Regarding the potential for LLRW shipments, the NRC staff expects that generated radioactive waste would be limited to negligible volumes because (i) SNF canisters would remain sealed during storage, (ii) external contamination would have been limited by required surveys at the reactor site prior to shipment, and (iii) the canisters would be inspected upon arrival at the proposed CISF project. Therefore, NRC staff expected the decommissioning activities to be limited and have minor associated waste volumes. EIS Section 3.13 provides a detailed description of the relevant disposal sites for each type of waste.

Reclamation would include activities and procedures for dismantling the proposed CISF project after the SNF (i.e., canisters) are removed from the proposed CISF project. EIS Section 2.2.1.4

describes reclamation activities, including dismantling and removing equipment, materials, buildings, rail, and other structures.

For the proposed action (Phase 1), activities producing waste during decommissioning and reclamation would be similar in nature to construction activities (Holtec 2019a). If reclamation of the proposed CISF were to occur, the nonhazardous solid waste the proposed CISF project generated would be 281,228 metric tons [310,000 short tons] (Holtec, 2020a). As discussed in EIS Section 3.13, both the Sandpoint and Lea County landfills are anticipated to close prior to decommissioning and reclamation of the proposed action (Phase 1) (NMENV, 2019). The NRC staff anticipates that the State of New Mexico would put in place additional landfill facilities as part of the normal urban development needs of the area. Therefore, the NRC staff assumes that the nonhazardous waste would be disposed according to all applicable regulations, and future capacity would be available. LLRW produced as a result of radiological decommissioning would consist of contamination survey rags, anti-contamination garments, and other health physics materials used to perform the final radiation survey of the site (Holtec, 2020a). For LLRW, decommissioning would generate 0.91 metric tons [1.00 short tons] of waste, which would be disposed at one of the two identified disposal facilities for LLRW. Historically, private industry has met the demand for LLRW disposal capacity. The NRC expects that this trend would continue into the future; therefore, the NRC staff consider the amount of LLRW the decommissioning stage of the proposed action (Phase 1) generated to be minor, in comparison to future disposal capacity for LLRW. Waste volume from sanitary waste would be 11,360 L/day [3,000 gal/day]. The NRC staff considers the amount of liquid sanitary waste the CISF decommissioning stage generated as relatively minor in comparison to the capacity of publicly owned treatment works to process such waste. Any contaminated storage casks would be decontaminated to levels at or below applicable NRC limits for unrestricted use, and therefore would be considered nonhazardous waste (Holtec, 2020a). The NRC staff assumes that any additional hazardous waste generated for the proposed action (Phase 1) would be equal to or less than that produced as part of the operations stage {1.2 metric tons per year [1.32 short tons]}. The NRC staff concludes that for the proposed action (Phase 1) decommissioning stage, the impacts for all waste streams would be SMALL.

For Phases 2-20, similar to the proposed action (Phase 1), nonhazardous solid waste the proposed CISF project generated as part of reclamation for Phases 2-20 would be 5,343,324 metric tons [5,893,306 short tons] (Holtec, 2020a). Similar to the proposed action (Phase 1), for Phases 2-20, both the Sandpoint and Lea County landfills are anticipated to close prior to the decommissioning and reclamation stage (NMENV, 2019). The NRC staff anticipates that the State of New Mexico would put in place additional landfill facilities as part of the normal urban development needs of the area. The NRC staff assumes that the volume of nonhazardous waste would be disposed of according to all applicable regulations and future capacity would remain available. However, because of the large volume of Phases 2-20 nonhazardous waste, the NRC staff concludes that the potential impact to landfill facilities could be MODERATE. For LLRW, the decommissioning stage of Phases 2-20 would generate 17.24 metric tons [19 short tons] and would be disposed at one of the two identified disposal facilities for LLRW. Historically, private industry has met the demand for LLRW disposal capacity. The NRC staff expects that this trend will continue into the future; therefore, the NRC staff considers the amount of LLRW the decommissioning and reclamation stage of the Phases 2-20 generates to be relatively minor in comparison to future available disposal capacity. Waste volume from sanitary waste would be 11,360 liters/day [3,000 gallons/day]. The NRC staff considers the amount of liquid sanitary waste the CISF decommissioning and reclamation stage generates to be relatively minor in comparison to the capacity of publicly owned treatment works to process such waste. As with the proposed action (Phase 1), any contaminated storage casks would be decontaminated to levels at or below applicable NRC limits for unrestricted use, and therefore would be considered nonhazardous waste (Holtec, 2020a). The NRC staff assumes that any additional hazardous waste generated for decommissioning and reclamation of Phases 2-20 would be equal to or less than hazardous waste produced as part of the operations stage {1.2 metric ton per year [1.32 short tons]}. The NRC staff concludes that for the Phases 2-20 decommissioning and reclamation stage, the impacts for LLRW, hazardous, and sanitary waste streams would be SMALL, and MODERATE for nonhazardous waste until a new landfill becomes available, after which the impact would be SMALL.

4.14.1.3.1 Rail Spur

Decommissioning of the rail spur and associated access road would occur at the discretion of the land owner (BLM). A minor amount of nonhazardous waste, including materials that cannot be recovered or recycled, are anticipated to be generated from decommissioning of the rail spur. In addition, the NRC and BLM staffs assume that a minor quantity of sanitary waste and hazardous waste would be generated during decommissioning of the rail spur (Holtec, 2020a). The amounts of waste generated would be much less than those generated from decommissioning the proposed CISF storage pads, buildings, and other infrastructure; therefore, the NRC and BLM staffs conclude that the potential impacts to waste management for the decommissioning stage of the rail spur would be SMALL.

If the rail spur is not decommissioned, there would be no hazardous, nonhazardous, LLRW or sanitary waste generated.

4.14.2 No-Action Alternative

Under the No-Action alternative, the NRC would not license the proposed CISF project. Therefore, impacts on waste management would not occur, because the generation of wastes from activities associated with the proposed CISF project would not occur. Construction wastes would be avoided because SNF storage pads, buildings, and transportation infrastructure would not be built. Operational wastes would also be avoided because no SNF canisters would arrive for storage. Decommissioning wastes would be avoided because there are no facilities to dismantle or SNF to relocate from the CISF. In the absence of a CISF, the NRC staff assume that SNF would remain onsite in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue as detailed in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assume that the SNF would be transported to a permanent geologic repository, when such a facility becomes available.

4.15 Accidents

This section addresses the environmental impacts of postulated accidents involving the storage of spent fuel at the proposed CISF project. The fuel would be stored in dry storage casks the NRC licensed. The types and consequences of accidents evaluated for the CISF are summarized in this section along with associated environmental impact conclusions.

NRC regulations at 10 CFR Part 72 “Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste,” require that structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena (such as earthquakes, tornadoes, hurricanes) and human-induced events without loss of capability to perform their safety functions. NRC siting regulations at 10 CFR 72, Subpart E, “Siting Evaluation Factors,” also require applicants to consider, among other things, physical characteristics of sites that are necessary for safety analysis or that may have an impact on plant design (e.g., the design earthquake). These characteristics are identified, characterized, and considered in determining the acceptability of the site and design criteria of the facility in the NRC’s safety evaluation, which is documented in the Safety Evaluation Report (SER).

Numerous features combine to reduce the risk associated with accidents involving SNF storage at the proposed CISF project. The NRC staff’s safety review verifies that Holtec has incorporated safety features into the design, construction, and operation of the proposed CISF project as a first line of defense to prevent the release of radioactive materials. The NRC staff also confirms that additional measures are designed to mitigate the consequences of failures in the first line of defense.

Consistent with the NRC’s defense-in-depth philosophy, this section describes design basis events that are evaluated to prevent or mitigate the consequences of accidents that could result in potential offsite doses. For some design basis events, such as tornadoes, this section describes how the proposed CISF project would be designed and built to withstand the event without loss of systems, structures, and components necessary to ensure public health and safety. In these cases, the environmental impacts are small because no release of radioactive material would occur. Other design basis events, such as spent fuel-handling accidents, are design basis accidents that Holtec must assume could occur. In these cases, Holtec must show how engineered safety features in the facility mitigate a postulated release of radioactive material. The environmental impacts of design basis accidents are small because Holtec must maintain engineered safety features that ensure that the NRC dose limits for these accidents are met. The basis for impact determinations for design basis events (i.e., whether the accident is prevented or mitigated) is described for each type of design basis event presented in this section. The consequences of a severe (or beyond-design-basis) accident, if one occurs, could be significant and destabilizing. The impact determinations for these accidents, however, consider the low probability of these events. The environmental impact determination with respect to severe accidents, therefore, is based on the risk, which the NRC defines as the product of the probability and the consequences of an accident. This means that a high-consequence low-probability event, like a severe accident, could result in a small impact determination, if the risk is sufficiently low.

Design Basis Events, Design Basis Accidents, and Severe Accidents

Design basis events are conditions of normal operation, design basis accidents, external events, and natural phenomena, for which the facility must be designed to ensure the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures (NRC, 2007).

Design basis accidents are postulated accidents that are used to set design criteria and limits for the design and sizing of safety-related systems and components (NRC, 2007).

Severe accidents, or beyond-design basis accidents, are accidents that may challenge safety systems at a level much higher than expected.

In the safety analysis report for the proposed CISF project (Holtec, 2020b), Holtec evaluates four categories of design events based on the NRC's standard review plan for spent fuel dry storage facilities (NRC, 2000). The four categories encompass a range of events including normal, off-normal, and accidental events. Specifically, Design Events represent those associated with normal operations. These events are expected to occur regularly or frequently. Examples of normal events include receipt, inspection, unloading, maintenance, and loading of a transportation package; transfer of loaded storage casks to the storage pads; and handling of radioactive waste generated as part of the operation of the proposed facility. The impacts from these events are similar to those of normal operations at the proposed CISF project (EIS Section 4.13.1.2), and are therefore anticipated to be SMALL.

Design Events II represent those associated with off-normal operations that can be expected to occur with moderate frequency, or approximately once per year. These events could result in members of the general public being exposed to additional levels of radiation beyond those associated with normal operations. During normal operations and off-normal conditions, the requirements of 10 CFR Part 20 must be met. In addition, the annual dose equivalent to any individual located beyond the controlled area must not exceed 0.25 mSv [25 mrem] to the whole body, 0.75 mSv [75 mrem] to the thyroid, and 0.25 mSv [25 mrem] to any other organ.

Off-normal events Holtec evaluated for the proposed CISF project (Holtec, 2020b) included off-normal pressure within a SNF storage canister, off-normal environmental temperature, leakage of an SNF storage canister seal weld, partial blockage of air inlet and outlet ducts in a SNF cask, hypothetical wind, and cask drop below the design allowable height. Holtec's safety evaluation of these off-normal events concluded that the proposed storage system would not exceed applicable 10 CFR 72.106(b) dose limits to individuals at or beyond the controlled area boundary and satisfies applicable acceptance criteria for maintaining safe operations regarding criticality, confinement, retrievability, and instruments and control systems (Holtec, 2020b). The NRC staff's review and acceptance of the Holtec off-normal design basis events analysis is contingent upon the completion of the NRC SER for the proposed CISF project. The NRC safety review staff evaluates Holtec's off-normal events analysis, determines if the required safety criteria have been met with any necessary acceptable safety margin, and documents the results of that review in the FSER. The NRC cannot grant a license for construction and operation of the proposed CISF project until it determines that all regulatory requirements of the AEA and NRC are satisfied. If the NRC safety review of Holtec's off-normal event's analysis is satisfactory, then the environmental impacts associated with off-normal events would be SMALL.

Design Events III represent infrequent events that could be reasonably expected to occur over the lifetime of the dry cask storage facility, while Design Events IV represent extremely unlikely events or design basis accidents that are postulated to occur because they establish the conservative design basis for systems, structures, and components important to safety. The dose from any credible design basis accident to any individual located at or beyond the nearest boundary of the controlled area may not exceed that specified in 10 CFR 72.106; specifically, the more limiting total effective dose equivalent of 0.05 Sv [5 rem] or the sum of the deep dose equivalent to and the committed dose equivalent to any individual organ or tissue (other than eye lens) of 0.05 Sv [50 rem]; a lens dose equivalent of 0.15 Sv [15 rem]; and a shallow dose equivalent to skin or any extremity of 0.5 Sv [50 rem].

Accident events Holtec evaluated for the proposed CISF project (Holtec, 2020b) included fire; partial blockage of SNF storage canister basket vent holes; tornado missiles; flood; earthquake; rupture of all fuel rods in a SNF storage canister; confinement boundary release; explosion;

lightning; complete blockage of air inlet and outlet ducts; burial under debris; extreme environmental temperature; cask tipover; cask drop; loss of shielding; adiabatic heatup; accidents at nearby sites; building structural failure onto structures, systems, and components; and rupture of all fuel rods in a SNF storage canister coincident with other accident events. Holtec's safety evaluation of these accident events concluded that the proposed storage system would not exceed applicable 10 CFR 72.106(b) dose limits to individuals at or beyond the controlled area boundary and satisfies applicable acceptance criteria for maintaining safe operations regarding criticality, confinement, retrievability, and instruments and control systems (Holtec, 2020b). The NRC staff's review and acceptance of the Holtec accident analysis is contingent upon the completion of the NRC FSER for the proposed CISF project. The NRC safety review staff evaluates Holtec's accident analysis, determines if the required safety criteria have been met with any necessary acceptable safety margin, and documents the results of that review in the FSER. The NRC cannot grant a license for construction and operation of the proposed CISF project until it determines that all regulatory requirements of the AEA and NRC are satisfied. If the NRC safety review of Holtec's accident analysis is satisfactory, then the environmental impacts associated with accident events would be SMALL.

The natural hazards that climate change could affect, which are important to the proposed CISF project siting and design, include flood and high-wind hazards. The timeframe for considering these hazards in this EIS is the proposed 40-year license term. The amount and rate of future climate change depends on current and future human-caused emissions (GCRP, 2014). Quantitative expressions, such as the amount of projected changes in rainfall or ambient temperature extend to the end of the century. To whatever extent climate change alters the magnitude and frequency of natural phenomena during the proposed CISF project license term, the NRC's oversight authority over the CISF is the mechanism that addresses the impact of natural hazards. Under current NRC regulations applicable to dry cask storage facilities, the NRC requires that Holtec include design parameters on the ability of the storage casks and facilities to withstand severe weather conditions such as hurricanes, tornadoes, and floods. To this end, the NRC safety staff have evaluated the proposed CISF project to ensure that performance of the safety systems, structures, and components will be maintained in response to natural phenomena hazards. In the event of climate change induced impacts, such as increases in ambient temperature, rainfall patterns, and the severity of weather events, which occur gradually over long periods of time, the NRC, under its oversight authority, can require licensees to implement corrective actions to identify and correct conditions adverse to safety. In summary, the CISF is designed to withstand the design basis accidents without losing safety functions. If climate change influences on natural phenomena create conditions adverse to safety, the NRC has sufficient time to require corrective actions to ensure that spent fuel storage at the proposed CISF project proceeds with minimal impacts for the term of the license. In addition, in order for the 40-year license to be extended with a 40-year renewal, the NRC staff would conduct another safety and environmental review to determine whether to grant the license extension. Those reviews would consider current and projected conditions at the time of renewal.

Overall, the NRC-licensed dry cask storage systems included in the Holtec CISF proposal are designed to withstand all normal and off-normal events (Design Events I and II) and postulated design basis accidents (Design Events III and IV) with no loss of the safety functions. In addition, the potential effects of climate changes over time can be addressed as needed by NRC oversight and required corrective actions. Based on the NRC staff's analysis, the overall environmental impact of the accidents at the proposed CISF project during the license term is SMALL because safety-related structures, systems, and components are designed to function during and after these accidents.

4.16 References

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20. "Standards for Protection Against Radiation." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 72. Code of Federal Regulations, Title 10, *Energy*, Part 72. "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste." Washington, DC: U.S. Government Publishing Office.

29 CFR Part 1910. Code of Federal Regulations, Title 29, *Labor*, Part 1910. "Occupational Safety and Health Standards." Washington, DC: U.S. Government Printing Office.

29 CFR Part 1926. Code of Federal Regulations, Title 29, *Labor*, Part 1926. "Safety and Health Regulations for Construction." Washington, DC: U.S. Government Publishing Office.

40 CFR 81.332. Code of Federal Regulations, Title 40, *Protection of the Environment*, Part 81. Section 332, "Attainment Status Designations - New Mexico." Washington, DC: U.S. Government Printing Office

51 FR 39425. "Oil, Gas, and Potash Leasing and Development Within the Designated Potash Area of Eddy and Lea Counties, New Mexico." *Federal Register*. Vol. 51, No. 208. pp. 39,425–39,427. Washington, DC: U.S. Government Printing Office. 2012.

59 FR 7629. "Summary of Executive Order 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." *Federal Register*. Vol. 59, Issue 32. Washington, DC: U.S. Government Printing Office. 1994.

69 FR 52040. "Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions." *Federal Register*. Vol. 69, Issue 163. pp. 52,040–52,048. Washington, DC: U.S. Government Printing Office. 2004.

77 FR 71814. "Oil, Gas, and Potash Leasing and Development Within the Designated Potash Area of Eddy and Lea Counties, NM." *Federal Register*. Vol. 77, No. 233. pp. 71,814–71,817. Washington, DC: U.S. Government Printing Office. 2012.

20 NMAC 2.72 New Mexico Administrative Code, Title 20, *Environmental Protection*, Chapter 2. Section 72 "Construction Permits." Santa Fe, New Mexico: The Commission of Public Records Administrative Law Division.

20 NMAC 2.73 New Mexico Administrative Code, Title 20, *Environmental Protection*, Chapter 2. Section 73 "Notice of Intent and Emissions Inventory Requirements." Santa Fe, New Mexico: The Commission of Public Records Administrative Law Division.

20 NMAC 6.2 New Mexico Administrative Code, Title 20, *Environmental Protection*, Chapter 6. Part 2 "Ground and Surface Water Protection." Santa Fe, New Mexico: The Commission of Public Records Administrative Law Division.

20 NMAC 6.4 New Mexico Administrative Code, Title 20, *Environmental Protection*, Chapter 6. Part 4 "Standards for Interstate and Intrastate Surface Water." Santa Fe, New Mexico: The Commission of Public Records Administrative Law Division.

APLIC. "Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006." ML12243A391. Washington, DC: Edison Electric Institute; and Sacramento, California: Avian Power Line Interaction Committee and the California Energy Commission. 2006.

BEA. "RIMS II Multipliers (2012/2017) Table 2.5 Total Multipliers for Output, Earnings, Employment, and Value Added by Industry Aggregation Proposed Holtec CISF Socioeconomic Region of Influence (Type II)." ADAMS Accession No. ML21195A392. U.S. Department of Commerce, Bureau of Economic Analysis: Washington, DC. 2020.

BEA. "RIMSII User Guide." Bureau of Economic Analysis. U.S. Department of Commerce. Washington, DC. 2013. <https://www.bea.gov/sites/default/files/methodologies/RIMSII_User_Guide.pdf> (Accessed 31 May 2019)

BLM. Letter from Cassie Brooks to Amy Minor, "RE: Re: [EXTERNAL] Holtec CISF application EIS development." ADAMS Accession No. ML19218A163. Washington, DC: U.S. Nuclear Regulatory Commission. 2019.

BLM. "Draft Resource Management Plan and Environmental Impact Statement." BLM/NM/PL-18-01-1610. Santa Fe, New Mexico: U.S. Department of the Interior Bureau of Land Management, Carlsbad Field Office. 2018a.

BLM. "Fasken Oil and Ranch LLC Lease No. NMNM 033955, Baetz 23 Federal 5, Baetz 23 Federal 6." DOI-BLM-NM-P020-2018-0496-EA. Carlsbad, New Mexico: U.S. Department of the Interior Bureau of Land Management, Carlsbad Field Office. 2018b. <https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=106506> (Accessed 6 November 2018)

BLM. "Summit Midstream, LP's Severus Gathering Project in Lea County, New Mexico." DOI-BLM-NM-P020-2017-0758-EA. Carlsbad, New Mexico: U.S. Department of the Interior Bureau of Land Management, Carlsbad Field Office. 2017a. <https://eplanning.blm.gov/epl-front-office/projects/nepa/88413/126080/153627/Summit_Severus_EA_11-14-2017.pdf> (Accessed 6 November 2018)

BLM. "Halfway Pasture 3 Waterline, Halfway Allotment #76021." DOI-BLM-NM-P020-2017-0776-EA. Carlsbad, New Mexico: U.S. Department of the Interior Bureau of Land Management, Carlsbad Field Office. 2017b. <https://eplanning.blm.gov/epl-front-office/projects/nepa/88816/120813/147570/DOI-BLM-NM-P020-2017-0776-EA.pdf> (Accessed 6 November 2018)

BLS. "Local Area Unemployment Statistics." Labor Force data by county, 2019 annual averages. Washington, D.C: U.S. Bureau of Labor Statistics. 2019. <https://www.bls.gov/lau/> (Accessed 25 February 2021)

CEQ. "Environmental Justice Guidance Under the National Environmental Policy Act." ADAMS Accession No. ML12199A438. Washington, DC: Council on Environmental Quality. 1997.

Cheeseman, R.J. “Geology and Oil/Potash Resources of Delaware Basin, Eddy and Lea Counties, New Mexico.” In: Geology and Mineral Deposits of Ochoan Rocks in Delaware Basin and Adjacent Areas. New Mexico Bureau of Mines and Mineral Resources, Circular 159, pp. 7–14. 1978.

Cornell Lab of Ornithology. ebird: “An Online Database of Bird Distribution and Abundance [web application]. Ithaca, New York: Cornell Lab of Ornithology. 2018. <http://www.ebird.org> (Accessed 24 April 2019)

Countess, R. “Methodology for Estimating Fugitive Windblown and Mechanically Resuspended Road Dust Emissions Applicable for Regional Scale Air Quality Modeling.” ADAMS Accession No. ML13213A294. Westlake Village, California: Countess Environmental. 2001.

Davis, D.R. and J.S. Hopkins. “Lake Water Quality Assessment Surveys, Playa Lakes.” NMED/SWQ-93/2. Santa Fe, New Mexico: New Mexico Environment Department, Surface Water Quality Bureau. 1993.

DOE. “DOE Standard: A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota.” DOE-STD-1153-2019. Washington, DC: U.S. Department of Energy. 2019. <https://www.standards.doe.gov/standards-documents/1100/1153-astd-2019/@@images/file> (Accessed 30 June 2019)

DOE. “Preliminary Evaluation of Removing Used Nuclear Fuel from Shutdown Sites.” FCRD-NFST-2014-000091 Rev. 1. Washington, DC: U.S. Department of Energy. 2014. <https://www.energy.gov/sites/prod/files/2015/05/f22/Preliminary%20Evaluation%20of%20Removing%20Used%20Nuclear%20Fuel%20from%20Shutdown%20Sites%20-%20October%202014%20Revision.pdf> (Accessed 13 November 2019)

DOE. “Final Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada.” DOE/EIS-0250F-S1. ADAMS Accession No. ML081750191 Package. Washington, DC: U.S. Department of Energy, Office of Civilian Radioactive Waste Management. 2008.

DOE. “Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada.” Appendix J. DOE/EIS-0250F. Washington, DC: U.S. Department of Energy. 2002.

DOT. “Transportation Fatalities by Mode.” Washington, DC: U.S. Department of Transportation Bureau of Transportation Statistics. 2021. https://www.bts.gov/content/transportation-fatalities-mode (Accessed 3 November 2021).

DOT. “2016 Emergency Response Guidebook.” Washington, DC: U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration. 2016.

Double Eagle Water Supply. Email correspondence to T. Holt from K. Cass. “Subject: Double Eagle Water Supply Follow-Up.” ADAMS Accession No. ML21201A139. Washington, DC: U.S. Nuclear Regulatory Commission. 2021.

Economic Profile System. “A Demographic Profile.” ADAMS Accession No. ML21158A204. Bozeman, Montana: Headwaters Economics. 2021.

ELEA. “Memorandum of Agreement with Holtec International.” Eddy-Lea Energy Alliance. 2016.

ELEA. “GNEP Siting Report.” ADAMS Accession Nos. ML17310A225, ML17310A227, ML17310A230, and ML17310A231. Hobbs, New Mexico: Eddy-Lea Energy Alliance. 2007.

FWS. “Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project.” Project Code: 2022-0025363. Project Name: Holtec International New Mexico Spent Nuclear Fuel Storage Facility. ADAMS Accession No. ML22129A105. Albuquerque, New Mexico: U.S. Fish and Wildlife Service. 2022.

FWS. “Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.” Consultation Code: 02ENNM00-2018-SLI-0582. Project Name: Holtec International New Mexico Spent Nuclear Fuel Storage Facility. ADAMS Accession No. ML21257A381. Albuquerque, New Mexico: U.S. Fish and Wildlife Service. 2021a.

FWS. “FWS Critical Habitat for Threatened and Endangered Species Mapper.” Washington, DC: U.S. Fish and Wildlife Service. 2021b. <https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77> (Accessed 9 March 2021)

FWS. “Migratory Bird Treaty Act of 1918.” Washington, DC: U.S. Fish and Wildlife Service. 2021c. <https://www.fws.gov/birds/policies-and-regulations/laws-legislations/migratory-bird-treaty-act.php> (Accessed 9 March 2021)

FWS. “Nationwide Standard Conservation Measures.” Washington, DC: U.S. Fish and Wildlife Service. 2018. <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf> (Accessed 8 November 2018).

FWS. “Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States, Biological Technical Publication BTP-R6001-2003.” Washington, DC: U.S. Fish and Wildlife Service. 2003. <https://www.fws.gov/mountain-prairie/migbirds/species/birds/wbo/Western%20Burrowing%20Owlrev73003a.pdf> (Accessed 31 May 2019)

GEI Consultants. “Geotechnical Data Report Hi-Store CISF Phase 1 Site Characterization, Lea County, New Mexico.” ADAMS Accession No. ML18023A958. Woburn, Massachusetts: GEI Consultants. 2017.

Gobat, E. Letter to A. Minor. “RE: Regional Information Inquiry for Proposed Consolidated Interim Storage Facilities.” ADAMS Accession No. ML19162A371. Southwest Research Institute, Center of Nuclear Waste Regulatory Analyses. 2019.

GCRP. “Highlights of Climate Change Impacts in the United States: The Third National Climate Assessment.” J.M. Melillo, T.C. Richmond, and G.W. Yohe (eds). ADAMS Accession No. ML14129A233. Washington, DC: U.S. Global Change Research Program, U.S. Government Printing Office. 2014.

Holtec. “Responses to Request for Additional Information. ADAMS Accession No. ML21228A203. Marlton, New Jersey: Holtec International. 2021.

Holtec. “Environmental Report-HI-STORE Consolidated Interim Storage Facility, Rev. 8.” ADAMS Accession No. ML20295A485. Marlton, New Jersey: Holtec International. 2020a.

Holtec. “Safety Analysis Report-HI-STORE Consolidated Interim Storage Facility.” ADAMS Accession No. ML20295A428. Marlton, New Jersey: Holtec International. 2020b.

Holtec. “Responses to Request for Additional Information.” ADAMS Accession No. ML19081A075. Marlton, New Jersey: Holtec International. 2019a.

Holtec. “Attachment 2 to Holtec Letter 5025040, HI-STORE RAI Part 2 Responses – January 2019.” ADAMS Accession No. ML19037A293. Marlton, New Jersey: Holtec International. 2019b.

Holtec. “Final Safety Analysis Report on the HI-STORM UMAX Canister Storage System”, Holtec Report No. HI-2115090, Revision 3. Adams Accession No. ML16193A336. USNRC Docket 72-1040. Marlton, New Jersey: Holtec International. 2016.

IAEA. “Effects of Ionizing Radiation on Plants and Animals at Levels Implied by Current Radiation Protection Standards.” Technical Report Series No. 332. Vienna, Austria: International Atomic Energy Agency. 1992.

ICRP (International Commission on Radiological Protection). “The 2007 Recommendations of the International Commission on Radiological Protection.” *Annals of the International Commission on Radiological Protection.* ICRP Publication 103. Amsterdam Netherlands: Elsevier, Inc. 2007. <http://www.icrp.org/publication.asp?id=ICRP%20Publication%20103> (Accessed 28 June 2019)

Intrepid. “Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for the fiscal year ended December 31, 2017.” Denver, Colorado: Intrepid Potash, Inc. 2018.

Intrepid. “Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for the fiscal year ended December 31, 2013.” Denver, Colorado: Intrepid Potash, Inc. 2014.

Johnson, K., T.B. Neville, and A. Kirk. “Monitoring Black-Tailed Prairie Dog Towns in Southeastern New Mexico Using Remote Sensing.” Final Report. NHMN Publication No. 06-GTR-296. Albuquerque, New Mexico: New Mexico Natural Heritage Program. 2006.

Klute, D.S., L.W. Ayers, M.T. Green, W.H. Howe, S.L. Jones, J.A. Shaffer, S.R. Sheffield, and T.S. Zimmerman. “Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States.” U.S. Department of Interior, Fish and Wildlife Service, Biological Technical Publication FWS/BTP-R6001-2003. Washington, DC: U.S. Fish and Wildlife Service. 2003.

Land, L. “Evaporite Karst in the Permian Basin Region of West Texas and Southeastern New Mexico: The Human Impact.” In L, Land (ed). 13th Sinkhole Conference, National Cave and Karst Research Institute, Symposium 2, Carlsbad, New Mexico. pp. 113–122. 2013.

Land, L. “Anthropogenic Sinkholes in the Delaware Basin Region: West Texas and Southeastern New Mexico.” *West Texas Geological Society Bulletin*. Vol. 48. pp. 10–22. 2009.

Malhotra, S. and D. Manninen. NUREG/CR–2002, Volume 1, “Migration and Residential Location of Workers at Nuclear Power Plant Construction Sites.” ADAMS Accession No. ML19094B801. PNL-3757. Washington, DC: U.S. Nuclear Regulatory Commission. 1981.

Murrell, M.L., T.M. Mills, C.J. Gregory, and D.T. Unruh. “A Cultural Resource Inventory of the Holtec International Proposed Consolidated Interim Storage Facility (CISF) Project Area, Lea County, New Mexico.” Albuquerque, New Mexico: Prepared for Tetra Tech, Inc. by Statistical Research, Inc. 2016.

National Park Service. “Federal Land Managers’ Air Quality Related Values Work Group (FLAG): Phase I Report—Revised (2010).” Natural Resource Report NPS/NRPC/NRR—2010/232. Washington, DC: U.S. Forest Service; Denver, Colorado: National Park Service; and Lakewood, Colorado: U.S. Fish and Wildlife Service. 2010.

Nicholson, A. Jr. and A. Clebsch, Jr. “Geology and Ground-Water Conditions in Southern Lea County, New Mexico.” ADAMS Accession No. ML042430324. Ground-Water Report 6, U.S. Geological Survey in cooperation with the New Mexico Institute of Mining and Technology, State Bureau of Mines and Mineral Resources, and New Mexico State Engineer. Socorro, New Mexico. 1961.

New Mexico Partners in Flight. “New Mexico Bird Conservation Plan 2.1.” 2007. <http://avianconservationpartners-nm.org/bird-conservation-plan-2/> (Accessed 19 September 2018)

NMDGF. “Project Title: Proposed Holtec Consolidated Interim Storage Facility.” Project ID NMERT-203. ADAMS Accession No. ML21195A387. Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2019.

NMDGF. “New Mexico Crucial Habitat Assessment Tool.” Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2018a. <http://nmchat.org/map/> (Accessed 24 October 2018)

NMDGF. Letter (August 31) C. Hayes, New Mexico Game and Fish Department, to Jill Caverly, NRC. RE: Holtec International HI-STORE Consolidated Interim Storage Facility Project, Environmental Impact Statement (EIS), Public Scoping; NMDGF No. 18390. ADAMS Accession No. ML18247A573. Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2018b.

NMDGF. “State Wildlife Action Plan.” Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2016.

NMDGF. “Baseline Wildlife Study Guideline.” Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2010. <https://www.wildlife.state.nm.us/download/conservation/habitat-handbook/project-guidelines/Wildlife-Baseline-Study-Guidelines-and-Appendix-2019.pdf> (Accessed 8 November 2018)

NMDGF. “Powerline Project Guideline.” Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2007. <http://www.wildlife.state.nm.us/download/conservation/habitat-handbook/project-guidelines/Powerline-Project-Guidelines-2007.pdf> (Accessed 8 November 2018)

NMDGF. “Habitat Fragmentation and Effects of Roads on Wildlife and Habitats.” Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2005. <http://www.wildlife.state.nm.us/download/conservation/habitat-handbook/project-guidelines/Effects-of-Roads-on-Wildlife-and-Habitats.pdf> (Accessed 8 November 2018)

NMDGF. “Habitat Guidelines for Mine Operations and Reclamation.” Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2004. <http://www.wildlife.state.nm.us/download/conservation/habitat-handbook/project-guidelines/Mining-Guidelines.pdf> (Accessed 8 November 2018)

NMDGF. “Trenching Guidelines.” Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2003. <http://www.wildlife.state.nm.us/download/conservation/habitat-handbook/project-guidelines/Trenching-Project-Guidelines.pdf> (Accessed 8 November 2018)

NMDOT. “2017 Zone 5 Seed List: Southern Desertic Basins, Plains, and Mountains.” Santa Fe, New Mexico: New Mexico Department of Transportation. 2017. <https://services.arcgis.com/hOpd7wfnKm16p9D9/arcgis/rest/services/NMDOT_Reveg_Zones/FeatureServer/0/5/attachments/15> (Accessed 8 November 2018)

NMDOT. “New Mexico Department of Transportation Environmental Section Biological Report and Format Standards.” Santa Fe, New Mexico: New Mexico Department of Transportation. 2013. <https://api.realfile.rtsclients.com/PublicFiles/f260a66b364d453e91ff9b3fedd494dc/86eac4ba-82f8-4ab5-9ae7-4ac00fdfe35f/Biological%20Assessment%20Instructions> (Accessed 8 November 2018)

NMED. “Information for Lea County LF and Sandpoint LF” email (June 28, 2019) and attachments: SandPointAnnualReport(s).doc, AnnualReport.LeaCounty(3).doc, 2018LandfillCapacityWorkSheet.SandPoint.pdf, Capacity analysis, LCLF – Dec 2017.docx, from George Schuman, Permit Section Manager, Solid Waste Bureau, New Mexico Environment Department, to Nathan Hall, Southwest Research Institute. 2019.

NMOCC. State of New Mexico, Energy Minerals and Natural Resourced Division, Oil Conservation Commission. Case No. 9316; R-111-P. 1988.

NMOCD. NM OCD Oil and Gas Map – ArcGIS Web Application. New Mexico Oil Conservation Division. 2020. <https://nmemnrd.maps.arcgis.com/apps/webappviewer/index.html?id=4d017f2306164de29fd2fb9f8f35ca75> (Accessed 19 November 2020)

NRC. “Memorandum of Understanding Between the U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards, and the New Mexico Environment Department on the Environmental Review Related to the Issuance of Authorizations to Build and Operate the Proposed Holtec International Consolidated Interim Storage Facility.” ADAMS Accession No. ML19206A094. Washington, DC: U.S. Nuclear Regulatory Commission. 2019.

NRC. "Memorandum of Understanding: Invitation to Participate as a Cooperation Agency in Preparation of the Environmental Impact Statement for the Proposed Holtec Consolidated Interim Storage Facility, Lea County, New Mexico (Docket No.: 72-1051)." ADAMS Accession No. ML18290A458. Washington, DC: U.S. Nuclear Regulatory Commission. 2018.

NRC. NUREG–2176, "Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Nuclear Plant Units 6 and 7." Washington, DC: U.S. Nuclear Regulatory Commission. 2016.

NRC. NUREG–2125, "Spent Fuel Transportation Risk Assessment, Final Report." ADAMS Accession No. ML14031A323. Washington, DC: U.S. Nuclear Regulatory Commission. 2014.

NRC. NUREG–1437. "Generic Environmental Impact Statement for License Renewal of Nuclear Plants." ADAMS Accession No. ML13106A241. Washington, DC: U.S. Nuclear Regulatory Commission. 2013.

NRC. NUREG–2113, "Environmental Impact Statement for the Proposed Fluorine Extraction Process and Depleted Uranium Deconversion Plant in Lea County, New Mexico." ADAMS Accession No. ML12220A380. Washington, DC: U.S. Nuclear Regulatory Commission. 2012.

NRC. "Environmental Assessment for the Amendment of U.S. Nuclear Regulatory Commission License No. SNM–2506 for Prairie Island Independent Spent Fuel Storage Installation." ADAMS Accession No. ML093080494. Washington, DC: U.S. Nuclear Regulatory Commission. 2009.

NRC. NUREG–0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants." LWR Edition. Revision 6. ADAMS Accession No. ML003734190. Washington, DC: U.S. Nuclear Regulatory Commission. 2007.

NRC. NUREG–1790, "Environmental Impact Statement for the Proposed National Enrichment Facility in Lea County, New Mexico." ADAMS Accession No. ML15155B297 Package. Washington, DC: U.S. Nuclear Regulatory Commission. 2005a.

NRC. "Environmental Assessment Related to the Construction and Operation of the Humboldt Bay Independent Spent Fuel Storage Installation." Accession No. ML052430106. Washington DC: U.S. Nuclear Regulatory Commission. 2005b.

NRC. "Environmental Assessment Related to the Renewal of the H.B. Robinson Steam Electric Plant, Unit No. 2 Independent Spent Fuel Storage Installation License, Special Nuclear Material License No. SNM–2502." Accession No. ML050700137. Washington DC: U.S. Nuclear Regulatory Commission. 2005c.

NRC. NUREG–1748, "Environmental Review Guidance for Licensing Actions Associated With NMSS Programs." ADAMS Accession No. ML032450279. Washington, DC: U.S. Nuclear Regulatory Commission. 2003.

NRC. NUREG–1714, “Final Environmental Impact Statement for the Construction and Operation of an Independent Spent Fuel Storage Installation on the Reservation of the Skull Valley Band of Goshute Indians and the Related Transportation Facility in Tooele County, Utah.” ADAMS Accession No. ML003725097 Package. Washington, DC: U.S. Nuclear Regulatory Commission. 2001.

NRC. NUREG–1567, “Standard Review Plan for Spent Fuel Dry Storage Facilities, Final Report.” ADAMS Accession No. ML003686776. Washington, DC: U.S. Nuclear Regulatory Commission. 2000.

NRC. NUREG–1437, “Generic Environmental Impact Statement for License Renewal of Nuclear Plant: Main Report (Volume 1).” ADAMS Accession Nos. ML040690705, ML040690738. Washington, DC: U.S. Nuclear Regulatory Commission. 1996.

NRC. “Environmental Assessment and Finding of No Significant Impact for the Storage of Spent Nuclear Fuel in NRC-Approved Storage Casks at Nuclear Power Reactor Sites.” ADAMS Accession No. ML051230231. Washington, DC: U.S. Nuclear Regulatory Commission. 1989.

NRC. NUREG–0170, “Final Environmental Statement on Transportation of Radioactive Material by Air and Other Modes.” Volume 1. ADAMS Accession Nos. ML022590265, ML022590348. Washington, DC: U.S. Nuclear Regulatory Commission. 1977.

NSC. “Preventable Injuries at Work by Industry, United States, 2016.” Itasca, Illinois: National Safety Council. 2018. <https://injuryfacts.nsc.org/work/work-overview/work-safety-introduction/> (Accessed 27 November 2018)

OSHA. “Recommended Practices for Safety and Health Programs in Construction.” Washington, DC: Occupational Safety and Health Administration. 2016. <https://www.osha.gov/shpguidelines/docs/8524_OSHA_Construction_Guidelines_R4.pdf> (Accessed 14 March 2019)

SEC. “Edgar Company Search Results.” Securities and Exchange Commission. ADAMS Accession No. ML22126A031. Washington, DC: 2021. <https://www.sec.gov/edgar/browse/?CIK=1421461&owner=exclude> (Accessed 21 October 2021)

State of New Mexico. “Lea County Regional Water Plan.” Santa Fe, New Mexico: State of New Mexico Interstate Stream Commission Office of the State Engineer. 2016. <http://www.ose.state.nm.us/Planning/RWP/Regions/16_Lea%20County/2016/Reg%2016_Lea%20County_Regional%20Water%20Plan%202016_December%202016.pdf> (Accessed 7 August 2018)

Southwest Gap Analysis Project. “Southwest Gap Analysis Project, Final Report.” U.S. Geological Survey (USGS) Gap Analysis Program (GAP), New Mexico Cooperative Fish and Wildlife Research Unit, Department of Fishery and Wildlife Sciences (FWCE), New Mexico State University (NMSU), Remote Sensing and GIS Laboratory, Utah State University (USU), U.S. Geological Survey (USGS) Forest & Rangeland Ecosystem Science Center (FRESC), Colorado Division of Wildlife (CDOW), U.S. Department of the Interior (DOI) Bureau of Land Management (BLM) National Science & Technology Center (NSTC), U.S. Environmental Protection Agency (EPA), National Exposure Research Lab, Las Vegas, U.S. Geological Survey

(USGS) Earth Resources Observation and Science (EROS) Data Center. 2007. <https://permanent.fdlp.gov/gpo35444/SWReGAP%20Final%20Report.pdf > (Accessed 29 April 2021)

SwRI. "Scientific Notebook #1333 for the Holtec Consolidated Interim Storage Facility EIS Supporting Calculations." ADAMS Accession No. ML19352G685. Southwest Research Institute, Center of Nuclear Waste Regulatory Analyses. 2019.

USACE. "No Permit Required – Action No. SPA-2021-00059-LCO, Holtec International HI-STORE FACILITY." ADAMS Accession No. ML21155A229. Las Cruces, New Mexico: U.S. Department of the Army, Corp of Engineers, Albuquerque District. 2021.

USCB. 2015-2019 5-year American Community Survey; Table B25064, Median Gross Rent (Dollars); Table DP03,Selected Economic Characteristics. Washington, DC: U.S. Department of Commerce, U.S. Census Bureau. 2019. <https://data.census.gov/cedsci/> (Accessed 24 February 2021)

USCB. "Table QT-P11: Households and Families." Washington, DC: U.S. Department of Commerce, Census Bureau. 2010.

USGS. "Mineral Commodity Summaries 2021." Reston, Virginia: U.S. Department of the Interior, U.S. Geological Survey. 2021. <https://doi.org/10.3133/mcs2021> (Accessed 25 April 2022)

USGS. "National Biogeographic Map Summary Report: Chihuahuan Deserts Ecoregion III." GAP/LANDFIRE National Terrestrial Ecosystems 2011, interactive mapping tool. Washington, DC: U.S. Department of the Interior, U.S. Geological Survey. 2020.

Weiner, R.F, K.S. Neuhauser, T.J. Heames, B.M. O'Donnell, and M.L. Dennis. "RADTRAN 6 Technical Manual." ADAMS Accession No. ML14286A085. SAND2014-0780. Albuquerque, New Mexico: Sandia National Laboratories. 2014.

Zhang, A., J. Lu, and J.W. Kim. "Detecting Mining-Induced Ground Deformation and Associated Hazards Using Spaceborne InSAR Techniques." *Geomatics, Natural Hazards and Risk*. Vol. 9, No. 1. pp. 211–223. 2018.

5 CUMULATIVE IMPACTS

5.1 Introduction

The Council on Environmental Quality's (CEQ's) regulations regarding National Environmental Policy Act (NEPA) define cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" [Title 40 of the *Code of Federal Regulations* (CFR) 1508.7]. Cumulative effects, synonymous with cumulative impacts, can result from individually minor but collectively significant actions taking place over a period of time. A proposed project could contribute to cumulative effects when its environmental impacts overlap with those of other past, present, or reasonably foreseeable future actions. For this environmental impact statement (EIS), other past, present, and future actions considered in the analysis for the proposed consolidated interim storage facility (CISF) project include (but are not limited to) potash mining, oil and gas production, other nuclear facilities, and wind and solar farms.

This analysis of the potential cumulative impacts from the proposed CISF project was based on publicly available information about existing and proposed projects, information in the Environmental Report (Holtec, 2020a) and the Safety Analysis Report (Holtec, 2020b) for the HI-STORE CISF, Holtec's responses to the U.S. Nuclear Regulatory Commission (NRC) requests for additional information (RAI) (Holtec, 2019), general knowledge of the conditions in southeast New Mexico and in the nearby communities, and information about reasonably foreseeable future actions that could occur. Only past, present, and reasonably foreseeable future actions within the broadest geographic scope of analysis for an individual resource area {80-kilometers (km) [50-miles (mi)] radius for Geology and Soils} are described in the next sections; however, each resource area may further delineate a narrower geographic scope of the analysis, as necessary {e.g., the analysis for land use is evaluated within a 10-km [6-mi] radius}.

EIS Section 5.1.1 describes other past, present, and reasonably foreseeable future actions considered in the cumulative impacts analysis. The methodology used to conduct the cumulative impacts analysis in this EIS is provided in Section 5.1.2.

5.1.1 Other Past, Present, and Reasonably Foreseeable Future Actions

The proposed CISF project would be located 51 km [32 mi] east of Carlsbad, New Mexico and 55 km [34 mi] west of Hobbs, New Mexico in Lea County, New Mexico (EIS Figure 2.2-1). The vicinity of the proposed CISF project area is predominantly rural, with limited development outside the cities of Carlsbad and Hobbs. The land surrounding the proposed CISF project area is predominantly used for cattle grazing; potash mining; and oil and gas exploration, development, and industry. There are currently three facilities within the region of the proposed CISF project area that are licensed to handle nuclear material, and another facility currently undergoing license review. The NRC staff used the EISs (or supporting documents) for these four facilities, the management plans for the U.S. Bureau of Land Management (BLM)-owned lands in the vicinity, the development plans for both the City of Carlsbad and the City of Hobbs, and other publicly available information to determine past, present, and reasonably foreseeable future actions in the vicinity of the proposed CISF project area.

5.1.1.1 Mining and Oil and Gas Development

The Permian Basin is one of the largest and most active oil basins in the United States and has recently risen to be the world's top oil producer (Rapier, 2019). It covers more than 220,000 km^2 [86,000 mi^2], stretching approximately from Lubbock, Texas, to the Rio Grande and into southeast New Mexico and includes the Delaware Basin, Central Basin Platform, and the Midland Basin (EIA, 2018). The area continues to be the focus of extensive exploration, leasing, development, and production of oil and gas with the most heavily concentrated area of wells being located in eastern Eddy County and western Lea County (BLM, 2018). The proposed CISF project area is located in the middle of the Permian Basin oil hub, near the Lea County and Eddy County borders. Lea County and Eddy County are consistently the top two producers of oil in the State and rank in the top five in gas production (Consensus Planning, 2020; Consensus Planning, 2017). The oil and gas industry in the region is anticipated to continue to have stable production output with some expansion over the foreseeable future (EIA, 2022a; BLM, 2018). Both counties have economies driven by the oil and gas industries, which tend to cycle through periods of booms and busts, resulting in the push for both Lea and Eddy County to diversify their local economies while still supporting continued development of oil and gas industry infrastructure and support services, such as additional housing and improved water systems (Lea County, 2005; Consensus Planning, 2017). For example, the Double Eagle Water Supply System improvement project is ongoing and moving through Phase III of the project and will include the addition of approximately 8 km [5 mi] of waterline to increase water supply to Carlsbad and oil and gas extraction facilities (MolzenCorbin, 2022; Onsurez, 2018). In Artesia, New Mexico, in addition to oil and gas extraction is the HollyFrontier Navajo Refinery. HollyFrontier is an independent petroleum refiner that produces gasoline, diesel fuel, jet fuel, specialty lubricant products, and specialty and modified asphalt. The Navajo Refinery has a crude oil capacity of 115,000 barrels per day and can process several types of crude oils. Inputs to the refinery are mainly from the Permian Basin in west Texas and southeast New Mexico, serving markets in the southwestern United States and northern Mexico (NMEMNRD, 2022; HollyFrontier, 2019).

Potash mining is also a major part of Lea and Eddy County economies. Mosaic and Intrepid Mining LLC (Intrepid), the two largest producers of potash in New Mexico, have multiple operations in both counties (New Mexico Bureau of Geology and Mineral Resources, 2008). Near Carlsbad, Intrepid has a solar evaporation mine and an underground mine where a rare, naturally occurring mineral called langbeinite is extracted (Intrepid, 2019). The Intrepid North Plant is located within 10 km [6 mi] of the proposed CISF project area and immediately adjacent to the proposed rail spur. The NRC staff does not anticipate that potash mining operations would cease or slow down for the foreseeable future. Besides the Intrepid North Plant, there are six other active potash mines in Eddy County (Consensus Planning, 2017). Based on historic market trends, the demand for potash will likely gradually increase over time, causing an increase in new mining operations over the next 20 to 30 years (BLM, 2018), but the current surplus supply both domestically and internationally could delay the price and demand recovery (Holtec, 2021; SEC, 2021). Ochoa Sulphate of Potash Mine (SOP) is a fertilizer production operation that plans to use room-and-pillar mining to extract polyhalite/sulphate potash from the Rustler Formation method and will be approximately 25 km [15.5 mi] south-southeast of the proposed CISF, encompassing over 12,599 ha [31,134 ac] in southwest Lea County (BLM, 2014). Once mined and processed, the final product would then be transported via truck to a loadout facility near Jal, New Mexico, loaded onto trains, and shipped (BLM, 2014). In 2014, BLM published a Final EIS on the Ochoa Mine which evaluated the environmental impacts of the SOP and estimated that at full production, approximately 4.99 million tonnes per year [5.5 million short tons per year] of polyhalite ore would be processed. PolyNatura, the constructors of the SOP project, expect the mine to have a life of 38 years with production having started in late 2021 and ramping up until 2023 (PolyNatura, 2017).

Caliche is mined near the surface and is crushed for use in surface roads and pads for the oil and gas industry, as well as other road construction activities. There is one caliche mine in Eddy County, and although caliche forms the basis of the Llano Estacado throughout northern and central Lea County, desirable caliche only occurs sporadically in the southern portion of Lea County (Consensus Planning, 2017; BLM, 2018). Both Lea County and Eddy County have high potential for the development of caliche, and as the oil and gas industry continues to grow over the next 20 to 30 years, the demand for caliche will increase (BLM, 2018).

Salt has been mined since 1931 in the vicinity of the proposed CISF project with variable production (BLM, 2018). There are currently three salt mines in Eddy County (Consensus Planning, 2017). According to BLM (BLM, 2018), the potential for development of salt mines is high, but because of the unpredictable demand, it is not possible to anticipate the actual land development areas.

Historically, there were 32 permitted brine well operations in New Mexico, with the majority of those located in Lea and Eddy County. After a collapse of two brine wells in Eddy County in 2008, a moratorium was placed on new brine wells (Consensus Planning, 2017). Currently there are only nine active brine wells in New Mexico and only one in Eddy County.

5.1.1.2 Nuclear Facilities

The Waste Isolation Pilot Plant (WIPP) is located approximately 25 km [16 mi] south of the proposed project area. WIPP is a permanent disposal facility for transuranic (TRU) waste. The disposal area is located 655 meters (m) [2,150 feet (ft)] underground in large panels mined out of the salt rock beds (WIPP, 2019a). The facility is the nation’s only deep geologic repository (WIPP, 2019b) and currently consists of eight panels, with two more panels planned (WIPP, 2019a). Operational since March 1999, WIPP has disposed of defense-generated TRU waste from over 22 generator sites across the nation (WIPP, 2019c) and is a major employer in Eddy County (Consensus Planning, 2017).

Approximately 37.2 km [23.1 mi] south of the proposed project area, 13.9 km [8.6 mi] south of WIPP, is the Gnome-Coach site, which covers approximately 275 ha [680 ac] (DOE, 2020). The Atomic Energy Commission, a predecessor agency to the Department of Energy (DOE), used the site on December 10, 1961 for Project Gnome, an underground nuclear test, in which a nuclear detonation was set off in the Salado Formation, 360.9 m [1184 ft] below the ground surface, creating a cavity at the detonation depth (DOE, 2020). Preparations for a second test, Project Coach, began shortly after Project Gnome; however, Project Coach was eventually cancelled (DOE, 2020). In 1963, a groundwater tracer test, using four dissolved radionuclides, was performed to help evaluate the potential movement of radionuclides within the Culebra Dolomite Member of the Rustler Formation (DOE, 2020). Since 1963, the DOE has performed cleanup actions at the site through a Voluntary Remediation Agreement with New Mexico (DOE, 2020). In 2015, a Conditional Certificate of Completion for the site surface cleanup was granted, certifying that all surface remediation had been completed in accordance with the State of New Mexico requirements and specifying long-term management requirements (DOE, 2020). The BLM maintains the surface rights and has designated the surface use as grazing and nonresidential land use. However, because subsurface contamination remains, drilling, excavation, or other activities that could disturb materials deeper than 6.1 m [20 ft] below the ground surface is prohibited, along with any excavation within 12.2 m [40 ft] of the emplacement shaft cap (DOE, 2020). The DOE currently monitors groundwater at the site and performs inspections to ensure the long-term protectiveness of the site (DOE, 2020).

Approximately 60 km [37 mi] southeast of the proposed CISF project, near Eunice, New Mexico, there is an operating uranium enrichment facility known as the National Enrichment Facility (NEF). It is currently the only operating commercial enrichment facility in the United States, producing approximately one-third of the nation's annual enriched uranium for commercial nuclear power reactors (Urenco, 2019). The uranium is enriched by vaporizing solid uranium hexafluoride and then feeding it into a centrifuge, after which it is compressed, cooled, and stored (Urenco, 2019). The NRC licensed NEF in 2006 for 30 years (NRC, 2012a), and it began operation in 2010 (Urenco, 2019). The environmental impacts as assessed during the licensing processes were primarily deemed to be small, with the exception of the positive impact of increased tax revenue (NRC, 2005).

Waste Control Specialists (WCS) is a company that provides treatment, storage, and disposal of Class A, B, and C LLRW, as defined by 10 CFR 61.55, hazardous waste and byproduct materials. WCS's facility is located on the Texas side of the New Mexico-Texas border, east of Eunice, New Mexico, approximately 72 km [45 mi] from the proposed CISF project (EIS Figure 5.1-1). Because Texas is an Agreement State, WCS is regulated by the Texas Commission on Environmental Quality (TCEQ) and is licensed by the TCEQ to dispose LLRW and by-product material in Andrews County, Texas (TCEQ, 2019). Class A, B, and C LLRW is disposed of by burying waste near-surface in concrete-lined cells on top of a 183-m [600-ft]-thick red-bed clay, which serves as a natural inhibitor to infiltration (WCS, 2019). The TCEQ's safety and environmental analysis regarding WCS concluded that, as authorized in the license, WCS's actions would protect health and minimize danger to life and the environment (TCEQ, 2019). In addition, WCS can currently store, but not dispose of, Greater-Than Class C (GTCC) and transuranic waste. These WCS disposal and storage capabilities are ongoing at the site.

In January 2015, TCEQ sent a letter to the NRC with questions concerning the State's authority to license a disposal cell for GTCC, GTCC-like, and transuranic waste. The Commission began considering the issue and undertook actions such as development of a regulatory basis, evaluation of technical issues, and stakeholder engagement activities. In February 2016, the U.S. Department of Energy (DOE) issued a final EIS titled, "Final Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste." The document evaluated disposition paths for GTCC, and the Final EIS identified the preferred alternative as the WIPP geological repository and/or land disposal at generic commercial facilities. In October 2018, DOE issued an environmental assessment (EA) that provides a site-specific analysis of the potential environmental impacts of disposing the entire inventory – 12,000 m^3 [423,776 ft^3] – of GTCC LLRW and GTCC-like waste at WCS (DOE, 2018a). However, publication of these documents by DOE is not a decision on GTCC LLRW disposal. Under the Energy Policy Act of 2005, additional actions would be required by both DOE and Congress. The NRC's actions regarding review of the TCEQ request and determinations regarding GTCC are ongoing. The NRC reviewed the DOE's Final EIS and EA, and has developed a draft regulatory basis for GTCC and transuranic waste disposal (ADAMS Accession No. ML19059A403). The NRC GTCC rulemaking is currently in progress. Thus, because disposal of GTCC at WCS would require completion of these NRC activities and actions by DOE and Congress, a detailed evaluation of this reasonably foreseeable future action is not feasible at this time but is noted here for completeness.

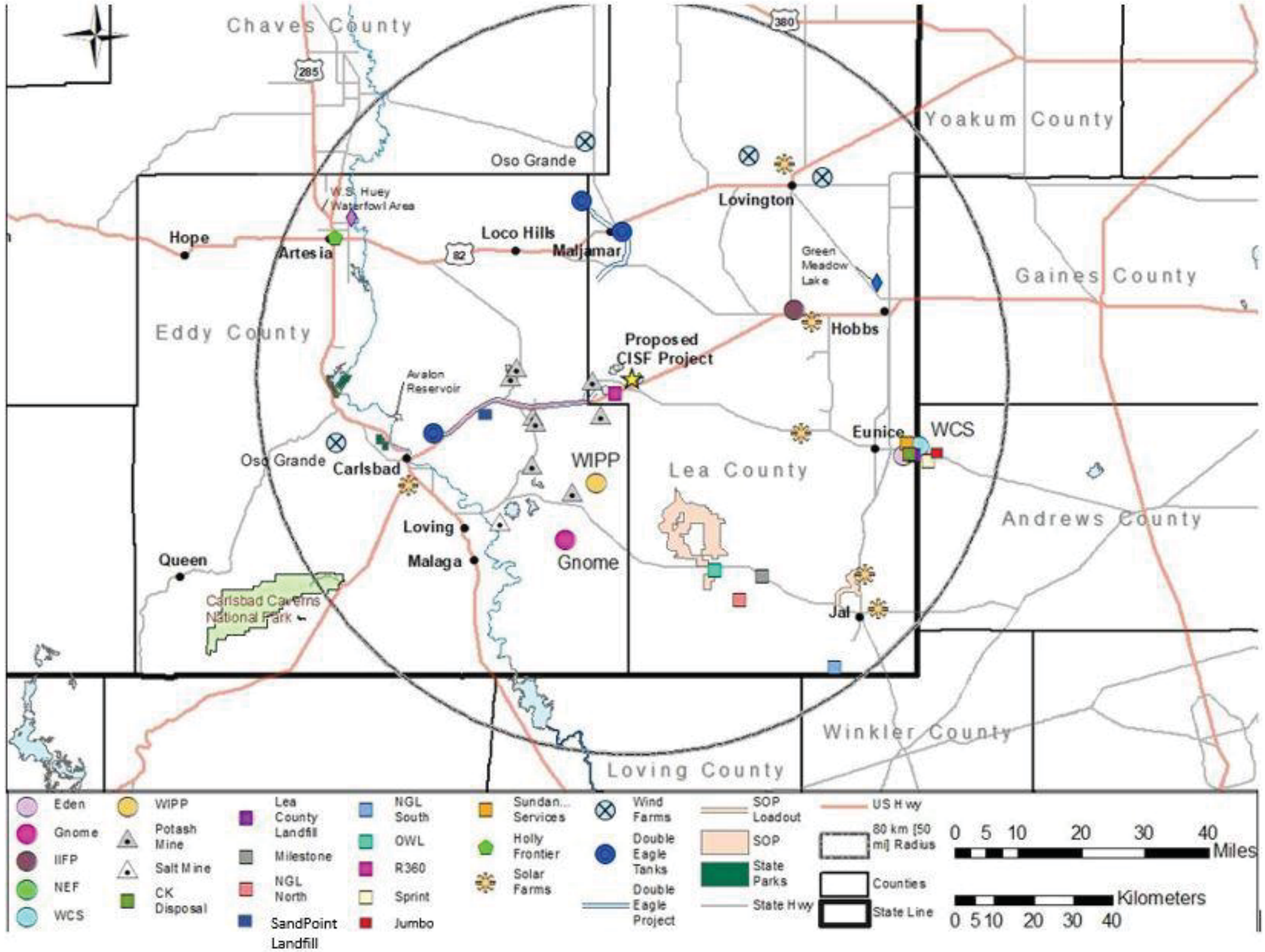

Figure 5.1-1 Location of Facilities within 80 km [50 mi] of the Proposed CISF Project

In October 2012, the NRC issued a license to International Isotopes Fluorine Products, Inc. (IIFP) for construction and operation of a depleted uranium deconversion facility known as the Fluorine Extraction and Depleted Uranium Deconversion Plant (FEP/DUP) (NRC, 2019). The facility would be located approximately 37.6 km [23.4 mi] northeast of the proposed CISF, east of Hobbs, New Mexico, and would convert depleted uranium hexafluoride into fluoride products for commercial resale and uranium oxides for disposal (NRC, 2019). The environmental impacts, as assessed during the licensing process, were predominantly small, with air quality during construction potentially being moderate (NRC, 2012b). Since the issuance of the license, no construction activities have occurred.

On June 11, 2019, Eden informed NRC of its intent to submit a license application to construct and operate a Medical Isotopes Production Facility (Eden, 2019a). Licensing of this facility would be subject to NRC regulations at 10 CFR Part 50 (Domestic Licensing of Production and Utilization Facilities); 10 CFR Part 70 (Domestic Licensing of Special Nuclear Materials) to receive, possess, use, and transfer special nuclear materials; and 10 CFR Part 30 (Rules of General Applicability to Domestic Licensing of Byproduct Material) to possess and transport molybdenum-99 for medical applications. Eden has stated its intent to build their facility east of Eunice, New Mexico, 3 km [1.9 mi] west of the New Mexico-Texas State line and 69 km [43 mi] southeast of the proposed CISF (Eden, 2019b). If an NRC license were issued, Eden would anticipate beginning construction in 2022 and production in late 2024 (Eden, 2019c).

5.1.1.3 Second CISF

In April 2016, WCS submitted a license application to the NRC requesting authorization to construct and operate a CISF for SNF at its existing hazardous and LLRW storage and disposal site in Andrews County, Texas. In 2018, WCS partnered with Orano CIS LLC to form Interim Storage Partners (ISP), and ISP submitted a revised license application to the NRC for the proposed CISF. The proposed ISP CISF would be co-located with the WCS facilities discussed in the prior section. Similar to the proposed Holtec CISF evaluated in this EIS, the function of the ISP CISF would be to store SNF and reactor-related GTCC LLRW generated at commercial nuclear power reactors. The SNF and reactor-related GTCC LLRW would be transported from commercial reactor sites to the CISF by rail. Although the initial license request is to store 5,000 MTU [5,500 short tons] at the CISF, ISP intends to submit future license amendment requests such that the facility would eventually store up to 40,000 MTU [44,000 short tons]. The NRC conducted a safety evaluation documented in a Safety Evaluation Report (SER) and also prepared an EIS (NRC, 2021). Based on the outcomes of those actions, the NRC granted the license (see ML21188A096); however, construction has not begun on the ISP CISF. Because detailed information about the ISP CISF is available, information about this reasonably foreseeable future action (i.e., construction and operation of the ISP CISF) is included where appropriate in this EIS.

5.1.1.4 Solar, Wind, and Other Energy Projects

New Mexico has a high potential for solar energy generation (Roberts, 2018). According to New Mexico's Energy, Minerals, and Natural Resources Department, New Mexico was generating over 254 megawatts (MW) of energy from solar sources as of January 2017, and had plans to generate 1,103 more MW of energy from solar sources within the State of New Mexico (NMEMNRD, 2017a). Within the region, there are six operating solar power facilities: one in Eddy County and five in Lea County (EIA, 2022b) (EIS Figure 5.1-1). SPS5 Hopi is a solar power station located in south Carlsbad, New Mexico (EIA, 2022b). SPS5 Hopi has been operating since late 2011 (EIA, 2022b). In Lea County, there are five operational solar power plants: (i) SPS1 Dollarhide, (ii) SPS2 Jal, (iii) SPS3 Lea, (iv) SPS4 Monument, and (v) Middle Daisy, all of which have been in operation since late 2011, with the exception of Middle Daisy, which began operations in 2017 (EIA, 2022b).

There are currently four operational wind projects located within the region of the proposed CISF project area (EIS Figure 5.1-1). Wildcat Wind Project, owned and operated by Exelon Generation, is located near Lovington, New Mexico, and went into operation in July 2012, producing 27 MW of power for Lea County, New Mexico (Exelon, 2019). Gaines Cavern Wind Project supplies 2 MW of power to Gaines, Texas, and was completed in 2013 (RES, 2019). The Jumbo Hill Wind Project produces 160 MW of power for Andrews County, Texas, and was completed in April 2020 (Engie North America, 2022).

According to the American Wind Energy Association, New Mexico is a leader in wind power, growing faster than any other State and with a goal of sourcing at least 50 percent of their energy from renewable sources by 2030 (American Clean Power, 2018, 2019). The Oso Grande Wind Project has been constructed and, as of 2020, was in production (TEP, 2020). The Oso Grande Wind Project includes a total of 61 wind turbines, some of which are in Chaves County, New Mexico, near State Highways 249 and 172, along with an electrical substation. The rest of the wind turbines and transmission lines are in Lea and Eddy County. According to the contractors, the expected annual energy production is expected to power over 100,000 homes and reduce carbon emissions by 688,000 metric tons [758,390 short tons] annually (EDF, 2019a; EDF, 2019b).

Xcel Energy is currently in the process of completing of their Power for the Plains Project, which is a project designed to improve the reliability of the existing transmission grid and provide an outlet for additional wind generation. The project plans to build new transmission lines and related facilities through portions of New Mexico and Texas (Xcel, 2019a). Power for the Plains involves the addition of two substations, construction of at least four new transmission lines, and the rebuilding of four power lines in Eddy and Lea Counties (Xcel, 2019b).

5.1.1.5 Housing Development and Urbanization

In addition to the energy projects previously described, there are several proposed and existing urban development projects within the region of the proposed CISF.

One of the goals stated in Lea County's most recent Comprehensive Plan is to increase housing in Lea County by 2025, as well as to increase the diversity in types of housing, including rentals, multi-family homes, and high-end homes (Lea County, 2005).

The City of Carlsbad is directing development efforts toward improving previously developed areas and areas that, if improved, would contribute to overall community services and facilities (Consensus Planning, 2020). There are a few exceptions to this plan, such as the new housing plan to provide temporary housing with 400 beds for oil workers (KRQE, 2019). Overall, it is the goal of the City of Carlsbad to ensure that future development and urbanization does not negatively impact the city's environmental resources, and the City is making efforts to protect water quality and wildlife, harvest storm water for irrigation and aquifer recharge, and adopt water conservation techniques (Consensus Planning, 2020). The City of Carlsbad recognizes the need for improved water and wastewater systems to support new housing developments and facilities, and funds have been allocated for future water and wastewater system rehabilitations (Consensus Planning, 2020).

5.1.1.6 Recreational Activities

Major National and State parks and recreational areas in the region of the proposed CISF project area are shown in EIS Figure 5.1-1. Carlsbad Caverns National Park is located south of Carlsbad and contains some of the largest caves in North America, including Carlsbad Caverns. Carlsbad Wilderness is desert backcountry surrounding Carlsbad Caverns National Park. The Guadalupe Back Country Byway west of Carlsbad is a 48-km [30-mi] road, which ascends about 915 m [3,000 ft] from the Chihuahuan Desert into the Guadalupe Mountains. The Living Desert Zoo and Gardens is located in Carlsbad and is dedicated to the interpretation of the Chihuahuan Desert. Brantley Lake State Park, located between the cities of Carlsbad and Artesia, includes a 1,214-ha [3,000-ac] lake on the Pecos River, created by construction of the Brantley Dam. Avalon Reservoir located 4.8 km [3 mi] north of Carlsbad, is a shallow 27-ha [66-ac] lake on the Pecos River and is stocked for fishing by the New Mexico Department of Game and Fish (NMDGF). The W.S. Huey Waterfowl Area, located northeast of Artesia, is a stopping and resting area for migrating waterfowl, including sandhill cranes and snow geese. Green Meadow Lake Fishing Area, located north of Hobbs, is stocked for fishing by the NMDGF. Local parks and recreational facilities (e.g., sport complexes, swimming pools, golf courses, hiking and biking trails, shooting ranges, and lakes) are also maintained by the cities of Carlsbad, Hobbs, Artesia, and Lovington.

5.1.1.7 Other Projects

R360 (also known as the Lea Land, LLC oil field waste landfarm) provides bioremediation of wellsite waste, disposal and recycling of nonhazardous oilfield operation materials, transportation of drilling waste, and other waste management services in support of the oilfield industry (Lea Land, LLC, 2022; R360, 2022). The facility is located across U.S. Highway 62, approximately 3.2 km [2 mi] southwest of the proposed project area and is approximately 192 ha [474 ac]. In 2019, NMED received a request for a major permit modification that would modify and expand their current operations (NMEMNRD, 2019a,b). The NMEMNRD issued a permit modification in 2020 (Lea Land, LLC, 2022; NMEMNRD, 2020). The expanded facility will consist of 12 evaporation ponds, and approximately 40.5 ha [100 ac] would be set aside for permanent disposal of exempt and non-hazardous oilfield waste (NMEMNRD, 2020, 2019b).

There are multiple existing and foreseeable waste disposal companies in the cumulative impacts study area, including Sundance Services, Lea County Sanitary Waste Landfill, Sprint Andrews County Disposal, and Sandpoint Landfill. Sundance Service is a full-service oilfield waste disposal facility with two existing facilities: one in Eunice, New Mexico (Parabo Facility), and the other located 8 km [5 mi] east of Eunice, New Mexico, near the New Mexico-Texas State line (Sundance, 2015). Together, the two facilities are approximately 340 ha [840 ac]. Since starting operations in 1978, Sundance Services has disposed both exempt (e.g., produced waters, drilling fluids, and drill cuttings) and non-exempt (e.g., waste solvents, cleaning fluids, and used hydraulic fluids) hazardous waste (Sundance, 2015). Sundance Services has proposed opening a new facility, Sundance West, 4.8 km [3 mi] east of Eunice, New Mexico, adjacent to the existing facility approximately 60.5 km [37.6 mi] east-southeast from the proposed CISF (Gordon Environmental, 2016). Sundance West would replace the older Sundance facility and include a liquid oilfield waste processing area and an oilfield waste landfill (Gordon Environmental, 2016). Construction of the new 129 ha [320 ac] facility would be phased over 4 years after the issuance of the final permit (Gordon Environmental, 2016); a permit was issued in July 2017 (NMEMNRD, 2017b).

The Lea County Sanitary Waste Landfill is approximately 62.7 km [37.6 mi] east-southeast of the proposed CISF project area. Lea County Sanitary Waste Landfill estimates that they annually receive: 90.7 metric tons [100 short tons] each of treated formerly characteristic hazardous waste, offal, sludge, and spill waste; 454 metric tons [500 short tons] each of industrial solid waste, petroleum-contaminated soils, and other solid waste; and up to 2,268 metric tons [2,500 short tons] of asbestos waste.

Sprint Andrews County Disposal is a waste disposal facility currently in the planning phase, which if built, would be on WCS-owned property, less than 3.2 km [2 mi] southeast of the licensed but not yet constructed ISP CISF site (EIS Section 5.1.1.3) and 65.9 km [40.9 mi] east-southeast of Holtec's proposed CISF site (BME, 2019). The Sprint facility would store, treat, reclaim, and dispose non-hazardous oil and gas waste (BME, 2019). The facility would cover 66.8 ha [165 ac] and would consist of four processing units and an evaporation pond (BME, 2019). The capacity of the facility, if permitted, would be 8,764,408 m^3 [11,463,414 yd^3], making the expected life of the facility 36 years (BME, 2019).

The Sandpoint Landfill is approximately 32 km [20 mi] west-southwest of the proposed Holtec CISF project area. The Sandpoint Landfill is managed by Eddy County (Eddy County, 2022). The Sandpoint Landfill is currently accepting waste, and specific details on the volumes and waste categories are found in EIS Section 3.13 and 4.14.1.

The Oilfield Water Logistics (OWL) Surface Waste Management Facility 35.4 km [22 mi] northwest of Jal, New Mexico is a new 218.5 ha [540 ac] oil and gas landfill, capable of handling over 400 loads per day of mud, cuttings, and other oil and gas solid wastes (OWL, 2018a,b). The OWL facility opened in 2019 and is approximately 44.2 km [27.4 mi] southwest of the proposed CISF (OWL, 2018b). Additionally, there are three potential waste facilities in Lea County, New Mexico that currently have submitted permit applications to NMED and have received tentative permits (NMEMNRD, 2021, 2019a). Milestone Environmental Services and NGL are the applicants for the proposed facilities. The proposed Milestone facility would be a 4 ha [10 ac] oilfield waste landfill 22.5 km [14 mi] west of Jal, New Mexico and 50.7 km [31.5 mi] south-southeast of the proposed CISF and would operate an Underground Injection Control Class II disposal well for the injection of slurry into the subsurface (NMEMNRD, 2019c). The first of the NGL facilities, NGL North, would be located approximately 27 km [17 mi] west of Jal, New Mexico and 52.8 km [32.8 mi] south-southeast of the proposed CISF and consist of 122.6 ha [303 ac] for non-hazardous oilfield waste (NMEMNRD, 2019d). NGL's second proposed facility, NGL South, would be located a little over 12.8 km [8 mi] southwest of Jal, New Mexico and 75.7 km [47 mi] south-southeast of the proposed CISF (NMEMNRD, 2019e). The facility would consist of 72.8 ha [180 ac] for non-hazardous oilfield waste (NMEMNRD, 2019e).

Some reactor sites, in particular those that have been shut down or decommissioned but continue to store SNF in dry storage casks, may require local transportation infrastructure upgrades to remove the SNF from the site for off-site storage or disposal (EIS Section 4.3.1.2.2). These upgrades, for example, could include installing or upgrading rail track, roads, or barge slips necessary to transfer SNF offsite. Because these infrastructure improvements are expected to be small construction projects limited to preexisting, previously disturbed, and previously evaluated reactor sites that are dispersed throughout the U.S., the environmental impacts are expected to be minor and are not evaluated further for cumulative impacts.

5.1.2 Methodology

The NRC's general approach for assessing cumulative impacts is based on principles and guidelines described in the CEQ's *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ, 1997) and relevant portions of the EPA's *Considerations of Cumulative Impacts in EPA Review of NEPA Documents* (EPA, 1999). Based on these documents, the NRC's regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 51, and NRC's guidance for developing EISs in NUREG–1748 (NRC, 2003), the NRC developed the following methodology for assessing cumulative impacts in this EIS:

1. Identify the potential environmental impacts of the proposed action, and evaluate the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions for each resource area. Potential environmental impacts of the proposed action are discussed and analyzed in EIS Chapter 4.

2. Identify the geographic scope for the analysis for each resource area. This scope will vary from resource area to resource area, depending on the geographic extent over which the potential impacts may occur.

3. Identify the timeframe for assessing cumulative impacts. The selected timeframe begins with NRC acceptance of the application for an NRC license to operate the proposed Holtec CISF Project on March 31, 2017. The cumulative impacts analysis timeframe ends in approximately 2060, the date estimated for the expiration of the initial license. The licenses that the NRC issues for 10 CFR Part 72 storage facilities (such as for the proposed CISF) are typically granted for a 40-year period. As discussed in Chapter 1 of this EIS, Holtec proposes to build the CISF project in 20 phases (Phases 1-20). In its license application, Holtec requests authorization for the initial phase (Phase 1) of the proposed CISF project. Holtec plans to subsequently request amendments for each of 19 expansion phases of the proposed CISF (a total of 20 phases) to be completed over the course of 20 years, to expand the facility to eventually store up to 10,000 canisters of SNF (Holtec, 2020a). Holtec's expansion of the proposed project (i.e., Phases 2-19) is not part of the proposed action currently pending before the agency. However, as a matter of discretion, the NRC staff considered these expansion phases in its impacts analysis in Chapter 4 of this EIS and carries forth those impacts into the description of cumulative impacts in this chapter, where appropriate, so as to conduct a bounded analysis for the proposed CISF project. Therefore, impacts are described in terms of the proposed action (Phase 1) and full build-out (Phases 1-20). Holtec has estimated that each phase will take a year to construct, while decommissioning would take 2 years.

4. Identify ongoing and prospective projects and activities that take place or may take place in the area surrounding the project site. These projects and activities are described in EIS Section 5.1.1.

5. Assess the cumulative impacts for each resource area from the proposed CISF project, and other past, present, and reasonably foreseeable future actions. This analysis would take into account the environmental impacts identified in Step 1 and the resource-area-specific geographic scope identified in Step 2.

The following terms, as defined in NUREG–1748 (NRC, 2003), describe the level of cumulative impact:

SMALL: The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource considered.

MODERATE: The environmental effects are sufficient to alter noticeably, but not destabilize, important attributes of the resource considered.

LARGE: The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource considered.

The NRC staff recognize that many aspects of the activities associated with the proposed CISF project would have SMALL impacts on the affected resources, as described in EIS Chapter 4. It is possible, however, that an impact that may be SMALL by itself, but could result in a MODERATE or LARGE cumulative impact when considered in combination with the impacts of other actions on the affected resource. Likewise, if a resource is regionally declining or imperiled, even a SMALL individual impact could be significant if it contributes to or accelerates the overall resource decline. The NRC staff determined the appropriate level of analysis that was merited for each resource area that the proposed CISF project potentially affected. The level of analysis was determined by considering the impact level to the specific resource, as well as the likelihood that the quality, quantity, and stability of the given resource could be affected. EIS Table 5.1-1 summarizes the potential cumulative impacts of the proposed CISF project on environmental resources the NRC staff identified and analyzed for this EIS, which are then detailed in the subsequent sections. The potential cumulative impacts take into account the other past, present, and reasonably foreseeable activities identified in EIS Section 5.1.1.

Table 5.1-1 Summary Table of Environmental Impacts of the Proposed Action (Phase 1), Phases 2-20, and the Cumulative Impact Considering All Phases

	Proposed Action (Phase 1)*	Phases 2-20*	Cumulative Impact
Land Use	SMALL	SMALL	The proposed project is projected to have a SMALL incremental effect when added to the MODERATE impacts from other past, present, and reasonably foreseeable future actions resulting in an overall MODERATE cumulative impact to land use.

Table 5.1-1 Summary Table of Environmental Impacts of the Proposed Action (Phase 1), Phases 2-20, and the Cumulative Impact Considering All Phases			
	Proposed Action (Phase 1)*	**Phases 2-20***	**Cumulative Impact**
Transportation	SMALL	SMALL for all stages, if reclamation transportation occurs in five or more years	The proposed project is projected to have a SMALL incremental effect for traffic-related impacts for all project stages, if reclamation transportation occurs in 5 or more years, and SMALL incremental effect for the radiological effects of radioactive materials transportation when added to the SMALL impacts from other past, present, and reasonably foreseeable future actions resulting in an overall SMALL cumulative impact to transportation resources.
Geology and Soils	SMALL	SMALL	The proposed project is projected to have a SMALL incremental effect when added to the MODERATE impacts from other past, present, and reasonably foreseeable future actions resulting in an overall MODERATE cumulative impact to geology and soils.

Table 5.1-1	**Summary Table of Environmental Impacts of the Proposed Action (Phase 1), Phases 2-20, and the Cumulative Impact Considering All Phases**		
	Proposed Action (Phase 1)*	**Phases 2-20***	**Cumulative Impact**
Surface Water	SMALL	SMALL	The proposed project is projected to have a SMALL incremental effect when added to the SMALL impacts from other past, present, and reasonably foreseeable future actions resulting in an overall SMALL cumulative impact to surface water.
Groundwater	SMALL	SMALL	The proposed project is projected to have a SMALL incremental effect when added to the MODERATE impacts from other past, present, and reasonably foreseeable future actions resulting in an overall MODERATE cumulative impact to groundwater.

Table 5.1-1	Summary Table of Environmental Impacts of the Proposed Action (Phase 1), Phases 2-20, and the Cumulative Impact Considering All Phases		
	Proposed Action (Phase 1)*	**Phases 2-20***	**Cumulative Impact**
Ecology	SMALL for wildlife and MODERATE for vegetation "No Effect" on Federally listed species, and "No Effect" on any existing or proposed critical habitats	SMALL for wildlife and MODERATE for vegetation "No Effect" on Federally listed species, and "No Effect" on any existing or proposed critical habitats	The proposed project is projected to have a SMALL to MODERATE incremental effect when added to the SMALL to MODERATE impact from other past, present, and reasonably foreseeable future actions resulting in an overall SMALL to MODERATE cumulative impact to ecology. "No Effect" on Federally listed species, and "No Effect" on any existing or proposed critical habitats
Air Quality	SMALL	SMALL	The proposed project is projected to have a SMALL incremental effect when added to the MODERATE impacts from other past, present, and reasonably foreseeable future actions resulting in an overall MODERATE cumulative impact to air quality.

Table 5.1-1 Summary Table of Environmental Impacts of the Proposed Action (Phase 1), Phases 2-20, and the Cumulative Impact Considering All Phases			
	Proposed Action (Phase 1)*	**Phases 2-20***	**Cumulative Impact**
Noise	SMALL	SMALL	The proposed project is projected to have a SMALL incremental effect when added to the SMALL impacts from other past, present, and reasonably foreseeable future actions resulting in an overall SMALL cumulative impact to noise.
Historic and Cultural	SMALL. Based on completion of consultation under NHPA Section 106, the NRC staff's conclusion is that the proposed project would have no effect on historic properties.	SMALL. Based on completion of consultation under NHPA Section 106, the NRC staff's conclusion is that the proposed project would have no effect on historic properties.	The proposed project is projected to have a SMALL incremental effect when added to the SMALL impact from other past, present, and reasonably foreseeable future actions resulting in an overall SMALL cumulative impact to historic and cultural resources.
Visual and Scenic	SMALL	SMALL	The proposed project is projected to have a SMALL incremental effect when added to the SMALL impact from other past, present, and reasonably foreseeable future actions resulting in an overall SMALL cumulative impact to visual and scenic resources.

Table 5.1-1 Summary Table of Environmental Impacts of the Proposed Action (Phase 1), Phases 2-20, and the Cumulative Impact Considering All Phases			
	Proposed Action (Phase 1)*	**Phases 2-20***	**Cumulative Impact**
Socioeconomic	SMALL impact for population and housing, and SMALL to MODERATE and beneficial impact for employment, public services, and local finance.	SMALL impact for population and housing, and SMALL to MODERATE and beneficial impact for employment, public services, and local finance.	The proposed project is projected to have a SMALL to MODERATE incremental effect when added to the SMALL to MODERATE impacts from other past, present, and reasonably foreseeable future actions resulting in a SMALL to MODERATE cumulative impact in the socioeconomic region of influence.
Environmental Justice	No disproportionately high and adverse impacts to low-income or minority populations	No disproportionately high and adverse impacts to low-income or minority populations	The cumulative impacts would have no disproportionately high and adverse impacts to low-income or minority populations.
Public and Occupational Health	SMALL	SMALL	The proposed project is projected to have a SMALL incremental effect when added to the SMALL impacts from other past, present, and reasonably foreseeable future actions resulting in an overall SMALL cumulative impact to public and occupational health.

Table 5.1-1 Summary Table of Environmental Impacts of the Proposed Action (Phase 1), Phases 2-20, and the Cumulative Impact Considering All Phases			
	Proposed Action (Phase 1)*	**Phases 2-20***	**Cumulative Impact**
Waste Management	SMALL	SMALL to MODERATE until a new landfill becomes available	The proposed project is projected to have a SMALL to MODERATE incremental effect when added to the SMALL impacts from other past, present, and reasonably foreseeable future actions resulting in an overall SMALL to MODERATE cumulative impact to waste management.

*These impact determinations are discussed in further detail in resource area sections of Chapter 4 of this EIS.

5.1.3 License Renewal and Use of the Continued Storage Generic Environmental Impact Statement (CS GEIS)

If the NRC grants a license for the proposed CISF, Holtec would have to apply for license renewal before the end of the initial license term, to continue operations. The license renewal process would require another NRC safety and environmental review for the proposed renewal period.

For the period of time beyond the license term of the proposed CISF, the NRC's CS GEIS (NUREG–2157) and rule at 10 CFR 51.23 apply. The CS GEIS analyzed the environmental effects of the continued storage of SNF at both at-reactor and away-from-reactor ISFSIs (NRC, 2014a).

The Continued Storage GEIS (NUREG–2157) is applicable only for the period of time after the license term of an away-from-reactor ISFSI (i.e., a CISF) (NRC, 2014a). In accordance with the regulation at 10 CFR 51.23(b), the impact determinations from the GEIS are deemed incorporated into this EIS for the timeframe beyond the period following the term of the CISF license. Thus, those impact determinations are not reanalyzed in this EIS.

Section 5.0 of the Continued Storage GEIS indicates several assumptions about the size and characteristics of a hypothetical CISF that were based on characteristics similar to the licensed, but not constructed, Private Fuel Storage (PFS) Facility (NRC, 2014a). Although some characteristics of the proposed Holtec CISF differ from the PFS Facility design, the Continued Storage GEIS acknowledges that not all storage facilities will necessarily match the "assumed generic facility," and therefore when it comes to "size, operational characteristics, and location of the facility, the NRC will evaluate the site-specific impacts of the construction and operation of any proposed facility as part of that facility's licensing process." In accordance with the regulation at 10 CFR 51.23(c), this EIS serves as the site-specific analysis of the impacts of construction and operation of the Holtec proposed CISF.

5.2 Land Use

The NRC staff assessed the geographic scope of the analysis on land use within a 10-km [6-mi] radius of the proposed project area, which is a land area of approximately 52,250 hectares (ha) [129,110 acres (ac)]. The timeframe for the analysis of cumulative impacts is 2017 to 2060, as described in EIS Section 5.1.2. Land use impacts result from (i) land disturbance, (ii) interruption, reduction, or impedance of livestock grazing and open wildlife areas, (iii) land access, and (iv) competition for mineral rights. The cumulative impacts on land use were not assessed beyond 10 km [6 mi] from the proposed project area because, at that distance, land use would not be anticipated to influence or be influenced by the proposed CISF project. As part of the NRC scoping process, the NRC staff received comments concerning the presence of dairy and pecan farms in southeastern New Mexico. However, both types of farms are outside of the geographic scope of the analysis for land use and are therefore not analyzed further. Land within a 10-km [6-mi] radius of the proposed project area is privately-owned or owned by BLM or the State of New Mexico (EIS Figure 3.2-1). BLM or the State of New Mexico own the subsurface mineral rights within the land use geographic scope (EIS Figure 3.2-2). Within the geographic scope of the analysis, activities on both private and public lands (e.g., livestock grazing, oils and gas production, and potash mining) are ongoing and projected to continue in the future.

Land use within the region is predominantly rangeland used for livestock grazing (EIS Figure 3.2-3). Cumulative impacts from the loss of rangeland within the geographic scope of the analysis for land use from existing and potential activities include a decrease in the area available for foraging, loss of forage or cropland productivity, loss of animal unit months (AUMs), and loss of water-related range improvements (e.g., improved springs, water pipelines, or stock ponds). An AUM is the amount of forage an animal grazing for one month needs. Another impact could be dispersal of noxious and invasive weed species both within and beyond areas where the surface had been disturbed, which reduces the area of desirable grazing by livestock.

As described in EIS Section 4.2, the land use impacts from full build-out of the proposed CISF project would be SMALL. If only the proposed action (Phase 1) (including the rail spur) was constructed and operated, the impacts would also be SMALL. At full build-out, the proposed CISF project would disturb approximately 133.5 ha [330 ac] and restrict cattle grazing. Over the license term, the amount of land that would be disturbed and fenced would be small {133.5 ha [330 ac]} in comparison to the available grazing land within the land use geographic scope of the analysis {i.e., approximately 52,250 ha [129,110 ac] of land within a 10-km [6-mi] radius of the proposed CISF project}.

Existing and reasonably foreseeable future nuclear facilities within the region are described in EIS Section 5.1.1.2. These facilities include WIPP, NEF, WCS, the recently licensed but not constructed ISP CISF, Project Gnome, and FEP/DUP. However, all of these facilities are outside the geographic scope of the analysis for land use that is anticipated to influence or be influenced by construction and operation of the proposed CISF. WIPP is located approximately 25 km [16 mi] southwest of the proposed project area, NEF is approximately 61 km [38 mi] southeast, WCS is approximately 63 km [39 mi] southeast, and FEP/DUP is approximately 37 km [23 mi] northeast.

As described in EIS Section 5.1.1.1, the Permian Basin is the focus of extensive exploration, leasing, development, and production of oil and gas with the most heavily concentrated area of wells located in eastern Eddy County and western Lea County. As described in EIS Section 3.2.4, extensive oil and gas production activities surround the proposed project area.

The location of oil and gas wells within and surrounding the proposed CISF project area are shown in EIS Figure 3.2-7. One operating gas well is present within the proposed CISF project area along with 18 plugged and abandoned wells. Impacts on land use from continued oil and gas development in the land use geographic scope would include construction of temporary access roads and 1.2-ha [3-ac] drill pads for each drill site (BLM, 2009). In addition, continued oil and gas development in the geographic scope of the analysis may lead to the need for additional support infrastructure such as compressor stations and pipelines to move oil and gas to market. EIS Figures 3.2-6 and 3.2-9 show oil and gas support facilities and pipelines surrounding the proposed CISF project area. As shown in EIS Figure 3.2-8, the majority of land within the geographic scope of the analysis for land use {i.e., land within a 10-km [6-mi] radius of the proposed CISF project} is within the known potash mining leasing area. As such, administrative controls implemented by the New Mexico Oil Conservation Commission, the New Mexico State Land Office, the State of New Mexico, U.S. Department of the Interior, and BLM would ensure that oil and gas development activities and potash mining activities within the geographic scope of the analysis for land use are closely monitored and regulated (Holtec, 2019).

As described in Section 5.1.1.1, potash mining is a major part of the Eddy and Lea County economies. Intrepid operates two underground potash mines (Intrepid North and Intrepid East) within 9.6 km [6 mi] of the proposed CISF project area (EIS Figure 3.2-6). The Intrepid North mine, located to the west, is no longer mining potash underground; however, surface facilities are currently being used in the manufacture of potash products. The Intrepid East mine, located to the southwest, is still mining underground potash ore (Holtec, 2020a). However, given the current market prices for potash, the surplus international supply, the requirements for obtaining additional permits for any new mines or to expand existing extraction activities, engineering challenges, and the constraints on the existing local potash mill for processing potash ores, it is highly unlikely that additional potash activities or extraction will occur beneath the proposed CISF site (Holtec, 2021; SEC, 2021; USGS, 2021). Even if potash price fluctuations were to become more prevalent, the changes in potash supply that would result would not likely make the proposed resources near the proposed project more desirable for extraction. There are significant potash reserves available in southeastern New Mexico outside of the proposed project area (Holtec, 2021). For these economic and geographic reasons, the construction and operation of the proposed CISF would not adversely affect potash activities or extraction.

As described in EIS Section 5.1.1.3, New Mexico has a high potential for solar energy generation. However, no current or planned solar facilities are located within the geographic scope of the analysis for land use. As further described in EIS Section 5.1.1.3, there are currently four operational wind projects located within the region of the proposed CISF project area. However, all four projects are outside of the geographic scope of the analysis for land use. If any future wind energy projects are developed in the region, they would be generally compatible with other land uses, including livestock grazing, recreation, and oil and gas production activities (BLM, 2005), with long-term disturbance associated with permanent facilities (i.e., access roads, support facilities, and tower foundations) (BLM, 2011).

Both urban development (EIS Section 5.1.1.5) and recreational activities (EIS Section 5.1.1.6) in the region all occur outside of the geographic scope of the analysis for land use. Within the geographic scope of the analysis for land use is the R360 oilfield waste facility located 3.2 km [2 mi] southwest of the proposed CISF. The NRC staff anticipates that with the large amount of oil and gas activity in the area that the oilfield waste landfarm would continue operating. Furthermore, facility is privately owned and access is restricted to customers of the facility.

The NRC staff have determined that the cumulative impact on land use within the geographic scope of the analysis resulting from past, present, and reasonably foreseeable future actions would be MODERATE. This finding is based on the assessment of existing and potential impacts on land use within the geographic scope from the following actions:

- Land disturbance from existing and future oil and gas production and development activities, such as access road and drill pad construction as well as the oilfield waste facility

- Land disturbance and restrictions on livestock grazing from construction and operation of additional infrastructure (e.g., compressor stations, booster stations, and pipelines) to support existing and future oil and gas production

- Land disturbance and restrictions on livestock grazing from existing and future potash mining

Other existing and reasonably foreseeable future actions are not expected to have a noticeable impact on land use within the land use geographic scope. There are no solar or wind energy generation projects, urban development, or recreation facilities planned within the land use geographic scope. Solar and wind energy projects, if constructed and operated within the geographic scope of the analysis, are generally compatible with the primary land use (i.e., livestock grazing) (BLM, 2005).

5.2.1 Summary

The estimated land disturbance of 133.5 ha [330 ac] at full build-out for the proposed CISF project area is a small amount of land in comparison to the geographic scope of the analysis for land use of 52,250 ha [129,110 ac]. Livestock grazing would be restricted on this amount of land over the license term of the proposed CISF. The 114.5-ha [283-ac] protected area containing the SNF storage pads and cask transfer building within the 133.5-ha [330-ac] storage and operations area would be enclosed by security fencing to restrict and control public access (Holtec, 2020a). At the end of operations, Holtec would decommission the site in accordance with an NRC-approved decommissioning plan. Additionally, Holtec has committed to reclaim and restore the land to its preoperational use of livestock grazing, unless the landowner justifies and approves an alternative use (e.g., the landowner may want to retain roads or buildings) (Holtec, 2020a). Therefore, the NRC staff concludes that at full build-out (Phases 1-20), the proposed CISF would add a SMALL incremental effect to the MODERATE impacts to land use from other past, present, and reasonably foreseeable future actions in the geographic scope of the analysis, resulting in an overall MODERATE cumulative impact in the land use geographic area.

5.3 Transportation

Cumulative transportation impacts related to increases in road traffic were evaluated locally and regionally within a geographic scope of analysis of an 80-km [50-mi] radius of the proposed CISF project. This region was chosen to be inclusive of areas close to the proposed CISF that would be most likely to notice changes in traffic but also consider more distant locations (e.g., WCS) where other nuclear materials facilities engage in transportation of radioactive materials. Because the proposed CISF and other facilities in the region would ship radioactive materials on a national scale, the affected populations along the transportation routes, and therefore the cumulative impact analysis, goes beyond the geographic scope of the analysis to various national origins or destinations. The timeframe for the analysis is 2017 to 2060.

As discussed in EIS Section 4.3.1, the transportation impacts from the proposed CISF project for all stages at full build-out would be SMALL. If only the proposed action (Phase 1) were licensed, the impact would also be SMALL. These impact analyses address the transportation impacts of supply shipments and commuting workers and the radiological and nonradiological impacts to workers and the public under incident-free and accident conditions from operational SNF shipments to and from the proposed CISF. The NRC staff's assessment of nonhazardous reclamation waste shipments during the decommissioning and reclamation stage of the proposed CISF at full build-out concluded that a SMALL impact on daily truck traffic on Highway 62/180 near the proposed CISF project would occur if reclamation occurs over a 5-year or longer period.

Other past, present, and reasonably foreseeable actions, including nuclear materials facilities within the region of the proposed CISF project are described in EIS Section 5.1.1. The NRC staff do not anticipate transportation impacts on the main rail, because of SNF shipments to the proposed CISF. Currently, the rail lines are managed by the rail carriers who direct traffic to maximize utility. While SNF shipments would be travelling at a slower speed than other trains, the NRC staff reasonably assumes that assume that rail carriers would make adjustments to account for SNF shipments. Therefore, the cumulative impact from the proposed CISF SNF shipments with other past, present, and reasonably foreseeable actions would be SMALL. Traffic-generating activities within the geographic scope of the analysis that could overlap with the traffic the proposed CISF activities generated are accounted for in the existing annual average daily traffic counts for area roadways described in EIS Section 3.3. If a second CISF were constructed, the NRC staff anticipates that the increase in traffic associated with the transport of construction materials would most likely come from west Texas proximity and the availability of materials. No other major future traffic-generating projects were identified in Section 5.1.1, and, where applicable, the impact analyses of the proposed CISF in EIS Section 4.3.1 account for the potential for growth in traffic with time based on the historical trend. Therefore, the NRC staff concludes that further analysis of the cumulative traffic-related transportation impacts from the other past, present, and reasonably foreseeable future actions (including traffic volume, safety, and infrastructure wear and tear) would not significantly change the traffic-related impacts previously evaluated in EIS Section 4.3.1 for the proposed CISF. Additionally, worker safety-related transportation impacts (e.g., injuries and fatalities) pertain to individual worker and workplace risks that are not considered to be cumulative in nature, whereas annual occupational radiation exposures are cumulative but are monitored and limited by regulation regardless of workplace. Therefore, the focus of the remaining analysis of the impacts of other past, present, and reasonably foreseeable future actions focuses on public radiation exposure to other current or future radioactive materials shipments.

Within the geographic scope of the analysis for transportation, there are several nuclear materials facilities that are described in EIS Section 5.1.1 and Section 3.12.1.2 including WIPP, NEF, FEP/DUP, Project Gnome, WCS, and the recently licensed but not constructed ISP CISF. Because of (i) the locations and distances from these facilities to the proposed CISF project, (ii) the predominant use of roadways to ship radioactive materials relative to the proposed CISF intent to use railways, and (iii) the separate local north-south rail lines serving facilities near Carlsbad and Hobbs, and (iv) in the case of the Project Gnome, the project is shut down, the NRC staff expects the potential for overlapping and accumulating radiation exposures to the public from this transportation (for example, shipments frequently exposing the same people in proximity to the transportation routes) would be low. However, because routes and locations of exposed individuals would vary, the cumulative impact analysis conservatively assumes the population dose estimates from all of these radioactive materials transportation activities are additive and therefore assume that the population is exposed to the radiation from all of the evaluated shipments.

EIS Table 5.3-1 summarizes the results of prior radioactive material transportation impact analyses conducted to evaluate the impacts of the proposed transportation for the aforementioned regional nuclear materials facilities. The analyses were conducted using the RADTRAN, (Version 5 or higher) (Neuhauser et al., 2000) transportation risk assessment software and the TRAGIS routing software (Johnson and Michelhaugh, 2003) based on projected transportation operations, including the materials to be shipped, the packaging, the mode of transportation, the number of expected shipments, the known or expected origin and destinations and estimated routing, the population along routes, and accident rates. The RADTRAN software calculated radiation doses to the exposed population along the routes as well as dose risks based on the probabilities and consequences of accidents, representing a wide range of severities, and these results were converted to expected latent cancer fatalities (LCF) using applicable conversion factors in the reports that documented the analyses. No available prior transportation risk was located for the WCS waste disposal operations; therefore, the NRC staff assumed that the FEP/DUP facility results were applicable based on similarities in the types of materials shipped.

As shown in EIS Table 5.3-1, the total estimated LCFs for incident-free radioactive materials transportation from decades of national transportation of radioactive materials from these other nuclear materials facilities within the region was one and the total estimated LCFs for transportation accidents was two. While the exposed population was not reported in the source documents, for national interstate transportation, the NRC previously reported that the exposed population along several representative truck and rail routes RADTRAN calculated ranged from 132,939 to 1,647,190 people (NRC, 2014b). Therefore, the estimated incident-free and accident LCFs are on the order of 1 and 2 LCFs per 100,000 or more exposed people, respectively. By comparison, as described in EIS Section 3.12.3, the baseline lifetime risk in the U.S. is 1 in 5 (or 20,000 per 100,000) for males and 1 in 6 (or about 17,000 per 100,000) for females developing a fatal cancer (ACS, 2022). Based on this analysis, the cumulative estimated increase in LCFs from potential exposures to radiation from the other regional nuclear material facilities in the region would have a negligible contribution to the number of LCFs expected in the exposed population from the existing baseline national cancer risk described in EIS Section 3.12.3. Therefore, the NRC staff concludes that the potential cumulative public dose impacts from the other past, present, and reasonably foreseeable future actions would be SMALL.

Other past, present, and reasonably foreseeable actions within the geographic scope of the analysis for transportation include solar and wind energy projects (EIS Section 5.1.1.4), urban development (EIS Section 5.1.1.5), recreational activities (EIS Section 5.1.1.6), and oilfield waste facilities (EIS Section 5.1.1.7). The NRC staff accounted for these projects in the analysis of current traffic conditions in EIS Section 4.3 and are not anticipated to contribute to radiological doses. Therefore, these projects contribute to the overall SMALL transportation impact for past, present, and reasonably foreseeable future actions.

5.3.1 Summary

Based on the preceding analysis, the NRC staff have determined that the cumulative impact on transportation in the geographic scope of the analysis resulting from other past, present, and reasonably foreseeable future actions would be SMALL. As described in the preceding analysis, the estimates of combined radiological exposures and associated LCF estimates from radioactive materials transportation associated with currently operating and proposed future facilities in the geographic scope represent a negligible contribution to the baseline cancer risk in the U.S. Considering the aforementioned estimated LCFs from the SNF transportation Holtec

Table 5.3-1 Summary of Available Transportation Risk Assessment Results for Other Facilities Within an 80-km [50-mi] Radius of the Proposed CISF Project

Facility	Material Shipped	Mode	Estimated Incident-Free Impacts (LCF)	Estimated Accident Impacts (LCF)
WIPP	Transuranic Waste	Truck	0.23	2.33×10^{-3}
NEF	UF_6, Depleted UF_6, Residuals and Wastes	Truck	0.009	0.5
FEP/DUP	Depleted UF_6 and LLRW	Truck	0.4	0.6
WCS Disposal	LLRW and Byproduct Material	Truck and Rail	0.4*	0.6*
Licensed, but not constructed ISP CISF at WCS	Spent Nuclear Fuel	Rail	0.09†	0.02†
All Facility Total	Radioactive Material	Truck and Rail	1	2

*No prior transportation impact analysis was identified for WCS disposal operations; therefore, NRC staff assumed that impacts would be similar to the estimated impacts for FEP/DUP which included shipments of LLRW and uranium.

†LCF's for the ISP CISF have been estimated by the NRC staff using the representative-route calculation approach described in EIS Section 4.3.1.2.2 scaled by the proposed estimated number of ISP SNF shipments (3,000) at full-build-out.

Source: WIPP (DOE, 2009); NEF (NRC, 2005); FEP/DUP (NRC, 2012b).

proposed for the CISF project at full-build-out of 0.31 public LCFs and 2.21 worker LCFs and the preceding estimated LCF risk from other past, present, and reasonably foreseeable future actions of 3 LCFs, the cumulative LCF risk would remain a negligible contribution to the estimated baseline cancer risk within the exposed populations that were evaluated. Additionally, the NRC staff's assessment of nonhazardous demolition waste shipments during the decommissioning and reclamation stage of the proposed CISF at full build-out concluded a SMALL impact on daily truck traffic on U.S. Highway 62/180 near the proposed CISF project. Therefore, the NRC staff concludes that at full build-out, the proposed CISF would add a SMALL impact for traffic-related impacts during decommissioning and reclamation, and a SMALL impact for the radiological effects of radioactive materials transportation incremental effect to the SMALL impacts to transportation resources from other past, present, and reasonably foreseeable future actions in the geographic scope of the analysis, resulting in an overall SMALL cumulative impact in the transportation geographic area.

5.4 Geology and Soils

The NRC staff assessed cumulative impacts on geology and soils within a geographic scope of analysis of 80 km [50 mi] to capture the large-scale nature of the geologic surface and subsurface formations in the region. The timeframe for the analysis of cumulative impacts is 2017 to 2060.

As described in EIS Section 4.4, the impacts to geology and soils from full build-out of the proposed CISF project would be SMALL. If only the proposed action (Phase 1) were constructed and operated, the impacts would also be SMALL. Impacts to geology and soils during construction, operation, and decommissioning of the proposed CISF project would be limited to soil disturbance, soil erosion, and potential soil contamination from leaks and spills of oil and hazardous materials. As described in EIS Section 4.4.1, Holtec would implement mitigation measures; BMPs; NPDES permit requirements; a Stormwater Pollution Prevention Plan (SWPPP); and a Spill Prevention, Control, and Countermeasures (SPCC) plan to limit soil loss, avoid soil contamination, and minimize stormwater runoff impacts.

Within the geological and soil resources geographic scope, nuclear-related activities, livestock grazing, oil and gas production and oilfield waste facilities, potash mining, solar and wind energy projects, and recreational activities are ongoing and projected to continue in the future (EIS Section 5.1.1).

Existing and reasonably foreseeable future nuclear facilities within the geological and soil resources geographic scope are described in EIS Section 5.1.1.2. These facilities include WIPP, NEF, WCS, FEP/DUP, Project Gnome, the ISP CISF, and Eden. As described previously, approximately 730 ha [1,802 ac] have been or would be disturbed and/or set-aside to support nuclear-related activities at these facilities (Holtec, 2020a). Based on information in the license applications, development of future nuclear-related projects in the region (e.g., the licensed but not constructed ISP CISF) would have impacts on geology and soils because of increased vehicle traffic, clearing of vegetated areas, soil salvage and redistribution, discharge of stormwater runoff, and construction and maintenance of project facilities and infrastructure (e.g., roads, pipelines, industrial sites, and associated ancillary facilities). The NRC staff assumes (or, in the case of the ISP CISF, has determined in its license review) that the development of such projects within the region would be similar to the proposed Holtec CISF project, with similar potential for surface impacts to geology and soils, although specific impact determinations would be made in site-specific licensing reviews of those facilities [e.g., the ISP CISF EIS (NRC, 2021)]. The construction and operation of the infrastructure for these future projects would be subject to similar requirements for monitoring, mitigation, and response programs to limit potential surface impacts (e.g., erosion, contamination from spills) as those for the proposed Holtec CISF project. Reclamation and restoration of disturbed areas would mitigate loss of soil and soil productivity associated with project activities.

Other past, present, and reasonably foreseeable future actions in the geology and soils geographic scope include livestock grazing, oil and gas production and oilfield waste processing, and potash exploration and mining. Surface-disturbing activities related to these actions, such as construction of new access roads and drill pads and overburden stripping, would have direct impacts on geological and soil resources. Direct effects on geology and soils from these activities would be limited to excavation and relocation of disturbed bedrock and unconsolidated surface materials associated with surface disturbances. Impacts from these activities include loss of soil productivity due primarily to wind erosion, changes to soil structure from soil handling, sediment delivery to surface water resources (i.e., runoff), and compaction from equipment and livestock pressure. Reclamation and restoration of soils disturbed by historic livestock grazing and exploration activities would mitigate loss of soil and soil productivity, and salvaged and replaced soil would become viable soon after vegetation is established.

As described in EIS Section 5.1.1.1, the Permian Basin is the focus of extensive exploration, leasing, development, and production of oil and gas, with the most heavily concentrated area of wells located in eastern Eddy County and western Lea County. In recent years, fluid injection and hydrocarbon production have been identified as potential triggering mechanisms for numerous earthquakes that have occurred in the Permian Basin (Frohlich et al., 2016). As described in EIS Section 3.4.4, recent seismicity within the geological and soil resources geographic scope in Eddy County approximately 80 km [50 mi] west of the proposed project area is suspected to be induced by wastewater injection from oil and gas production into deep wells. As further described in EIS Section 3.4.4, earthquakes suspected of being induced by wastewater injection west of the proposed project area, as well as in west Texas, typically have magnitudes ranging from 2.5 to 4.0. Potential seismic impacts at the proposed project site are evaluated in the NRC safety evaluation report, including the potential for oil and gas exploration and development activities to induce earthquakes or any other major ground motion.

As discussed in EIS Section 3.4.5, sinkholes and karst fissures formed in gypsum bedrock are common features of the lower Pecos region of west Texas and southeastern New Mexico. New sinkholes form almost annually, often associated with upward artesian flow of groundwater from regional karstic aquifers that underlie evaporitic rocks at the surface (Land, 2003, 2006). A number of these sinkholes are of anthropogenic (man-made) origin and are associated with improperly cased abandoned oil and water wells or with solution mining of salt beds in the shallow subsurface (Land, 2009, 2013). The location of anthropogenic sinkholes and dissolution features in southeastern New Mexico are shown in EIS Figure 3.4-12 and include the Jal, Jim's Water Service, Loco Hills, and the I&W Brine Well, which are located within the geological and soil resources geographic scope. As described previously, the potential for sinkhole development within and surrounding the proposed CISF project area is low because no thick sections of soluble rocks are present at or near the land surface.

As described in EIS Section 5.1.1.1, potash mining is a major part of the Eddy and Lea County economies. The location of potash mine workings in the area of the proposed CISF project are shown in EIS Figure 3.2-8. The potash in area mines is extracted from the Permian Salado Formation at maximum depths of approximately 549 m to 914 m [1,800 to 3,000 ft] (Holtec, 2020b). As discussed in EIS Section 3.4.6, a recent study employing satellite imagery identified significant subsidence in several distinct areas within potash mining areas located approximately 16.1 km [10 mi] west-southwest of the proposed project area (Zhang et al., 2018). A strong correlation was observed between the rate of subsidence and the potash production rate, indicating that potash extraction is the cause of the subsidence (Zhang et al., 2018). As discussed in EIS Section 5.1.1.1, based on the best available information, there are no new potash extraction projects planned in the project area (Holtec, 2021). As stated in EIS Section 4.2.1, given the current markets prices for potash, the surplus international supply, the requirements for obtaining additional permits for any new mines or to expand existing extraction activities, engineering challenges, and the constraints on the existing local potash mill for processing potash ores, it is highly unlikely that additional potash activities or extraction will occur beneath the proposed CISF site (Holtec, 2021; SEC, 2021; USGS, 2021). Even if potash price fluctuations were to become more prevalent, the changes in potash supply that would result would not likely make the proposed resources near the proposed project more desirable for extraction. There are significant potash reserves available in southeastern New Mexico outside of the proposed project area (Holtec, 2021). For these economic and geographic reasons, the construction and operation of the proposed CISF would not adversely affect potash activities or extraction. In addition, the distance to the nearest potash mining is 6.8 km [4.2 mi]; however, this site is closed. The closest active potash mining entrance is 7.8 km [4.9 mi] from the site with the closest subsurface mine workings approximately 3.3 km [2.1 mi] from the proposed project boundary (Holtec, 2021). At these distances, the NRC staff does not anticipate that the proposed CISF would increase the potential of subsidence from past and active mining activities. Therefore, the risk of subsidence at the site from potash mining is low.

As described in EIS Section 5.1.1.3, New Mexico has a high potential for solar energy generation. As of January 2017, New Mexico was generating over 254 MW of energy from solar sources and had plans to generate an additional 1,103 MW of energy from solar sources within the State of New Mexico (NMEMNRD, 2017a). Within the cumulative impacts study area for geology and soils, there are six operating solar power facilities: one in Eddy County and five in Lea County (EIA, 2022b) (EIS Figure 5.1-1). Impacts to geology and soils from solar energy projects include use of geologic resources (e.g., sand and gravel) and increased soil erosion. Sand and gravel and/or quarry stone would be needed for access roads. Concrete would be needed for buildings, substations, solar panel array pads and/or foundations, and other ancillary structures. These materials would be mined as close to the potential solar energy site as possible. Soil erosion would result from (i) ground surface disturbance to construct and install access roads, pads/foundations, staging areas, substations, underground cables, and other onsite structures; (ii) heavy equipment traffic; and (iii) surface runoff. Any impacts to geology and soils would be largely limited to the proposed project area. Erosion controls that comply with county, State, and Federal standards would be applied. Implementation of BMPs would limit the impacts from earthmoving and construction activities. Excess excavation material would be stockpiled for use in reclamation activities.

As further described in EIS Section 5.1.1.3, New Mexico is a leader in wind energy generation. There are currently four operational wind projects located within the region of the proposed CISF project area (EIS Section 5.1.1.3). These projects are located east of the proposed CISF project area near Lovington, New Mexico, Gaines, Texas and Andrews, Texas. Impacts to geology and soils from wind energy projects include use of geologic resources (e.g., sand and gravel), activation of geologic hazards (e.g., landslides and rockfalls), and increased soil erosion. Sand and gravel and/or quarry stone would be needed for access roads. Concrete would be needed for buildings, substations, transformer pads, wind tower foundations, and other ancillary structures. These materials would be mined as close to the potential wind energy site as possible. Tower foundations would typically extend to depths of 12 m [40 ft] or less. The diameter of tower bases is generally 5 to 6 m [15 to 20 ft], depending on the turbine size. Construction activities can destabilize slopes if they are not conducted properly. Soil erosion would result from (i) ground surface disturbance to construct and install access roads, wind tower pads, staging areas, substations, underground cables, and other onsite structures; (ii) heavy equipment traffic; and (iii) surface runoff. Any impacts to geology and soils would be largely limited to the proposed project area. Erosion controls that comply with county, State, and Federal standards would be applied. Operators would identify unstable slopes and local factors that can induce slope instability. Implementation of BMPs would limit the impacts from earthmoving activities. Foundations and trenches would be backfilled with originally excavated material, and excess excavation material would be stockpiled for use in reclamation activities (BLM, 2005).

Other past, present, and reasonably foreseeable actions within the geographic scope of the analysis for geology and soils include urban development (EIS Section 5.1.1.5), recreational activities (EIS Section 5.1.1.6), and oilfield waste facilities (EIS Section 5.1.1.7). Urban development occurring in Lea County and the Carlsbad area would be planned and developed under the regulations and policies of the local governments. Thus, the NRC staff assume that any new development would be protective of the landscape. Present recreational activities would not be anticipated to impact subsurface geologic systems or soils. National and State parks operate under the policies of park systems which the NRC staff assume would have policies in place to protect the natural environment. Oilfield waste facilities (oilfield landfarms) are owned and operated by private entities that must abide by all applicable State of New Mexico regulations. The occurrence of urban development, recreational activities, and oilfield waste facilities all contribute to the MODERATE impact to geology and soils.

Surface-disturbing activities associated with ongoing and reasonably foreseeable future nuclear-related, energy resource exploration and development (i.e., oil and gas and potash), solar and wind energy projects, urban development, and recreational activities would have direct impacts on geology and soils. Therefore, the NRC staff determines that the cumulative impacts on geology and soils within the geographic scope of the analysis from all past, present, and reasonably foreseeable future actions would be MODERATE. Direct impacts would result from any additional infrastructure constructed because of increased traffic, clearing of vegetated areas, soil salvage and redistribution, and construction of project facilities and infrastructure. In addition, induced seismicity, sinkholes, and subsidence resulting from oil and gas production and development and potash mining activities, although not anticipated within the proposed project area as discussed In EIS Section 4.4, could have direct impacts on geology and soils in other project areas elsewhere in the geographic scope of analysis.

5.4.1 Summary

Factors to consider for the cumulative impact determination for geology and soil resources include: (i) the systems, plans, and procedures that would be in place to limit soil loss, avoid soil contamination, and minimize stormwater runoff; (ii) available information showing that the proposed project area is in an area of low seismic risk from natural phenomena and is not likely to be affected by significant induced seismicity from oil and gas production and wastewater injection; (iii) a low potential for sinkhole development due to the absence of soluble rocks at or near the land surface; (iv) available information showing a low potential for subsidence from past potash mining; and (v) the reclamation and decommissioning that would take place to return the proposed project area to preoperational conditions through return of topsoil, removal of contaminated soils, and reestablishment of vegetation. Therefore, the NRC staff concludes that at full build-out, the proposed CISF would add a SMALL incremental effect to the MODERATE impacts to geology and soils from other past, present, and reasonably foreseeable future actions in the geographic scope of the analysis, resulting in an overall MODERATE cumulative impact in the geology and soils geographic area.

5.5 Water Resources

5.5.1 Surface Water

The NRC staff assessed cumulative impacts on surface waters within the Laguna Plata subbasin (i.e., the geographic scope of the surface water analysis), defined by the Watershed Boundary Dataset (USGS, 2019). As described in EIS Section 5.1.2, the timeframe for the analysis is from 2017 to 2060.

The Laguna Plata subbasin is approximately 63,540 ha [157,010 ac] and includes Laguna Gatuna and Laguna Plata as well as all drainage areas contributing to either laguna (EIS Figure 3.5-2). The proposed project area is located in the Laguna Plata subbasin and, as described in EIS Section 3.5.1, drains to Laguna Gatuna and Laguna Plata with no external drainage (EIS Figure 3.5-2). The cumulative surface water impact analysis outside of the Laguna Plata subbasin was not evaluated because drainage in other subbasins or watersheds is not anticipated to influence or to be influenced by the proposed CISF project.

As described in EIS Section 4.5.1.1, there are no perennial streams in the proposed CISF project area and any water in Laguna Plata and Laguna Gatuna occurs predominantly in response to surface drainage after precipitation events (Holtec, 2020a). Evaporation is the primary mechanism for water loss in Laguna Plata and Laguna Gatuna (Holtec, 2020a).

The surface water impacts from full build-out of the proposed CISF project, as described in EIS Section 4.5.1, would be SMALL. If only the proposed action (Phase 1) was constructed, operated, and decommissioned, the impacts would also be SMALL. Surface-water runoff from the approximate 133.5-ha [330-ac] footprint of the facility would be able to be fully captured by Laguna Plata and Laguna Gatuna, assuming that both lagunas were dry prior to the start of the rain event (Holtec, 2020a). Prior to entering the lagunas, surface-water runoff would be managed in accordance with Holtec's Stormwater Pollution Prevention Plan (SWPPP), National Pollutant Discharge Elimination System (NPDES) permits for construction and for industrial stormwater, and a Spill Prevention, Control, and Countermeasures Plan (SPCC Plan), as described in EIS Section 4.5.1.1, which includes erosion and sediment control best management practices (BMPs). This would help mitigate the impacts of soil erosion, sedimentation, and spills and leaks of fuels and lubricants on Laguna Plata and Laguna Gatuna.

Within the region, past, present, and foreseeable future actions include oil and gas production and exploration, oilfield waste processing, potash mining, nuclear-related activities, livestock grazing, wind and solar energy projects, recreational activities, and plans to increase housing in both Lea County and Eddy County (EIS Section 5.1.1). However, a number of these activities are outside the Laguna Plata subbasin and thus are not considered in the surface water cumulative impact analysis, including nuclear facilities WIPP, NEF, WCS, Project Gnome, FEP/DUP, and the licensed but not constructed ISP CISF; the Wildcat Wind Project, the Gaines Cavern Wind Project, the Jumbo Wind Project, and the Oso Grande Wind Project (EIS Section 5.1.1.3); as well as recreational activities described in EIS Section 5.1.1.6. Additionally, plans to increase housing in both Lea County and Eddy County (EIS Section 5.1.1.5) are unlikely to impact the Laguna Plata Watershed due to the rural nature of the area and the limited amount of privately owned land that could be used for housing development (EIS Section 4.2). Development of housing is more likely to occur outside of the surface water geographic scope, near the cities of Carlsbad, New Mexico, Artesia, New Mexico, and Hobbs, New Mexico where populations are larger.

Within the surface water resources geographic scope of the analysis (Laguna Plata subbasin), the ongoing and reasonably foreseeable projects include oil and gas production and exploration, oilfield waste disposal, and potash mining, as described in EIS Sections 5.1.1.1 and 5.1.1.7. Oil and gas production and potash mining are the economic drivers of both Lea and Eddy County. Both counties have a history of extensive exploration, leasing, development, and production of oil, gas, and potash and this trend is expected to continue. The locations of oil and gas wells within and surrounding the proposed CISF project area are shown in EIS Figure 3.2-7 and include numerous active and plugged wells in the Laguna Plata subbasin. Within the proposed CISF project area, there is an operating gas well and 18 plugged and abandoned wells.

Impacts on surface water resources from the continued development of the oil and gas and potash industries in the surface water geographic scope would include runoff from disturbed areas and leaks or spills of fuels or lubricants from equipment or operations. Oil and gas development activities and potash mining is monitored and regulated by the State of New Mexico, U.S. Department of the Interior, and BLM (Holtec, 2019). Also, all industrial operations would be required to obtain a NPDES industrial stormwater permit, which would require a SWPPP, thus protecting surface water resources in the area.

The NRC staff concludes that the cumulative impact on surface water resources within the surface water geographic scope resulting from past, present, and reasonably foreseeable future actions would be SMALL. This finding is based on the lack of major surface water features other than the lagunas, and the assessment of existing and potential impacts on surface waters within Laguna Plata subbasin from existing and future oil and gas exploration, production and development, as well as potash mining. Other existing and reasonably foreseeable future actions are not expected to have a noticeable impact on surface water within the surface water geographic scope as there are no nuclear, solar or wind energy, recreational, or housing development projects planned in Laguna Plata subbasin.

5.5.1.1 Summary

The impacts to the surface water resources in the surface water geographic scope of the analysis from the proposed action (Phase 1) and the full build-out (Phases 1-20) would result from surface-water runoff and potential spills and leaks but would be mitigated by the implementation of Holtec's SWPPP, SPCC Plan, and NPDES permits. These impacts would cease at the end of decommissioning when the license is terminated. However, Holtec has committed to reclamation of the site to return the land to preoperational use. Therefore, the NRC staff concludes that at full build-out, the proposed CISF would add a SMALL incremental effect to the SMALL impacts to surface water from other past, present, and reasonably foreseeable future actions in the geographic scope of the analysis, resulting in an overall SMALL cumulative impact to surface water resources in the geographic area.

5.5.2 Groundwater

The NRC staff assessed cumulative impacts for groundwater within the Capitan Underground Water Basin as the geographic scope of the analysis, which is described further in Section 3.5 of this EIS, and which covers approximately 296,028 ha [731,500 ac] in south-central Lea County (EIS Figure 3.5-4). The timeframe for the analysis is from 2017 to 2060.

Important sources of groundwater in the groundwater geographic scope (the Capitan Underground Water Basin) include the Rustler Formation, Dockum Group (Santa Rosa Sandstone and Chinle Formation), Ogallala Formation (Ogallala Aquifer), and Quaternary alluvium. As described in EIS Section 3.5.3, although water samples taken in 1969 near Laguna Gatuna were identified as potable, no potable groundwater is known to currently exist in the vicinity of the proposed project area. Groundwater quality, as described in EIS Section 4.5.2.1.1, is variable in each of the aquifers, ranging from freshwater zones that stretch from Carlsbad to the Guadalupe Mountains to very poor water quality with high TDS concentrations and brines in Lea County (Bjorklund and Motts, 1959; Richey et al., 1985). The Ogallala Aquifer is a major source of groundwater in the geographic scope of the analysis for groundwater, supplying water to Carlsbad and northwestern Lea County (City of Carlsbad Water Department, 2018). However, only in the eastern portion of Lea County is the Ogallala Formation a water-producing unit, elsewhere the Ogallala (if present) is unsaturated.

The groundwater impacts from full build-out of the proposed CISF project, as described in EIS Section 4.5.2, would be SMALL. If only the proposed action (Phase 1), including the rail spur, was constructed, operated, and decommissioned, the impacts would also be SMALL. Groundwater impacts would result mainly from consumptive use and infiltration into near-surface aquifers. Potable water demands for the proposed action (Phase 1) and full build-out (Phases 1-20) would be provided by the City of Carlsbad's Double Eagle Water Supply facility, which draws from the Ogallala Aquifer (Holtec, 2020a, Double Eagle Supply, 2021). Negative impacts to groundwater quality in near-surface aquifers would be mitigated by the implementation of the SWPPP, SPCC Plan, and the requirements of the NPDES permits, groundwater discharge permit (if required), and Section 401 certification (if required). At the end of the license term, for either the proposed action (Phase 1) or full build-out (Phases 1-20), the proposed CISF project would be decommissioned such that the proposed project area and remaining facilities could be released for unrestricted use.

Within the region, past, present, and foreseeable future actions include oil and gas production and exploration, waste disposal, potash mining, nuclear-related activities, livestock grazing, wind and solar energy projects, recreational activities, and plans to increase housing in both Lea County and Eddy County (EIS Section 5.1.1).

Both counties have a history of extensive exploration, leasing, development, and production of oil, gas, and potash and this trend is anticipated to continue. The location of oil and gas wells within and surrounding the proposed CISF project area are shown in EIS Figure 3.2-7 and include numerous active and plugged wells in the groundwater geographic scope. Impacts on groundwater resources from the continued development of the oil and gas and potash industries in the groundwater geographic scope would include the consumptive use of water and potential contamination because of improperly plugged or cased wells, which could impact groundwater quality through infiltration to near-surface aquifers. Eddy County is currently making improvements to the Double Eagle Water System in anticipation of the increased water demand for oil and gas production as well as potash mining and will provide water to Eddy County and the northwestern portion of Lea County (Onsurez, 2018). The NRC staff anticipates that impacts from construction of these facilities would be subject to the same monitoring, mitigation, and response programs (e.g., NPDES permit, SWPPP, SPCC Plan) required to limit potential groundwater quality impacts. Construction and operation of the facilities would be monitored by the New Mexico Oil Conservation Commission, State of New Mexico, U.S. Department of the Interior, and BLM (Holtec, 2019). The NRC staff anticipates that groundwater quality protections required during the operation of oil-, gas-, and potash-related facilities would be adequate to protect groundwater quality in the geographic scope of the analysis for groundwater.

Nuclear facilities discussed in EIS Section 5.1.1.2 include WIPP, NEF, WCS, FEP/DUP, Project Gnome, the licensed but not constructed ISP CISF, and Eden. The NRC staff anticipates that impacts to groundwater from the existing facilities would remain similar to current uses, and proposed facilities would have similar consumptive water needs and stormwater runoff requirements. Similarly, the construction and operation of the future projects would be subject to the same monitoring, mitigation, and response programs required to limit potential groundwater quality impacts as those for the proposed Holtec CISF project. NRC, EPA, TCEQ, and NMED oversight would further mitigate negative impacts to groundwater resources in the geographic scope of the analysis for groundwater.

There are four operational wind projects in the geographic scope of the analysis, the Wildcat Wind Project, located near Lovington, New Mexico, Gaines Cavern Wind Project in

Gaines County, Texas, Jumbo Hill Wind Project in Andrews County, Texas, and the Oso Wind Project in Chaves County, New Mexico. Because the projects are already operational, the NRC staff anticipates that the consumptive use of groundwater during operations would be less than that for construction. Should additional wind energy and associated infrastructure projects be constructed, the impacts to groundwater quality would be highest during construction as is the risk of negative impacts to groundwater quality would be from stormwater runoff and spills and leaks from construction equipment. However, the NRC staff anticipates that the stormwater runoff during construction would be managed according to a SWPPP, that spills and leaks would be prevented and handled in accordance with a SPCC Plan, that any surface water discharges would fall under the jurisdiction of a NPDES permit, and that any groundwater discharges would fall under the jurisdiction of a groundwater discharge permit (if required).

The City of Carlsbad also plans to improve and rehabilitate aging water and wastewater systems, which helps reduce potable water loss from broken or leaking supply lines and protects groundwater quality from contamination from broken or leaking wastewater lines (Consensus Planning, 2020). The construction and rehabilitation of buildings, portions of the water and wastewater systems, and infrastructure would require consumptive water use and could impact groundwater quality through infiltration to near-surface aquifers. The NRC staff anticipates that stormwater controls and spill prevention and response procedures similar to those for the proposed CISF project would be implemented both for the construction of new housing developments and for the construction, rehabilitation, and operation of related infrastructure (e.g., the water and wastewater systems).

Recreational activities in the region are all associated with either surface activities (e.g., hunting, fishing) or surface water bodies not hydrologically connected to the groundwater resources and therefore the NRC staff does not anticipate an overlapping cumulative impact. Oilfield waste facilities (oilfield landfarms) have the potential for spills and leaks as well as runoff from stormwater with the potential for infiltration. However, the NRC staff assumes that any potential spills, leaks, and stormwater runoff would be managed according to applicable regulations and in accordance with a NPDES permit.

The NRC staff concludes that the cumulative impact on groundwater resources within the geographic scope of the analysis resulting from past, present, and reasonably foreseeable future actions would be MODERATE. This finding is based on the assessment of existing and potential impacts on groundwater within the geographic scope of the analysis for groundwater from existing and future oil and gas exploration, production, development, and waste; potash mining; nuclear-related facilities; wind projects; recreational activities, and housing developments, all of which would require consumptive water use and have potential impacts on groundwater quality.

5.5.2.1 Summary

The impacts to groundwater resources in the geographic scope of the analysis from the proposed action (Phase 1) and the full build-out (Phases 1-20) would result from consumptive use and infiltration of surface-water runoff and spills and leaks to near-surface aquifers. The implementation of Holtec’s SWPPP, SPCC Plan, NPDES permits and groundwater discharge permit (if required) would mitigate these impacts. After the land is returned to unrestricted use following the decommissioning of the proposed CISF project area, in accordance with an NRC-approved decommissioning plan, the impacts to groundwater resources would cease. Therefore, the NRC staff concludes that at full build-out, the proposed CISF would add a SMALL incremental effect to the MODERATE impacts to groundwater from other past, present, and reasonably foreseeable future actions in the geographic scope of the analysis, resulting in an overall MODERATE cumulative impact to groundwater resources in the geographic area.

5.6 Ecology

The impacts analysis in EIS Section 4.6 describes the ecological impacts that could occur within an approximate 3.2 km [2 mi] radius of the proposed project area. Given that wildlife and vegetation occurrences fluctuate over time within unpredictable boundaries, and because the proposed rail spur would extend approximately 6.1 km [3.8 mi] to the west of the proposed project area with a length of 8 km [5 mi], the cumulative impacts geographic scope of the analysis for ecology is an approximate 8-km [5-mi] radius from the middle of the proposed CISF project area. The cumulative impact analysis is limited to this radius because ecological resources are not anticipated to influence or to be influenced by the proposed CISF project outside of this area.

As described in EIS Section 3.6.1, the proposed CISF project is located in a transitional zone between the short grass prairie of the High Plains habitat and the Chihuahuan Desert Scrub habitat (Holtec, 2020a; NMDGF, 2016; Elliot, 2014). During the last century, conversion of grasslands to scrublands has occurred within this transition zone as a result of combinations of changes in land use, drought, livestock overgrazing, and decreases in fire frequency (NMDGF, 2016). As described in EIS Section 4.6, impacts to ecological resources from full build-out of the proposed CISF would be SMALL to MODERATE because (i) the area surrounding the proposed CISF project is largely undeveloped; (ii) there is abundant suitable habitat in the vicinity of the project to support displaced animals; (iii) there are no rare or unique communities, habitats, or wildlife on the proposed CISF project; (iv) the impacts to vegetation would be expected to contribute to the change in vegetation species' composition, abundance, and distribution within and adjacent to the proposed CISF project (i.e., ecosystem function); and, (v) per BLM, the establishment of mature, native plant communities may require decades. If only the proposed action (Phase 1) was constructed (including the rail spur) and operated, the impacts to ecological resources would also be SMALL to MODERATE. All phases of the CISF would have "No Effect" on Federally listed species, and "No Effect" on any existing or proposed critical habitats.

Activities in the region evaluated for cumulative ecological impacts include cattle grazing, mining, oil and gas exploration and waste disposal, recreational activities, and urban development. The nuclear facilities, wind and solar projects, recreational activities and housing and urban development described in EIS Section 5.1.1 are outside of the geographic scope of analysis for ecological resources. The cumulative effects of cattle grazing, mining, and oil and gas exploration can influence habitats indirectly (i.e., segmentation) or directly (i.e., vegetation removal), thereby affecting wildlife. Potential effects to ecological resources, both flora and fauna, include reduction in wildlife habitat and forage productivity, modification of existing vegetative communities through land-clearing activities, degradation of air and water quality, and potential spread of invasive species and noxious-weed populations from land disturbance. Impacts to wildlife could involve loss, alteration, and incremental habitat fragmentation; displacement of and stresses on wildlife; and direct and indirect mortalities. For these reasons, and similar to the NRC staff's conclusions for the proposed project described in EIS Section 4.6, the NRC staff determines that the impacts on ecological resources resulting from cattle grazing, mining, and oil and gas exploration and waste disposal would be SMALL to MODERATE.

As shown in EIS Figure 3.2-1, most of the land within the 8-km [5-mi] geographic scope of analysis for ecological resources is managed by the BLM and the State of New Mexico

(BLM, 2018). Ecological resources in the geographic scope of the analysis for ecology would experience beneficial cumulative impacts from Federal and State management actions for the reasonably foreseeable future. For example, BLM restricts oil and gas drilling and seismic exploration from occurring in Lesser prairie-chicken habitat during the period from March 1 through June 15 annually, and certain activities are only allowed to occur between the hours of 3:00 am and 9:00 pm daily during this period. Additionally, BLM does not allow new oil and gas drilling within 200 m [0.12 mi] of Lesser prairie-chicken leks known at the time of permitting, and noise from pump jack engines must be muffled or otherwise sound-controlled so as not to exceed 75 db measured at 9.1 m [30 ft] from the source of the noise. These actions would lessen the impacts of oil and gas activities on the Lesser prairie-chicken. All reasonably foreseeable future actions in the geographic scope of the analysis for ecological resources are subject to Federal laws (e.g., the Endangered Species Act, the Migratory Bird Treaty Act, the Clean Water Act), and most private projects are subject to other State requirements such as land reclamation and complying with NPDES permits. Adherence to these standards would reduce many of the cumulative adverse impacts from reasonably foreseeable future actions. Conservation partnerships such as the Restore New Mexico program would contribute additional beneficial cumulative impacts as additional acres are restored to historical, native vegetative communities annually (BLM, 2018).

5.6.1 Summary

Significant changes to land use in the region over the last century have had a significant impact on ecological resources (NMDGF, 2016); however, because a large amount of the land in the geographic scope of the analysis for ecological resources is administered by the BLM and the State, reasonably foreseeable future actions are not expected to significantly impact ecological resources during the license term of the proposed CISF. Therefore, the NRC staff concludes that at full build-out, the proposed CISF would add a SMALL to MODERATE incremental effect to the MODERATE impacts to ecological resources from other past, present, and reasonably foreseeable future actions in the geographic scope of the analysis, resulting in an overall SMALL to MODERATE cumulative impact in the ecology geographic area.

5.7 Air Quality

The NRC staff assessed cumulative impacts on air quality from nonradiological emissions within the region (inclusive of the geographic scopes of all other resource areas) with primary focus on the portions of the Pecos-Permian Basin Intrastate Air Quality Control Region located within this region (EIS Figure 5.1-1). The NRC staff define this as the geographic scope of the analysis for air quality. As described in EIS Section 5.1.2, the timeframe for the analysis of cumulative impacts is 2017 to 2060. EIS Section 5.13 (Public and Occupational Health) addresses potential cumulative impacts from radiological airborne emissions.

5.7.1 Non-Greenhouse Gas Emissions

As described in EIS Section 4.7.1.1, the air quality impacts from full build-out of the proposed CISF project would be SMALL. This determination was based on the NRC staff's consideration of the following key assessment factors: (i) the existing air quality, (ii) the proposed CISF emissions levels, and (iii) the proximity of the proposed CISF emissions sources to receptors. If only the proposed action (Phase 1) was considered, the impacts would also be SMALL based on these same factors. The cumulative impacts analysis also considers similar factors such as the air quality in the geographic scope of the analysis, the contribution of the proposed CISF emission levels relative to the overall emission levels in the geographic scope of the analysis, and the ability of proposed CISF impacts to overlap with the impacts from the other emission sources (e.g., proximity of the emission sources to one another).

The effects of past and present activities on the geographic scope of the analysis's air quality are represented in the EPA's National Ambient Air Quality Standards compliance status for that area. As described in EIS Section 3.7.2.1, the entire geographic scope of the analysis is in attainment for all pollutants. Based on this attainment status, the NRC staff consider the geographic scope of the analysis air quality as good. However, all of the activities described in EIS Section 5.1.1 generate gaseous emissions at some level. In particular, the Permian Basin is one of the largest and most active oil basins in the United States. The geographic scope of analysis continues to be the focus of extensive exploration, leasing, development, and production of oil and gas with the most heavily concentrated area of wells being located in eastern Eddy County and western Lea County. These two counties are consistently the top two producers of oil in the state. The proposed CISF project area is located in the middle of the Permian Basis oil hub, near the Lea County and Eddy County borders. Activities associated with oil and gas contribute to the air emissions generated within these two counties (EIS Table 3.7-4). The NRC staff consider that the emission levels within the geographic scope of analyses are noticeable but not destabilizing. The future pollutant levels generated within the geographic scope of the analysis would be based on (i) the emission level trends for the existing sources and activities and (ii) the new emissions from reasonably foreseeable future actions. BLM conducted air dispersion modeling to support their update of the Carlsbad Regional Management Plan. To analyze future cumulative impacts, modeling was conducted by BLM using an emission inventory based on the estimated emissions in the year 2028. The results predicted that the air quality for the geographic scope of the analysis for this EIS would continue to meet the NAAQS (URS, 2013). Therefore, the NRC staff expects the future air quality in the geographic scope of the analysis would remain good.

The NRC staff have determined that the cumulative impact on air quality within the geographic scope of analysis from the past, present, and reasonably foreseeable future actions for air emissions would be noticeable (EIS Table 3.7-4) but not destabilizing (i.e., in attainment for NAAQS compliance) and therefore MODERATE.

A factor for the cumulative impacts analysis is the contribution of the proposed CISF emission levels relative to the overall emission levels in the geographic scope of the analysis. EIS Table 3.7-4 describes the pollutant levels the various activities generated within the geographic scope of the analysis. EIS Table 5.7-1 describes the contribution (i.e., percent) of the proposed CISF estimated annual emission levels compared to the overall geographic scope of the analysis emission levels. Specifically, the proposed CISF emissions levels are no more than about one tenth of one percent of the geographic scope of the analysis emission levels.

Proximity of the proposed CISF to the other sources identified in EIS Section 5.1.1 influences the ability for impacts to overlap. Based on EIS Figure 5.1-1, the closest known reasonably foreseeable future action to the proposed CISF would be the new waterline for the Double Eagle Water Supply System improvement project located as close as about 26.5 km [16.5 mi] to the north (Double Eagle Supply, 2021). The timeframe for construction of the waterline would only overlap with the proposed CISF license term for a short duration. Because of these factors (i.e., distance and short duration of activities generating emissions) the NRC staff concludes that ability of the impacts of these projects to overlap would be limited. Because the other reasonably foreseeable future actions are located further away from the proposed CISF than the

Double Eagle Water Supply System improvement project, the NRC staff concludes that impacts from other projects are unlikely to overlap with impacts to air quality from the proposed CISF.

5.7.1.1 Summary

In summary, the geographic scope of the analysis possesses good air quality, the proposed CISF emission levels are relatively minor when compared to the overall geographic scope of the analysis emission levels, and the overlapping impacts are limited, primarily because of the distance between the proposed CISF and the other emission sources in the geographic scope of the analysis. Therefore, the NRC staff concludes that at full build-out, the proposed CISF would add a SMALL incremental effect to the MODERATE impacts to air quality from other past, present, and reasonably foreseeable future actions in the geographic scope of the analysis, resulting in an overall MODERATE cumulative impact in the air quality geographic area.

Table 5.7-1 The Contribution (i.e., Percentage) of the Proposed CISF Estimated Annual Emissions Compared to the Geographic Scope's Estimated Annual Emission Levels

County	Pollutant						
	Carbon Monoxide	Hazardous Air Pollutants	Nitrogen Oxides	Particulate Matter PM_{10}	Particulate Matter $PM_{2.5}$	Sulfur Dioxide	Volatile Organic Compounds
Lea	0.03	0.0002	0.06	0.11	0.10	0.0005	0.005
Eddy	0.03	0.0001	0.09	0.10	0.08	0.002	0.004
Both	0.01	0.0001	0.04	0.05	0.04	0.0004	0.002

Source: Generated from the information in EIS Tables 2.2-1, 2.2-2, 3.7-4, and SwRI (2019)

5.7.2 Greenhouse Gas Emissions and Climate Change

The impact magnitude resulting from a single source or a combination of greenhouse gas emission sources over a larger region must be placed in geographic context for the following reasons:

- The environmental impact is global rather than local or regional,
- The effect is not particularly sensitive to the location of the release point,
- The magnitude of individual greenhouse gas sources related to human activity, no matter how large compared to other sources, are small when compared to the total mass of greenhouse gases resident in the atmosphere, and
- The total number and variety of greenhouse gas emission sources is extremely large, and the sources are ubiquitous.

Based primarily on the scientific assessments of the U.S. Global Climate Research Program (GCRP) and National Research Council, the EPA Administrator issued a determination in 2009 (74 FR 66496) that greenhouse gases in the atmosphere may reasonably be anticipated to endanger public health and welfare, based on observed and projected effects of greenhouse gases, their effect on climate change, and the public health and welfare risks and effects associated with such climate change. Therefore, the NRC staff concludes that national cumulative impacts of greenhouse gas emissions are noticeable but not destabilizing.

5.7.2.1 Proposed CISF Greenhouse Gas Emissions

Greenhouse gas emissions are generated by activities at the proposed CISF as well as during the SNF transportation to and from the proposed CISF. As described in EIS Section 2.2.1.6, the peak year Phase 1 activities at the proposed CISF generate an estimated 2,306 metric tons [2,542 short tons] of carbon dioxide and the peak year Phase 1-20 activities generate 2,642 metric tons [2,913 short tons] of carbon dioxide. As described in EIS Section 3.7.2.2, the EPA established thresholds for greenhouse gas emissions in the Tailoring Rule that define whether sources are subject to EPA air permitting. For new sources, the threshold is 90,718 metric tons [100,000 short tons] of carbon dioxide equivalents per year, and for modified existing sources, the threshold is 68,039 metric tons [75,000 short tons] of carbon dioxide equivalents per year. As described in EIS Section 4.7.1.1, the EIS compares estimated emission levels to such thresholds to provide context for understanding the magnitude of these emissions, which are mostly from mobile and fugitive dust rather than stationary sources. This comparison in the EIS does not document or represent a formal determination for air permitting or regulatory compliance. Because emission estimates for the proposed project are below the EPA thresholds in the Tailoring Rule, the NRC staff concludes that the activities at the proposed CISF would generate low levels of greenhouse gases relative to other sources and would have a minor impact on air quality in terms of greenhouse gas emissions. For context, the proposed action generates about 0.008 percent of the total projected greenhouse gas emissions in New Mexico of 31.3 million metric tons [34.5 million short tons] of carbon dioxide equivalents in 2017 (EPA, 2018). This also equates to about 0.00004 percent of the total United States annual emission rate of 6.5 billion metric tons [7.2 billion short tons] of carbon dioxide equivalents in 2017 (EPA, 2019).

The NRC staff estimated the proposed CISF greenhouse gases emissions from transporting the SNF from the nuclear power plants and ISFSIs to the proposed Holtec site by prorating the greenhouse gas estimates for transporting SNF along the Caliente rail alignment for the Yucca Mountain Project (DOE, 2008). This prorating accounted for the differences in the distance traveled by the SNF and the amount of SNF transported. EIS Table 5.7-2 contains the prorating information and the proposed CISF emission estimates. The purpose of this basic estimate was to provide a value for comparison to the EPA thresholds specified in the previous paragraph. Because proposed CISF emission estimates for transporting SNF are above the thresholds in the Tailoring Rule, the NRC staff expects that transporting SNF for both Phase 1 and full build-out would have a noticeable but not destabilizing impact on air quality in terms of greenhouse gas emissions.

To provide additional context, transporting SNF generates about 0.02 percent of the total United States annual emission rate of 6.5 billion metric tons [7.2 billion short tons] of carbon dioxide equivalents in 2017 (EPA, 2019).

In summary, the activities from the proposed CISF in combination with national SNF transportation would generate greenhouse gas levels above the EPA thresholds. Therefore, the NRC staff expects that both the proposed action (Phase 1) and full build-out in combination with the transportation of SNF would generate high levels of greenhouse gas emissions relative to other sources and would add a MODERATE incremental effect to air quality in terms of greenhouse gas emissions when added to the MODERATE impact to air quality from other past, present, and reasonably foreseeable future actions in the geographic scope of the analysis, resulting in an overall MODERATE cumulative impact to air quality greenhouse gas emissions in the geographic scope.

Greenhouse gas generation is considered in a nation-wide context; thus, the NRC staff considers it appropriate for the cumulative impacts analysis to include carbon footprint as a relevant factor in evaluating distinctions between alternatives, including the No-Action alternative. For activities associated with storing SNF, emissions for the proposed CISF and the No-Action alternative would be similar. The proposed CISF would add another site that generates emissions, but at the same time would allow for the elimination of emissions from nuclear power plants and ISFSIs that are fully decommissioned. For activities related to transporting SNF, the No-Action alternative would generate fewer emissions than the proposed CISF because the overall distance traveled from the nuclear power plants and ISFSIs to a repository would likely be less than from the nuclear power plants and ISFSIs to the proposed CISF and then to a repository.

Table 5.7-2 Proposed CISF Greenhouse Gas (GHG) Emission Estimates for Transporting SNF

Proposed CISF SNF Transportation Event		Yucca Mountain GHG Emissions (Tons)*	Distance Prorating Factor†	Amount of SNF Prorating Factor‡	Proposed CISF GHG Emissions (Tons)§	
					Total	Annual‖
From Nuclear Power Plants and ISFSIs to Proposed CISF	Phase 1	2,040,248	5.22	0.124	1,320,612	1,320,612
	Full Build-out	2,040,248	5.22	1.43	15,229,635	761,482
From Proposed CISF to Repository	Phase 1	2,040,248	2.03	0.124	513,571	513,571
	Full Build-out	2,040,248	2.03	1.43	5,922,636	296,132

*Greenhouse gas emissions from SNF transportation along the Caliente rail alignment, which is only a portion (i.e., the last segment) of the distance between the nuclear power plants and ISFSIs and the Yucca Mountain site. To convert metric tons to short tons, multiply by 1.1023

†Since the distance traveled for the estimated Yucca Mountain greenhouse gas emissions varies from the distance traveled for the proposed action, a prorating factor is used. The distance prorating factor is calculated by dividing the distance SNF travels for the proposed CISF transportation events {3,362 km [2,089 mi] for the nuclear power plants and ISFSIs to the proposed CISF and 1,308 km [813 mi] for the proposed CISF to Yucca Mountain site} by the distance SNF travels for the Caliente rail alignment segment {644 km [400 mi]}.

‡Since the amount of SNF transported for the estimated Yucca Mountain greenhouse gas emission varies from the amount of SNF transported for the proposed action, a prorating factor is used. The amount of SNF prorating factor is calculated by dividing the amount of SNF transported for the proposed CISF 8,680 MTU for Phase 1 and 100,000 MTU for full build-out by the amount of SNF transported for the Yucca Mountain analysis (70,000 MTU).

§To convert metric tons to short tons, multiply by 1.1023.

‖For Phase 1, the total and annual emissions are the same because they both transport 8,680 MTU of SNF over one year. For full build-out, the annual emissions were generated by dividing total emissions by 20 (i.e., the number of years this transportation event takes to accomplish).

Source: Final Environmental Impact Statement for a Rail Alignment for the Construction and Operation of a Railroad in Nevada to a Geologic Repository at Yucca Mountain, Nye County, Nevada (DOE, 2008)

5.7.2.2 Overlapping Impacts of the Proposed CISF and Climate Change

Climate change impacts could overlap with impacts from the proposed CISF. Based on the list of climate change projections for the State of New Mexico in EIS Section 3.7.1.2, the NRC staff concludes that water scarcity would be the most likely area where impacts from both climate change and the proposed action could overlap. Climate change is expected to increase drought intensity in New Mexico. Droughts can cause increased competition for limited water resources. Although some aspects of spent fuel storage require water, the amount of water needed is minimal and water use for spent fuel storage is not expected to cause water-use conflicts, even under the changed conditions that climate change could cause. Climate change impacts are predicted to occur over long periods of time, and the license term of the proposed facility is 40 years. Therefore, impacts from the proposed CISF that may overlap with the impacts of climate change are likely to be minor.

5.8 Noise

The NRC staff assessed cumulative impacts on noise resources within a geographic scope of 10-km [6-mi] around the proposed project area. The timeframe for the analysis is from 2017 to 2060. Cumulative noise impacts outside of the geographic scope of the analysis {10-km [6-mi]} were not evaluated because noise from the proposed project would not propagate outside of the 10-km [6-mi] radius such that there could be a cumulative impact with other noise sources.

The nearest noise receptors for the proposed action, as described in EIS Section 3.8, are travelers on State Highway 63, which is approximately 0.8 km [0.5 mi] south of the proposed CISF project property boundary. The nearest residents to the proposed CISF project area are located 2.4 km [1.5 mi] away (Holtec, 2020a). Within the 10-km [6-mi] geographic scope of the analysis for noise impacts, the land is sparsely populated and primarily used for livestock grazing. The main contributors to noise sources are traffic from U.S. Highway 62 and State Highway 243 (EIS Figure 3.2-4) and operating oil pump jacks (Holtec, 2020a).

As described in EIS Section 4.8, the impacts to noise from full build-out (Phases 1-20) of the proposed CISF project would be SMALL. If only the proposed action (Phase 1), including the rail spur, was constructed, operated, defueled, and decommissioned, the impacts would also be SMALL. Noise impacts associated with construction are from (i) heavy equipment and machinery use; (ii) construction of new buildings and infrastructure; (iii) additional vehicle traffic; and (iv) earthwork. As described in EIS Section 4.8, Holtec would primarily conduct construction activities during daylight hours. From U.S. Highway 62 and State Highway 243, the highest noise levels from construction are estimated to be in the range of 44 dBA to 59 dBA. Aside from construction, the main project-related noises are associated with the transfer of the casks and include noise from delivery trucks and rail cars and operation of cranes and loading equipment. Other operational noises are limited to the operation and maintenance of the buildings and infrastructure. After the license term ends, for either the proposed action (Phase 1) or full build-out (Phases 1-20), the proposed CISF project area would be decommissioned such that the area would be released for unrestricted use in accordance with 10 CFR Part 20, Subpart E, at which point all noise impacts would cease (EIS Section 4.8.1.3). It is expected that the greatest noise impacts would occur during the construction of the proposed action (Phase 1). Although there are no applicable noise restrictions in the area other than BLM timing restrictions which limit certain activities from 3:00 AM to 9:00 AM from March 1 to June 15 on land under their jurisdiction, OSHA standards limit noise exposure for employees within a facility.

Within the region described in EIS Section 5.1.1, other actions include oil and gas production, exploration and waste disposal, potash mining, nuclear-related activities, livestock grazing, recreational activities, and wind and solar energy projects. However, within the geographic scope of the analysis for noise, only the ongoing and reasonably foreseeable actions related to oil and gas production and exploration and potash mining are considered because they occur within the geographic scope.

Within 10 km [6 mi] of the proposed CISF project area, there are numerous oil, gas, and potash facilities (EIS Figure 3.2-7) in various stages of operation. Expansion or development of future oil-, gas-, and potash-related projects would have an impact on noise resources of the area because of increased vehicle traffic, heavy equipment use, and construction and maintenance of project facilities and infrastructure (e.g., roads, oil pump jacks, pipelines, electric lines, processing sites, and associated ancillary facilities). The NRC staff anticipates that the noise impacts of past, present, and reasonably foreseeable future oil and gas production and potash mining would last over the license term and have the potential to contribute to the ambient noise (i.e., background noise) of the area. The largest temporary impacts to noise would be associated with the construction of facilities, especially if construction activities of one facility overlap with those of another, or with the construction of either the proposed action (Phase 1) or the full build-out (Phases 1-20). However, OSHA standards would limit the amount of noise generated from these sites. Administrative controls implemented by the New Mexico Oil Conservation Commission, U.S. Department of the Interior, State of New Mexico, and BLM would also monitor and regulate oil and gas development activities and potash mining activities within the noise geographic scope of the analysis (Holtec, 2019), further reducing the likelihood of noise impacts from coinciding construction activities.

The NRC staff have determined that the cumulative impacts to noise resources within the noise geographic scope of the analysis resulting from all past, present, and foreseeable future actions would be SMALL. This finding is based on the assessment of existing and potential impact on noise within the noise geographic scope of the analysis from existing and future oil and gas exploration, production and development as well as potash mining.

5.8.1 Summary

Noise impacts from the proposed action (Phase 1) and full build-out of the proposed CISF (Phases 1-20) are expected to be dominated by construction noise impacts which, at most, would be in the range of 44 dBA to 59 dBA at U.S. Highway 62 and State Highway 243. Noise impacts from the proposed CISF would cease after the decommissioning of the facility at the end of the license term. Therefore, the NRC staff concludes that at full build-out, the proposed CISF would add a SMALL incremental effect to the SMALL impacts to noise resources from other past, present, and reasonably foreseeable future actions in the geographic scope of the analysis, resulting in an overall SMALL cumulative impact in the noise geographic area.

5.9 Historic and Cultural Resources

Cumulative impacts on historic and cultural resources were assessed within a geographic radius of influence that encompasses a 16-km [10-mi] radius around the proposed Holtec CISF project. The study area covers a larger spatial extent than either the direct or indirect area of potential effect (APE) in order to evaluate activities outside the proposed project area. The assessment of cumulative impacts on historic and cultural resources beyond 16 km [10 mi] was not undertaken because at that distance, the impacts on historic and cultural resources from the proposed CISF on other past, present, and reasonably foreseeable future actions would be minimal. The timeframe for this analysis is 2017 to 2060, based on the estimated period of construction and operation of the proposed project.

Most of the cumulative impacts on historic and cultural resources in the study area were considered to be from future potash mining, other nuclear facilities, oil and gas development, and wind and solar projects, which are expected to continue at the same or increased intensity for the foreseeable future. Potential impacts to cultural and historic resources could also result from increased land area access and surface-disturbing activities associated with new projects in the study area. Impacts from these activities would result primarily from the loss of or damage to historic, cultural, and archaeological resources; temporary restrictions on access to these resources; or erosion and destabilization of land surfaces. As new developments start, the NRC staff anticipates that activities associated with surface-disturbing activities would be surveyed for historic and cultural resources, as appropriate. Given the amount of Federally owned land in New Mexico and Federal regulations involved with energy generation and transmission projects, it is likely that most mining, nuclear, oil and gas, and other energy developments would be subject to appropriate historic and cultural resource evaluations as part their own regulatory processes. Also, State-funded projects would also be required to ensure protection of cultural and historic resources. Therefore, the NRC staff concludes that other past, present, and reasonably foreseeable future nuclear facilities, mining projects, and oil and gas operations would not adversely affect historic and cultural resources. Therefore, the NRC staff concludes that other past, present, and reasonably foreseeable future nuclear facilities, mining projects, and oil and gas operations will be evaluated for impacts to historic and cultural resources along with adequate and reasonable preservation activities, including those that would be required by Federal and State agencies, which, when implemented, could avoid, minimize, or mitigate any impacts.

As discussed in EIS Section 4.9, four resources (one historic rail, one historic road segment and two prehistoric sites) were identified within the Holtec proposed project area. The two historic resources and one prehistoric resource were recommended as not eligible for the National Register of Historic Places (NRHP) by NRC staff, and one prehistoric site will be recommended as eligible. In addition, none of the four resources are currently in the direct APE for the proposed project. Therefore, the NRC staff concludes that the proposed CISF project impacts on historic and cultural resources would be SMALL.

5.9.1 Summary

Because of the lack of historic or cultural resources within the direct APE, the NRC staff concludes that historic properties would not be affected by full build-out (Phases 1-20) of the proposed project. Due to the reliance on Federal and State regulations to ensure protection of cultural and historic resources, historic properties would not be affected by past, present, and reasonably foreseeable future projects. Therefore, the NRC staff concludes that the proposed project would add a SMALL incremental impact when added to the SMALL impact on historic and cultural resources from all other past, present, and reasonably foreseeable future actions, which would result in an overall SMALL impact to historic and cultural resources.

5.10 Visual and Scenic

The NRC staff assessed cumulative impacts to visual and scenic resources within a geographic scope of analysis of 10 km [6 mi] around the proposed project area. The timeframe for the analysis is from 2017 to 2060.

Cumulative visual and scenic impacts outside of a 10-km [6-mi] radius of the proposed project area were not evaluated, because the proposed CISF project would not influence visual and scenic resources. The past, present, and reasonably foreseeable future actions not included in this analysis are: NEF, WIPP, FED/DUP, WCS, the licensed but not constructed ISP CISF, Project Gnome, wind and solar projects, recreational activities, and housing development, because none of these are within the geographic scope of the analysis for visual and scenic resources. Visual and scenic resources in the vicinity of the proposed project area, as described in EIS Section 3.10, are classified as Class IV by the BLM Visual Resource Management (VRM) evaluation (BLM, 1986). Class IV land can have high characteristic changes to the landscape, and those changes are allowed to dominate the view and be the major focus of viewer attention. As described in EIS Section 3.10, the area surrounding the proposed CISF project area is sparsely populated and primarily used for cattle grazing and oil and gas exploration and production, and BLM determined that the proposed CISF project area has a low sensitivity level for public concern regarding scenic quality (ELEA, 2007).

As described in EIS Section 4.10, the impacts to visual and scenic resources from full build-out of the proposed CISF project would be SMALL. If only the proposed action (Phase 1) was constructed, operated, and decommissioned, the impacts would also be SMALL. Visual and scenic impacts are the result of (i) heavy equipment use, (ii) construction of new buildings and infrastructure, (iii) additional vehicle traffic, (iv) fugitive dust, and (v) land disturbance. As described in EIS Section 4.10, Holtec would implement dust suppression and down-shielding of all security lights to mitigate some visual and scenic impacts. Other impacts related to the storage pads, facility building, and other infrastructure are either below-grade or have limited visibility from the major transportation corridor (i.e., U.S. Highway 62) where the majority of the public would view the facility. The land disturbance, additional traffic, and heavy equipment use would occur mainly during the construction and decommissioning stages of the proposed project. After the license term ends, for either the proposed action (Phase 1) or full build-out (Phases 2-20), the proposed CISF project area would be decommissioned such that the area would be released for unrestricted use.

Within the region described in EIS Section 5.1.1, there is oil and gas production and exploration, potash mining, nuclear-related activities, livestock grazing, and wind and solar energy projects. However, within the visual and scenic resources geographic scope {10 km [6 mi]}, the ongoing and reasonably foreseeable projects include only oil and gas exploration, production, and waste disposal, and potash mining.

Within the geographic scope of the analysis for visual and scenic resources, there are numerous oil, gas, and potash facilities (EIS Figure 3.2-7) in various stages of operation that impact the visual landscape. Expansion or development of future oil-, gas-, and potash-related projects would have an additional impact on the visual and scenic resources of the area because of increased vehicle traffic, land disturbances, landscape changes, heavy equipment use, and construction and maintenance of project facilities and infrastructure (e.g., roads, pipelines, electric lines, industrial sites, and associated ancillary facilities). The NRC staff anticipates that the visual and scenic impacts of past, present, and reasonably foreseeable future oil and gas production and potash mining would last for the license term of the proposed project with the potential to notably change the characteristics of the landscape and become a major focus of viewer attention. These changes would be allowed by the BLM VRM Class IV classification. Therefore, the NRC staff concludes that the cumulative impacts to visual and scenic resources within the geographic scope resulting from all past, present, and foreseeable future actions would be SMALL.

5.10.1 Summary

Because of the BLM VRM Class IV classification, the low sensitivity level of the proposed CISF project area, and the return of the land to unrestricted use after the decommissioning and reclamation of the facility at the end of the license term, the NRC staff concludes that at full build-out, the proposed CISF would add a SMALL incremental effect to the SMALL impacts to visual and scenic resources from other past, present, and reasonably foreseeable future actions in the geographic scope of the analysis, resulting in an overall SMALL cumulative impact in the visual and scenic geographic area.

5.11 Socioeconomics

The region of influence (ROI) for socioeconomics is the 4-county area described in EIS Chapters 3 and 4 (Andrews and Gaines, Texas, and Lea and Eddy, New Mexico). The timeframe for this analysis is from 2017 to 2060. The same socioeconomic indicators that were considered in NRC's analysis in Chapter 4 are considered as part of this analysis: employment and income, population, local finance, housing, school enrollment, and utilities and public services.

As described in EIS Section 4.11.1, the NRC staff determined that full build-out (Phases 1-20) of the proposed CISF project during the construction and decommissioning stages would have a SMALL impact for population and housing, and MODERATE and beneficial impact for employment, public services, and local finance. The socioeconomic impacts during the operations stage of the proposed action and for full build-out would be SMALL. If only the proposed action (Phase 1) was licensed, the impacts would also be SMALL to MODERATE.

As stated in EIS Section 4.11.1.1, impacts to socioeconomic and community resources are primarily associated with workers who might move into an area and tax revenues that they would generate, which would influence resources availability for the community. Because of the rapid rise and fall of populations in response to the oil and gas industry boom and bust cycles since the 1920s, population centers in the region have expanded to accommodate greater populations over that time period (EIS Section 3.11.1.1). The potash mineral industry could also contribute to employment and population changes through 2060. As stated in EIS Section 4.11.1, in 2016, Intrepid laid off 3,000 workers because of the stoppage at the West Mine near Carlsbad. For example, historical population data demonstrate that the population of Lea County alone rose by 15,000 people in less than 10 years between 1970 and the early 1980s, and then declined by approximately 10,000 people over a 5-year period between the mid-1980s and 1990 (Rhatigan, 2015). The NRC staff concludes that the type of historical population fluctuation demonstrated in Lea County is considered a MODERATE cumulative impact to socioeconomics in the region.

If the reasonably foreseeable future actions described in EIS Section 5.1.1 go forward and become functional within the geographic scope of the socioeconomic analysis, workers would be needed to build and operate these facilities. The reasonably foreseeable future actions described in EIS Section 5.1.1 within the region include agriculture, mining, oil and gas exploration, oilfield waste facilities, energy-related projects (nuclear facilities, wind, and solar), and urban planning and development. With regard to work force, these projects would be anticipated to influence or be influenced by construction and operation of the proposed CISF. It is likely that any additional workers that would be hired as a result of reasonably foreseeable future actions would desire to live closer to their places of employment and become active in their communities. Therefore, the NRC staff anticipates that the communities of Hobbs and

Carlsbad, New Mexico, and Andrews, Texas, would experience the largest growth in the future because of commercial presence, housing availability, and location of major transportation routes in those communities. However, forward-looking population projections through 2060 for this area have not been accurate enough to provide reliable information for this analysis. For example, a 2003 population study the University of New Mexico Bureau of Business and Economic Research (BBER) conducted predicted a decline in population (a negative growth rage) in Lea County every 5 years from 2005 to 2040, while Eddy County would experience less than a 1 percent population growth rate every 5 years over the same time (Alcantara and Lopez, 2003). However, in reality, the population growth rate in Lea County was higher between 2000 and 2010 than it was in several previous decades.

Based on recent census data, the population change of both Lea and Eddy Counties increased between 2010 and 2019 by approximately 12.4 and 9.6 percent, respectively (Economic Profile System, 2021). In 2010, the BBER developed a population projection that predicted that about 73,000 people would be living in Lea County in 2030 (BBER, 2010). Two years later in 2012, the BBER developed a population projection that predicted that about 93,700 people would be living in Lea County in 2030, which is a difference of 20,700 people compared to their 2010 prediction (BBER, 2012). The same two documents projected an even larger difference in population projections for Lea County in 2040. These differences in population growth estimates up to 2040 demonstrate that population growth predictions are difficult and unlikely to reliably predict actual population sizes, particularly in this region where the oil and gas industry boom and bust cycles dominate the socioeconomic landscape.

The NRC staff predict that the oil and gas industry boom and bust cycle would continue as a major employment sector in the region as a reasonably foreseeable future action through 2060, and that the population in the region would also rise and fall through 2060. However, the continuation of agriculture, potash mining, and other large-scale projects (e.g., WIPP, wind projects) described in EIS Section 5.1.1 serve as a stable population employment base in the region. As further described in EIS Section 5.1.1, New Mexico is a leader in wind energy generation, and there are proposed wind projects and associated transmission line projects located within the geographic scope for the analysis for socioeconomics. The creation of new energy and transmission line projects in the region would increase jobs, increase the number of direct workers and families and indirect workers, and increase local finances by generating tax revenues. Smaller communities in the ROI, such as Jal, could experience housing impacts because of limited housing availability. If, however, the new employees and their families relocate to one of the larger communities, such as Hobbs or Carlsbad where additional housing, transportation, and utility improvements are planned, the NRC staff anticipate that there would be adequate housing and infrastructure to absorb the influx of workers and their families from ongoing and reasonably foreseeable future actions. As described in EIS Section 5.1.1, the NRC staff has confidence that the regional plans described to build additional housing, improve traffic congestion, and improve water systems located within the geographic scope for this socioeconomic analysis are sufficient to support the anticipated growth of the region through 2060. Based on the number of permanent employees needed to operate reasonably foreseeable future actions in the geographic scope of the analysis, there may be additional impacts to local government facilities, schools, and public services (e.g., fire protection, law enforcement services, hospitals) as population increases in the affected counties and communities, which would generally result in across-the-board increases in the demand on services. There are a number of existing medical and emergency facilities that would be capable of handling support for an increased population (EIS Section 4.11.1.1).

5.11.1 Summary

The NRC staff anticipates that, although exact numbers are unpredictable, there will be a rise and fall of population in the geographic scope of the analysis in the future, and these population changes would result in MODERATE socioeconomic impacts to employment and income, population, local finance, housing, school enrollment, and utilities and public services, based on the NRC staff's assessment provided in EIS Section 5.11. Although the nature of financial impacts from past, present, and reasonably foreseeable future actions depends on local economic activity, which the NRC staff cannot predict with certainty, the NRC staff anticipate that the past, present, and reasonably foreseeable future actions would not appreciably affect the overall socioeconomic characteristics of the area (i.e., expenditures, tax revenues, demand for housing, public utilities, and public services). Therefore, the NRC staff concludes that during construction and decommissioning stages at full build-out, the proposed CISF would add a SMALL incremental effect for population and housing, and a MODERATE and beneficial incremental impact for employment, public services and local finance to the MODERATE impacts to socioeconomic resources from other past, present, and reasonably foreseeable future actions in the ROI, resulting in an overall SMALL to MODERATE and beneficial cumulative impact in the socioeconomic ROI. During the operations stage for full build-out, the proposed CISF would add a SMALL incremental socioeconomic impact to the MODERATE impacts to socioeconomic resources from other past, present, and reasonably foreseeable future actions in the ROI, resulting in an overall SMALL to MODERATE and beneficial cumulative impact in the socioeconomic ROI.

5.12 Environmental Justice

The NRC staff assessed cumulative impacts on environmental justice within a geographic scope of analysis of 80 km [50 mi] around the proposed project area (NRC, 2003), comprising 115 block groups mostly located in Lea and Eddy counties. The timeframe for the analysis of cumulative impacts is 2017 to 2060.

Adverse health effects are measured in terms of the risk and rate of fatal or nonfatal adverse impacts on human health. Disproportionately high and adverse human health effects occur when the risk or rate of exposure to an environmental hazard for potentially affected minority and low-income populations exceed the risk or exposure rate for the general population or for another appropriate comparison group. Disproportionately high environmental effects refer to impacts or risk of impact on the natural or physical environment in a minority or low-income community that are significant and appreciably exceed the environmental impact on the larger community. Such effects may include biological, cultural, economic, or social impacts, and these potential effects have been evaluated in resource areas presented in Chapter 4 of this EIS. Minority and low-income populations in the geographic scope of analysis for environmental justice are subsets of the general public residing in the area, all of whom would be exposed to the same hazards generated from the proposed CISF and reasonably foreseeable future actions.

As explained in detail in EIS Sections 3.11 and 4.12, of the 115 block groups within 80 km [50 mi] of the proposed CISF project, 67 of the block groups have potentially affected minority populations, 12 block groups have potentially affected low-income families, and 12 block groups also have potentially affected low-income individuals. As described in EIS Section 4.12.1, after reviewing the information presented in the license application and associated documentation, considering the information presented throughout Chapters 1 through 4 of this EIS, and considering any special pathways through which potentially affected environmental justice populations could be more affected or affected differently from other segments of the general population, the NRC staff did not identify any disproportionately high and adverse human health or environmental impacts on any potentially affected environmental justice populations from full build-out of the proposed CISF. If only the proposed action (Phase 1) were constructed and operated, the same minority and low-income populations would be affected compared to full build-out; thus, there would also be no disproportionately high and adverse impacts on any potentially affected environmental justice populations.

Past, present, and reasonably foreseeable future actions described in EIS Section 5.1.1 could potentially contribute to cumulative disproportionately high and adverse human health or environmental effects within 80 km [50 mi] of the proposed CISF project. In this geographic scope, there are three other nuclear-related projects currently in the licensing and operation stages, one licensed but not yet constructed SNF storage site (the ISP CISF), one legacy site (Project Gnome) and one speculative facility (Eden). These facilities have undergone or would require license reviews, are required to meet Federal and State environmental and safety regulations. As described in EIS Section 5.13, the NRC staff found that, because of the distance of nuclear-related projects from the proposed CISF project, these projects would not add to the radiation in the immediate vicinity of the proposed project area. However, it is possible an individual that routinely spends time at different locations within the region could be exposed to low levels of radiation from more than one facility over the course of a year. If the licensed but not constructed ISP CISF were constructed and operated, it could have site-specific impacts on environmental justice. Those impacts have been evaluated in a separate NRC licensing review (NRC, 2021), and, in general, are expected to have impacts similar to the proposed action evaluated in this EIS, because the location has a similar population distribution and similar socioeconomic characteristics.

As described in EIS Section 5.1.1.1, the Permian Basin is the focus of extensive exploration, leasing, development, and production of oil and gas as well as oilfield waste disposal. Potash mining is also a major part of the Eddy and Lea County economies. Administrative controls implemented by the New Mexico Oil Conservation Commission, the New Mexico State Land Office, U.S. Department of the Interior, and BLM would ensure that oil and gas development activities and potash mining activities within the land use study area are closely monitored and regulated (Holtec, 2019). There are no current or planned solar facilities located within the geographic scope of the analysis around the proposed CISF project area. However, there are currently four operational wind projects located within the 80-km [50-mi] radius of the proposed CISF project area. These projects are located east of the proposed CISF project area near Lovington, New Mexico, Chaves County, New Mexico, Gaines, Texas, and Andrews, Texas. Development of wind energy projects are associated with long-term disturbances, such as access roads, support facilities, and tower foundations (BLM, 2011). Therefore, the NRC staff anticipates that all of these facilities would continue to operate according to their Federal and State license requirements and would not have a disproportionately high and adverse effect on minority or low-income populations compared to other segments of the general population. Other existing and reasonably foreseeable future actions such as livestock grazing, land development, and recreational projects are not expected to contribute to cumulative disproportionately high and adverse human health or environmental effects.

While certain Tribal groups have expressed a heightened interest in cultural resources potentially affected by the proposed project and other nuclear facilities in the geographic region of analysis for environmental justice, the impacts to Indian Tribes would not be disproportionately high and adverse, because there are no Tribal lands and no potentially affected American Indian populations in the region. Holtec would follow inadvertent discovery procedures regarding the discovery of previously undocumented human remains during the project lifetime (EIS Section 5.9) (Holtec, 2019a). These procedures would entail the stoppage of work and the notification of appropriate parties (Federal, Tribal, and State agencies).

The NRC staff determined in the Public and Occupational Health and Safety sections of this EIS (Sections 3.12 and 4.13) that the level of potential nonradiological impacts and radiological doses to the public from the proposed action would be within NRC regulatory limits and applicable Federal, State, and local regulatory limits. Holtec's safety evaluation of accident events described in EIS Section 4.15 concluded that the proposed CISF would not exceed applicable 10 CFR 72.106(b) dose limits to individuals at or beyond the controlled area boundary and satisfies applicable acceptance criteria for maintaining safe operations regarding criticality, confinement, retrievability, and instruments and control systems (Holtec, 2020b). Different segments of the population, including minority or low-income populations, would not be affected differently by accident events. In addition, accident events do not yield any pathways that could lead to adverse impacts on human health to minority or low-income populations. Based on the analysis above, the NRC staff determined that there would be no disproportionately high and adverse impacts on any environmental justice populations from the proposed CISF project and that there would most likely be no disproportionately high and adverse impacts on environmental justice communities from any past, present, or reasonably foreseeable future projects in the 80-km [50-mi] study area.

5.12.1 Summary

In summary, the environmental justice cumulative impact analysis assesses the potential for disproportionately high and adverse human health and environmental effects on minority and low-income populations that could result from past, present, and reasonably foreseeable future actions, including construction, operation, and decommissioning of the proposed CISF at full build-out. The NRC staff finds that the impacts from the proposed CISF on the resources evaluated in this EIS would be SMALL for most resources, SMALL to MODERATE for ecological resources and socioeconomics. Furthermore, the NRC staff did not identify any high and adverse human health or environmental impacts from the past, present, or reasonably foreseeable future actions in the geographic region of analysis {80 km [50 mi]} on minority and low-income populations, and concludes in EIS Section 4.12 that there would be no disproportionately high and adverse impacts on any environmental justice populations as a result of the proposed CISF. Therefore, the NRC staff finds that cumulative impacts would not be considered disproportionately high and adverse on low-income or minority populations.

5.13 Public and Occupational Health

The geographic scope of the analysis for public and occupational health is an 80-km [50-mi] radius of the proposed CISF project. This distance was chosen to be inclusive of areas in the region where other nuclear facilities that work with radioactive materials are located. This is a conservative approach (that is, it is expected to overestimate typical impacts) because the distances between the existing facilities are sufficient to limit cumulative exposures to radiation from operations of each facility unless the exposed individual moves from one facility to another. This approach is reasonable, however, because it is possible for an individual to live, work, and spend additional time near separate facilities. The timeframe for the analysis is 2017 to 2060.

The public and occupational health impacts from the proposed CISF Project would be SMALL and are discussed in detail in EIS Section 4.13.1. The potential exposure pathways at the proposed CISF include direct exposure to radiation emitted from the storage casks. During normal activities associated with all phases of the project lifecycle, radiological and nonradiological worker and public health and safety impacts would be SMALL. Annual radiological doses to workers and the most highly exposed nearest residents from the proposed CISF project would be below applicable NRC regulations. For the full build-out of 10,000 loaded canisters, Holtec estimated an annual dose of 0.122 mSv [12.2 mrem] to a hypothetical individual that spends 2,000 hours at the fence line 400 m [1,300 ft] from the proposed CISF (Holtec, 2020a). Doses to individuals located a greater distance from the proposed CISF project or who spend less than 2,000 hours at the boundary would be smaller. Occupational exposures would not exceed the NRC dose limit for workers, and therefore the radiological impacts to workers would be SMALL. Nonradiological impacts to public and occupational health include impacts associated with typical construction work and would also be SMALL.

Past, present, and reasonably foreseeable future nuclear materials facilities within the region of the proposed CISF project are described in EIS Section 5.1.1. Within an 80-km [50-mi] radius of the proposed CISF project, there are several nuclear materials facilities that are described in EIS Section 5.1.1 and Section 3.12.1.2 including WIPP, NEF, FEP/DUP, Project Gnome, and WCS, and the licensed but not constructed ISP CISF. Because of the distances from the proposed CISF project, and in the case of Project Gnome cessation of operations, the NRC staff consider that these projects would not add to the radiation in the immediate vicinity (e.g., within 1 km) of the proposed project area. However, it is possible that an individual who routinely spends time at different locations within the region could be exposed to low levels of radiation from more than one facility over the course of a year.

EIS Section 3.12.1.2 summarizes available information documenting public dose estimates at the boundary of each of the other nuclear materials facilities that include 1.04×10^{-6} mSv [1.04×10^{-4} mrem] for WIPP (DOE, 2018b); 0.019 mSv [19 mrem] for NEF (NRC, 2005); 0.21 mSv [20.8 mrem] for FEP/DUP (NRC, 2012b); and 0.027 mSv [2.7 mrem] for WCS (WCS, 2015). Additionally, ISP was granted a license for but has not begun construction of the CISF adjacent to the existing WCS facility. The ISP CISF would be smaller than the proposed Holtec CISF and has lower estimated public dose impacts {i.e., 0.07 mSv [7 mrem] at the controlled area boundary at full build-out} (NRC, 2021) relative to the proposed Holtec CISF. Because these facilities are dispersed throughout the region, it would be unlikely for any individual to receive the full annual estimated dose from all of these facilities of 0.55 mSv [55 mrem]; and therefore, actual public doses would be a fraction of this total dose. Based on this analysis, the cumulative public dose to an individual from potential exposures to all of the other regional facilities would be below the NRC 10 CFR Part 20 annual public dose limit of 1 mSv [100 mrem] and have a negligible contribution to the 3.1 mSv [310 mrem] annual average natural background radiation dose described in EIS Section 3.12.1.1. Therefore, the NRC staff concludes that the potential cumulative public dose impacts from the other past, present, and reasonably foreseeable future actions would be SMALL.

5.13.1 Summary

As described in the preceding analysis, the estimates of combined radiological exposures from currently operating and proposed future facilities in the geographic scope of the analysis are well below the regulatory public dose limit of 1.0 mSv/yr [100 mrem/yr] and have a negligible contribution to the 3.1 mSv [310 mrem] annual average background dose for a member of the public from natural sources. Adding the aforementioned public dose from the proposed Holtec CISF project of 0.122 mSv [12.2 mrem] to the preceding estimated dose from other past, present, and reasonably foreseeable future actions would not increase the estimated public dose above the NRC 10 CFR Part 20 annual public dose limit of 1 mSv [100 mrem]. Therefore, the NRC staff concludes that at full build-out, the proposed CISF would add a SMALL incremental effect to the SMALL impacts to public and occupational health from other past, present, and reasonably foreseeable future actions in the geographic scope of the analysis, resulting in an overall SMALL cumulative impact in the public and occupational health geographic area.

5.14 Waste Management

The geographic scope of the analysis for waste management is an 80-km [50-mi] radius around the proposed CISF project because the rural setting and large number of other industries make it feasible that waste disposal would be collected over several counties or transferred to further locations so as to not overwhelm smaller local landfills. The timeframe for the analysis of cumulative impacts is 2017 to 2060. This section evaluates the effects of the proposed CISF on the capacity and operating lifespan of waste-management facilities for LLRW, nonhazardous, hazardous, and sanitary wastes when added to the aggregate effects of other past, present, and reasonably foreseeable future actions.

The magnitude of cumulative impacts on waste management resources resulting from other past, present, and reasonably foreseeable future actions would depend on the total waste generation from the activities identified in EIS Section 5.1.1. These activities include nuclear facilities, solar and wind generation projects, housing developments, potash mining, and extensive exploration, leasing, development, production of oil and gas, and oilfield waste disposal. As described in EIS Section 5.1.1, three NRC-licensed nuclear material facilities and a second licensed but not yet constructed CISF are within the geographic scope. The DOE Gnome-Coach site, a legacy nuclear testing site, has completed remediation and is not active (DOE, 2020). Thus, the site is not producing or expected to produce waste that would have a cumulative impact with the proposed CISF on waste management resources. Therefore, the Gnome-Coach site is not discussed further in this section.

Cumulative Impact from LLRW Disposal

The geographic scope for the evaluation of cumulative impacts from disposal of LLRW (e.g., contamination survey rags, anti-contamination garments, and other health physics materials) considers the nuclear facilities discussed in EIS Section 5.1.1, which include the NEF, the WCS disposal facility, the licensed but not yet constructed FEP/DUP, and a second licensed but not constructed CISF (ISP) located at the WCS facility in Andrews, Texas. In NUREG–1790 and NUREG–2113, the NRC staff concluded that the impact of LLRW generated from the NEF and FEP/DUP on LLRW disposal facilities would be SMALL (NRC, 2005, 2012b). The WCS disposal facility is a minimal producer of LLRW and is already licensed to dispose of LLRW. The second CISF identified in EIS Section 5.1.1.3 (ISP) would be less than half of the size of the proposed Holtec CISF, and in EIS Section 4.14, the NRC staff concluded that the proposed Holtec CISF would produce a minor amount of LLRW. The ISP CISF, if constructed, would produce 234 m^3 [304 yd^3] of LLRW and the NRC staff have determined that this volume would be minor compared to the waste capacity of the facilities to dispose of such waste (NRC, 2021).

Holtec has identified two options for disposal of LLRW generated from the proposed CISF: the WCS facility in Andrews, Texas, and the Energy*Solutions* LLRW disposal facility in Clive, Utah, (Holtec, 2020a). In 2017, the total LLRW received at the Energy*Solutions* and WCS disposal facilities was 142,007 m^3 [185,738 yd^3], and 327 m^3 [427.7 yd^3], respectively (NRC, 2018). The total LLRW produced from the proposed project from full build-out (Phases 1-20), including decommissioning, would be approximately 27.21 metric tons [30 short tons] (Holtec, 2020a), which corresponds to a volume of approximately 261.5 m^3 [342 yd^3] of LLRW. This represents 0.2 percent of the total waste disposed at the Energy*Solutions* and WCS disposal facilities. As discussed in EIS Section 4.14, historically private industry has met the demand for LLRW disposal capacity, and the NRC staff expects that this trend will continue into the future, and that there would be adequate disposal capacity for the cumulative quantities of LLRW that the proposed CISF and other nuclear-related facilities located in the region would produce. Because present and reasonably foreseeable future nuclear facilities would produce a minor amount of LLW, the incremental increase in LLRW from the proposed Holtec CISF would be minor, and current LLRW facilities are capable and have the capacity to accept the LLRW, the NRC staff concludes that the combined impacts of LLWR from past, present, and reasonably foreseeable future actions on LLRW disposal capacity would be SMALL. In addition, with regard to these facilities, disposal of LLRW would be required to be conducted in accordance with all Federal and State regulations.

Cumulative Impact from Nonhazardous, Hazardous, and Sanitary Waste Disposal

As described in EIS Section 4.14, the waste management impacts from nonhazardous waste generated during the construction and operation stages of full build-out (Phases 1-20) of the proposed CISF project would be SMALL. Accordingly, if only the proposed action (Phase 1) was constructed and operated, the impacts would also be SMALL. Many of the activities within the geographic scope of the analysis, including those discussed in EIS Section 5.1.1, would produce nonhazardous, hazardous, and sanitary wastes. As identified in EIS Section 5.1.1.7, there are five waste disposal facilities within the geographic scope, and those facilities only accept oil and gas industry-related waste. Within the geographic scope of the analysis, there are six solar farms. Since these solar facilities are already constructed and operating, are passive systems, and require minimal maintenance, the NRC staff assume that the waste streams (i.e., nonhazardous, hazardous, and sanitary wastes) generated would be minor. In addition, there are four operating wind projects within the geographic scope of the analysis. Similarly to the solar projects, the wind facilities would be passive and require minimal maintenance. Also in the geographic scope of the analysis, recreational activities and facilities are also assumed to have minor contributions to the waste streams discussed in this section. Furthermore, as detailed in EIS Section 5.1.1.5, some housing developments and urbanization projects are planned within the geographic scope of the analysis. Because these are new construction projects that do not involve significant demolition, the NRC staff does not anticipate that they would contribute significant amounts of nonhazardous waste to the waste streams within the geographic scope. Therefore, the NRC staff concludes that the impact from waste streams contributed from oil and gas industry, solar and wind projects, recreational activities, and housing and urbanization in the geographic scope of the analysis would be SMALL.

During the construction and operation stages of a full build-out (Phases 1-20) of the proposed CISF, the NRC staff estimated that approximately 5,171 metric tons [5,700 short tons] of nonhazardous waste would be generated annually and would have a minor impact. In NUREG–1790 and 2113, the NRC staff concluded that the impact of nonhazardous waste generation from the NEF and FEP/DUP on disposal facilities would be SMALL (NRC, 2005, 2012b). Therefore, the NRC staff concludes that the impact from nonhazardous waste contributed from the nuclear-related facilities within the geographic scope would be SMALL. The total nonhazardous solid waste that the licensed but not constructed ISP CISF would generate would be approximately 962 metric tons [1,060 short tons] over the course of the project (NRC, 2021). The NRC staff determined that the amount of nonhazardous solid waste generated would be minor in comparison to the capacity of the landfill to dispose of such waste, and that there would be adequate capacity to dispose of the nonhazardous waste produced (NRC, 2021).

For disposal of all nonhazardous waste over the analysis timeframe, Holtec has selected two municipal landfills, the Sandpoint Landfill, located 40 km [25 mi] west of the proposed CISF, and the Lea County Landfill, located east of Eunice, NM. If either the Lea County Landfill or the Sandpoint Landfill were to receive all of this waste, it would generate less than 7 and 6 percent, respectively, of the cumulative annual municipal solid waste received at these landfills (NMED 2019). Therefore, the NRC staff concludes that cumulative annual volume of nonhazardous waste generated during the construction and operation stages of the full build-out (Phases 1-20) to be significantly less than the available capacity to dispose of such waste. As discussed in EIS Section 2.2.1.6, the total volume of waste produced as a result of reclamation is expected to be significantly higher than waste produced during the construction and operation stages. Nonhazardous waste produced from reclamation of the proposed CISF would be approximately 5,624,552 metric tons [6,200,000 short tons] over a 2-year decommissioning schedule. If the ISP CISF were to decommission and undergo reclamation [although reclamation is not included as part of the license (NRC, 2021)] at the same time as the proposed Holtec CISF, the NRC staff estimate that the combined quantities of nonhazardous waste from both CISFs produced as a result of reclamation would be 7,874,373 metric tons [8,680,000 short tons] (i.e., scaling reclamation waste from the proposed Holtec CISF to accommodate the smaller size of the ISP CISF). However, as discussed in EIS Section 4.11.1.3, both the Sandpoint and Lea County landfills are anticipated to be closed by the time of the decommissioning and reclamation stage (NMED, 2019). Therefore, the impact from total estimated volume of nonhazardous solid waste from reclamation of the proposed CISF project, when added to the existing annual landfill throughputs would be MODERATE until the State licenses a new landfill. The number of new permitted landfills in New Mexico has increased over the last several years, with new facilities having a generally larger capacity than the current facilities (NMED, 2015). Additionally, there has been a trend toward the use of transfer stations, which would temporarily hold waste until a suitable landfill is available (NMED, 2015). Depending on where capacity is available, these transfer stations and subsequent landfills may be located outside the geographic scope of the analysis. Therefore, the NRC staff assume that for these reasons, the State of New Mexico would continue to have available landfill capacity to dispose of reclamation waste as needed and necessary. For these reasons, the NRC staff concludes that the potential impacts from contribution of the proposed CISF and past, present, and reasonably foreseeable future actions on nonhazardous waste management resources in the cumulative area of analysis would be MODERATE until a larger capacity landfill is identified and permitted, after which the NRC staff concludes the impact would be SMALL.

As described in EIS Section 4.14, the waste management impacts from hazardous waste generated during the operation and decommissioning and reclamation stages of the full build-out (Phases 1-20) of the proposed CISF project would be SMALL. Accordingly, if only the proposed action (Phase 1) were constructed, the operation and decommissioning impacts would also be SMALL. The proposed CISF would produce 1.2 metric tons per year [1.32 short tons] of hazardous waste. Activities in the geographic scope of the analysis, as discussed in EIS Section 5.1.5, would produce hazardous waste. Since 2001, the average quantity of hazardous waste produced from all hazardous waste generators in New Mexico was approximately 733,114 metric tons [808,118 short tons], with a majority being contributed by the HollyFrontier Navajo Refinery in Artesia, New Mexico (EPA, 2017). The second and third largest contributors to hazardous waste, based on EPA statistics, are Intel Corp, in Rio Rancho, New Mexico, and Los Alamos National Laboratories, in Los Alamos, New Mexico, respectively; however, these two facilities are outside of the geographic scope of the analysis (EPA, 2017). Already operating solar and wind projects are anticipated to produce a minor, if any, amount of hazardous waste. The oil and gas industry currently operating within the geographic scope of the analysis would be expected to produce some hazardous waste as part of operation. Any future oil and gas development would also produce hazardous waste. However, since the oil and gas industry is ongoing, the NRC staff assume that any hazardous waste produced would continue to be disposed of in accordance with State of New Mexico laws. Although total amounts of hazardous waste produced has decreased in recent years (EPA, 2017), the contribution from hazardous waste generated from the proposed CISF would result in an increase to the average total hazardous waste generated in the State of New Mexico (i.e., with HollyFrontier Navajo Refinery as the largest contributor) by approximately 0.00016 percent and therefore would be SMALL. Because the volume of hazardous waste the proposed CISF project generated would be SMALL, and the waste would be handled, stored, and disposed of in accordance with applicable regulations, the NRC staff concludes that the potential impacts from the contribution of the proposed CISF on waste management resources when added to past, present, and reasonably foreseeable future actions in the cumulative impacts area of analysis would be SMALL.

As discussed in EIS Section 2.2.1.6, the sanitary waste produced from the proposed CISF would be contained using onsite sewage collection tanks and underground digestion tanks similar to septic tanks but with no drain field, and after testing the waste in the collection tanks to ensure 10 CFR Part 20 release criteria are met, the sewage would be disposed at an offsite treatment facility. During the construction and operation stages of the proposed CISF, a maximum of 135 people would be expected to relocate to the geographic scope of the analysis and likely find housing within areas that a public wastewater system would serve (Holtec, 2020a). The major public wastewater treatment facilities in the geographic scope serve approximately 78,917 people and all have excess capacity (NRC, 2012). The addition of 135 staff for construction and operations would result in a 0.02 percent increase in the total number of people who rely on the public wastewater systems included within the geographic scope of the analysis. Therefore, the NRC staff concludes that the impact of the proposed CISF on public wastewater facilities would be SMALL.

5.14.1 Summary

As described in the preceding analysis, disposal infrastructure exists for LLRW, nonhazardous, hazardous, and sanitary wastes generated within the geographic scope of the analysis. For LLRW, the NRC staff concludes that the combined impacts of LLRW generated from nuclear-related facilities within the geographic scope of the analysis on LLRW disposal would be SMALL. For nonhazardous waste, the NRC staff expects that the incremental quantity of nonhazardous waste the proposed CISF produced during concurrent construction and operations would be minor; however, the NRC staff expects the incremental quantity produced during reclamation to be MODERATE. The NRC staff expects that even though nonhazardous waste volumes produced from reclamation would have a MODERATE impact on currently available landfill capacity, adequate infrastructure and capacity for disposal of the additional waste in the State of New Mexico are likely to be available at that time. Thus, the NRC staff concludes that the potential impacts from the contribution of the proposed CISF on nonhazardous waste management resources in the cumulative area of analysis would be MODERATE, until a larger capacity landfill is identified and permitted, and SMALL thereafter. As previously discussed, because the volume of hazardous waste the proposed project generated would be minor and the waste would be handled, stored, and disposed of in accordance with applicable regulations, the NRC staff concludes that the potential impacts from the contribution of the proposed CISF on waste management resources in the cumulative impacts area of analysis would be SMALL. Additionally, the NRC staff concludes that the incremental quantity of sanitary waste the proposed CISF produced would be comparatively minor, and that capacity for offsite disposal would be adequate to handle the additional sanitary waste. Therefore, the NRC staff concludes that at full build-out, the proposed CISF would add a SMALL to MODERATE incremental effect to the SMALL impacts to waste management from other past, present, and reasonably foreseeable future actions in the geographic scope of the analysis, resulting in an overall SMALL to MODERATE cumulative impact in the waste management geographic area.

5.15 References

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20. "Standards for Protection Against Radiation." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 30. Code of Federal Regulations, Title 10, *Energy*, Part 30. “Rules of General Applicability to Domestic Licensing of Byproduct Material.” Washington, DC: U.S. Government Publishing Office.

10 CFR Part 50. Code of Federal Regulations, Title 10, *Energy*, Part 50. “Domestic Licensing of Production and Utilization Facilities.” Washington, DC: U.S. Government Publishing Office.

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51, “Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions.” Washington, DC: U.S. Government Printing Office.

10 CFR 61.55. Code of Federal Regulations, Title 10, *Energy*, § 61.55. “Licensing Requirements for Land Disposal of Radioactive Waste.” Washington, DC: U.S. Government Printing Office.

10 CFR Part 70. Code of Federal Regulations, Title 10, *Energy*, Part 70. “Domestic Licensing of Special Nuclear Material.” Washington, DC: U.S. Government Publishing Office.

10 CFR Part 72. Code of Federal Regulations, Title 10, *Energy*, Part 72. “Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste.” Washington, DC: U.S. Government Publishing Office.

40 CFR 1508.7. Code of Federal Regulations, Title 40, § 1508.7. “Chapter V – Council on Environmental Quality Part 1508 – Terminology and Index.” Washington, DC: U.S. Government Printing Office.

74 FR 66496. *Federal Register*, Vol. 74, No. 239. “Endangerment and Cause or Contribute Findings for Greenhouse Gases.” 2009.

ACS. “Lifetime Risk of Developing or Dying From Cancer.” Atlanta, Georgia: American Cancer Society. 2022. <https://www.cancer.org/cancer/cancer-basics/lifetime-probability-of-developing-or-dying-from-cancer.html> (Accessed 17 May 2022)

Alcantara, A. and E. Lopez. “Demographic and Population Study for Regional and Statewide Water Planning; Population Projections for 16 Regions July 1, 2001 to July 1, 2060.” Albuquerque, New Mexico: University of New Mexico Bureau of Business and Economic Research. 2003. <http://www.ose.state.nm.us/Planning/PDF/population-report.pdf> (Accessed 11 June 2019)

American Clean Power. “New Mexico Takes Bold Step Toward a Cleaner, Stronger 21st Century Economy.” Press Release. American Wind Energy Association. 2019. < https://cleanpower.org/news/new-mexico-energytransitionact-2019/ > (Accessed 31 May 2019)

American Clean Power. “Wind Powers Forward to Reach 30 Percent in Four States.” Press Release. American Wind Energy Association. 2018. <https://cleanpower.org/news/wind-powers-forward-to-reach-30-percent-in-four-st/ > (Accessed 31 May 2019)

BBER. “New Mexico County Population Projections July 1, 2010 to July 1, 2040.” 2012. <https://cc.bingj.com/cache.aspx?q=ew+Mexico+County+Population+Projections+July+1%2c+2010+to+July+1%2c+2040&d=4850130805327193&mkt=en-US&setlang=en-US&w=y_vweeTg4vedlfFtekWhZEvLHXm2jjYm > (Accessed 11 June 2019)

BBER. “Bureau of Business and Economic Research (BEER) – Population Projections for New Mexico and Counties.” Albuquerque, New Mexico: University of New Mexico Bureau of Business and Economic Research. ADAMS Accession No. ML103430027. 2010.

BLM. “Draft Resource Management Plan and Environmental Impact Statement.” BLM/NM/PL-18-01-1610. Santa Fe, New Mexico: U.S. Department of the Interior Bureau of Land Management, Carlsbad Field Office. 2018. <https://eplanning.blm.gov/epl-front-office/projects/lup/64444/153042/187358/BLM_CFO_Draft_RMP_-_Volume_I_-_EIS_-_August_2018_(1).pdf> (Accessed 23 May 2019)

BLM. “Ochoa Mine Project Final Environmental Impact Statement.” Carlsbad, New Mexico: U.S. Department of the Interior, Bureau of Land Management, Carlsbad Field Office. BLM/NM/PL-14-02-3500. 2014. <https://www.nm.blm.gov/cfo/ochoaMine/finalEIS.html> (Accessed 20 November 2019)

BLM. “Task 2 Report for the Powder River Basin Coal Review – Past and Present and Reasonably Foreseeable Development Activities.” Casper, Wyoming: Bureau of Land Management, High Plains District Office. 2011. < https://eplanning.blm.gov/public_projects/nepa/64842/78267/88481/18-Task2-Past.Present.ReasonableForeseeableDevelopment.pdf> (10 June 2019)

BLM. “Final Environmental Impact Statement for the South Gillette Area Coal Lease Applications.” WYW172585, WYW173360, WYW172657, and WYW161248. Cheyenne, Wyoming: Bureau of Land Management. 2009. <https://eplanning.blm.gov/public_projects/nepa/67025/82254/97147/vol1.pdf > (Accessed 20 July 2021)

BLM. “Chapter 5: Potential Impacts of Wind Energy Development and Analysis of Mitigation Measures.” Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States. FES 05-11. ADAMS Accession No. ML12243A271. Washington, DC: Bureau of Land Management, U.S. Department of the Interior. 2005.

BLM. “Manual H-8410-1 - Visual Resource Inventory.” ADAMS Accession No. ML13014A664. Washington, DC: U.S. Department of the Interior Bureau of Land Management, Carlsbad Field Office. 1986.

Bjorklund, L.J. and W.S. Motts. “Geology and Water Resources of the Carlsbad Area, Eddy County, New Mexico.” U.S. Geological Survey Open File Report 59-9. Albuquerque, New Mexico: U.S. Geological Survey. 322 p. 1959.

BME. “Sprint Andrews County Disposal Facility Andrews County, Texas Permit Application.” ADAMS Accession No. ML20015A450. Mansfield, Texas: Biggs & Mathews Environmental. 2019.

CEQ. “Environmental Justice Guidance under the National Environmental Policy Act.” ADAMS Accession No. ML12199A438. Washington, DC: Council on Environmental Quality. 1997.

City of Carlsbad. “Monthly Reports, Planning, Engineering and Regulation Department.” Carlsbad, New Mexico: City of Carlsbad. 2018. <https://www.cityofcarlsbadnm.com/download/planning_eng_reg/monthly_reports/building_activity_reports/2018/PERD-Monthly-Building-Rpt-08-2018.pdf> (Accessed 13 August 2018)

Consensus Planning. “City of Carlsbad Comprehensive Plan.” Albuquerque, New Mexico: Consensus Planning, Incorporated. 2020. <https://cityofcarlsbadnm.com/download/planning_eng_reg/publications/Final-Approved-Carlsbad-Comprehensive-Plan-1.28.2020-1.pdf> (Accessed 18 May 2022)

Consensus Planning. “Eddy County Comprehensive Plan.” Albuquerque, New Mexico: Consensus Planning, Incorporated. 2017. <https://www.co.eddy.nm.us/DocumentCenter/View/2184/Eddy-County-Comp-Plan---Adopted-62717> (Accessed 29 May 2019)

DOE. “Gnome-Coach, New Mexico, Site Fact Sheet.” Grand Junction, Colorado: U.S. Department of Energy, Office of Legacy Management. 2020. <https://www.energy.gov/sites/prod/files/2020/04/f74/GnomeCoachFactSheet.pdf> (Accessed 19 January 2021)

DOE. “Environmental Assessment for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste at Waste Control Specialists, Andrews County, Texas.” Washington, DC: U.S. Department of Energy. 2018a. <https://www.energy.gov/sites/prod/files/2018/11/f57/final-ea-2082-disposal-of-gtcc-llw-2018-10.pdf> (Accessed 6 June 2019)

DOE. “Waste Isolation Pilot Plant Annual Site Environmental Report for 2017.” DOE/WIPP-18-3591. Washington, DC: U.S. Department of Energy. 2018b. <https://wipp.energy.gov/library/ser/DOE-WIPP-18-3591_Rev_0.pdf> (Accessed 18 June 2019)

DOE. “Supplemental Analysis for the Waste Isolation Pilot Plant Site-Wide Operations.” DOE/EIS-0026-SA-07. Carlsbad, New Mexico: U.S. Department of Energy. 2009. <https://www.energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/EIS-0026-SA-07-2009.pdf> (Accessed 24 June 2019)

DOE. Final Environmental Impact Statement for a Rail Alignment for the Construction and Operation of a Railroad in Nevada to a Geologic Repository at Yucca Mountain, Nye County, Nevada. DOE/EIS-0369. Las Vegas, Nevada: Office of Civilian Radioactive Waste Management. ADAMS Accession No. ML082070185. 2008.

Double Eagle Water Supply. Email correspondence to T. Holt from K. Cass. “Subject: Double Eagle Water Supply Follow-Up.” ADAMS Accession No. ML21201A139. Washington, DC: U.S. Nuclear Regulatory Commission. 2021.

Economic Profile System. “A Demographic Profile.” Bozeman, Montana: Headwaters Economics. 2021.

Eddy County. “Sandpoint Landfill”. 2022. <http://www.co.eddy.nm.us/165/Sandpoint-Landfil> (Accessed 20 May 2022)

Eden Radioisotopes, LLC. “Subject: Intent to Build Domestic Medical Isotope Production Facility.” ADAMS Accession No. ML19169A062. Letter from B.J. Lee, Eden Radioisotopes, LLC to Document Control Desk, U.S. Nuclear Regulatory Commission. Albuquerque, New Mexico: Eden Radioisotopes, LLC. 2019a.

Eden Radioisotopes, LLC. “Overview of Company.” ADAMS Accession No. ML19255G793. Meeting slides from Eden Radioisotopes LLC to U.S. Nuclear Regulatory Commission. Albuquerque, New Mexico: Eden Radioisotopes, LLC. 2019b.

Eden Radioisotopes, LLC. “NRC Pre-application Meeting.” ADAMS Accession No. ML19283B737. Preapplication meeting slides from Eden Radioisotopes LLC to U.S. Nuclear Regulatory Commission. Albuquerque, New Mexico: Eden Radioisotopes, LLC. 2019c.

EDF Renewables. “EDF Renewables North America Enters Contract to Build Oso Grande Wind Project Agreement with Tucson Electric.” Press Release. EDF Renewables. 2019a. <https://www.edf-re.com/edf-renewables-north-america-enters-power-to-build-oso-grande-wind-project-agreement-with-tucson-electric/> (Accessed 1 June 2019)

EDF Renewables. “Oso Grande Wind Project.” EDF Renewables. 2019b. <https://www.edf-re.com/project/oso-grande-wind-project/> (Accessed 1 June 2019)

EIA. “Drilling Productivity Report for Key Tight Oil and Shale Gas Regions.” Washington, DC: United States Energy Information Administration. 2022a. <https://www.eia.gov/petroleum/drilling/pdf/dpr-full.pdf> (Accessed 20 May 2022)

EIA. “U.S. Energy Mapping System.” Washington, DC: United States Department of Energy, United States Energy Information Administration. 2022b. <https://www.eia.gov/state/maps.php?v=Renewable> (Accessed 20 May 2022)

EIA. “Permian Basin, Wolfcamp Shale Play, Geology Review.” Washington, DC: United States Energy Information Administration. 2018. <https://www.eia.gov/maps/pdf/PermianBasin_Wolfcamp_EIAReport_Oct2018.pdf> (Accessed 21 June 2019)

ELEA. “GNEP Siting Report.” ADAMS Accession Nos. ML17310A225, ML17310A227, ML17310A230, and ML17310A231. Hobbs, New Mexico: Eddy-Lea Energy Alliance. 2007.

Elliott, L. “Descriptions of Systems, Mapping Subsystems, and Vegetation Types for Texas.” Austin, Texas: Texas Parks and Wildlife. 2014.

Engie North America. “Jumbo Hill wind project in Texas.” Houston, Texas: Engie North America. <https://www.engie-na.com/jumbo_hill_wind> (Accessed 20 May 2022)

EPA. “Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2017.” EPA 430-R-19-001. Washington, DC: U.S. Environmental Protection Agency. 2019.

EPA. “2017 Greenhouse Gas Emissions from Large Facilities.” Washington, DC: EPA Facility Level Information on Greenhouse Gases Tool (FLIGHT). 2018. <https://ghgdata.epa.gov/ghgp/main.do#> (Accessed 15 July 2019)

EPA. “The National Biennial RCRA Hazardous Waste Report (Based on 2009 Data)”. Washington, DC: U.S. Environmental Protection Agency. 2010. <https://nepis.epa.gov/Exe/ZyNET.exe/P10095NC.TXT?ZyActionD=ZyDocument&Client=EPA&Index=2006+Thru+2010&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C06thru10%5CTxt%5C00000022%5CP10095NC.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL> (Accessed 27 June 2019)

EPA. “Considerations of Cumulative Impacts in EPA Review of NEPA Documents.” Washington, DC: U.S. Environmental Protection Agency. 1999. <https://www.epa.gov/sites/production/files/2014-08/documents/cumulative.pdf> (24 June 2019)

Exelon Generation. “Wildcat Wind Project.” 2019. <https://www.exeloncorp.com/locations/power-plants/wildcat-wind-project> (Accessed 1 June 2019)

Frohlich, C., H. Deshon, B. Stump, C. Hayward, M. Hornbach, and J. Walter. “A Historical Review of Induced Earthquakes in Texas.” *Seismological Research Letters*. Vol. 87, No. 4. pp. 1,022–1,038. Albany, California: Seismological Society of America. 2016.

Gordon Environmental. “Application for Permit, Sundance West, Volume 1: Permit Application Text.” ADAMS Accession No. ML22139A202. Bernalillo, New Mexico: Gordon Environmental, Inc. 2016. <http://ocdimage.emnrd.state.nm.us/imaging/filestore/SantaFeAdmin/AO/200211/pUNK1109653010_1_AO.pdf> (Accessed 5 December 2019)

HollyFrontier. “Navajo Refinery.” Artesia, New Mexico. 2019. <https://www.hollyfrontier.com/operations/refineries/navajo/default.aspx> (Accessed 29 June 2019)

Holtec. “Responses to Request for Additional Information. ADAMS Accession No. ML21228A203. Marlton, New Jersey: Holtec International. 2021.

Holtec. “Environmental Report-HI-STORE Consolidated Interim Storage Facility, Rev. 8.” ADAMS Accession No. ML20295A485. Marlton, New Jersey: Holtec International. 2020a.

Holtec. “Safety Analysis Report-HI-STORE Consolidated Interim Storage Facility.” ADAMS Accession No. ML20295A428. Marlton, New Jersey: Holtec International. 2020b.

Holtec. “Responses to Request for Additional Information.” ADAMS Accession No. ML19081A075. Marlton, New Jersey: Holtec International. 2019.

Intrepid. “About Us.” 2019. <https://www.intrepidpotash.com/about/> (Accessed 3 June 2019)

Johnson, P.E. and R.D. Michelhaugh. “Transportation Routing Analysis Geographic Information System (TRAGIS) User’s Manual.” ORNL/NTRC-006, Revision 0. ADAMS Accession No. ML113260107. Oak Ridge, Tennessee: Oak Ridge National Laboratory. 2003.

KRQE. “Carlsbad Hopes Temporary Housing Project Will Win Over Oil Workers.” Carlsbad, New Mexico: Nexstar Broadcasting Incorporated, KRQE Media. 2019. <https://www.krqe.com/news/new-mexico/carlsbad-hopes-temporary-housing-project-will-win-over-oil-workers/1826659388> (Access 23 May 2019)

Land, L. “Evaporite Karst in the Permian Basin Region of West Texas and Southeastern New Mexico: The Human Impact.” In L, Land (ed). 13th Sinkhole Conference, National Cave and Karst Research Institute, Symposium 2, Carlsbad, New Mexico. pp. 113–122. 2013.

Land, L. “Anthropogenic Sinkholes in the Delaware Basin Region: West Texas and Southeastern New Mexico.” *West Texas Geological Society Bulletin*. Vol. 48. pp. 10–22. 2009.

Land, L. “Hydrogeology of Bottomless Lakes State Park.” In L. Land, V. Lueth, B. Raatz, P.I. Boston, and D. Love (eds). Caves and Karst of Southeastern New Mexico: *New Mexico Geological Society.* Guidebook 57. pp. 95–96. 2006.

Land, L. “Evaporite Karst and Regional Ground Water Circulation in the Lower Pecos Valley.” In K.S. Johnson and J.T. Neal (eds). Evaporite Karst and Engineering/Environmental Problems in the United States: Oklahoma Geological Survey Circular 109. Norman, Oklahoma: The University of Oklahoma. pp. 227–232. 2003.

Lea County. “Lea County Comprehensive Plan.” 2005. <https://d38trduahtodj3.cloudfront.net/files.ashx?t=fg&rid=LeaCounty&f=2005_Lea_County_Comprehensive_Plan.pdf> (Accessed 28 May 2019)

MolzenCorbin. “Carlsbad Double Eagle Water System Improvements: Tank and Chlorination Facility (Phase III).” 2022. <https://www.molzencorbin.com/portfolio/carlsbad-double-eagle-water-system-improvements-tank-and-chlorination-facility-phase-iii/> (Accessed 19 May 2022)

Neuhauser, K.S., F.L. Kanipe, and R.F. Weiner. “RADTRAN 5 Technical Manual”. SAND2000-1256. ADAMS Accession No. ML16013A013. Albuquerque, New Mexico: Sandia National Laboratories. 2000.

New Mexico Bureau of Geology and Mineral Resources. “New Mexico Potash—Past, Present, and Future.” Socorro, New Mexico: New Mexico Institute of Mining and Technology, New Mexico Bureau of Geology and Mineral Resources. 2008. <https://geoinfo.nmt.edu/publications/periodicals/earthmatters/8/n2/em_v8_n2.pdf#:~:text=Commercial%20potash%20is%20produced%20primarily%20in%20Eddy%20and,the%20only%20producer%20of%20langbeinite%20in%20the%20world> (Accessed 18 May 2022)

New Mexico Bureau of Geology and Mineral Resources. “New Mexico Potash—Past, Present, and Future.” Socorro, New Mexico: New Mexico Institute of Mining and Technology, New Mexico Bureau of Geology and Mineral Resources. 2008. <https://geoinfo.nmt.edu/publications/periodicals/earthmatters/8/n2/em_v8_n2.pdf#:~:text=Commercial%20potash%20is%20produced%20primarily%20in%20Eddy%20and,the%20only%20producer%20of%20langbeinite%20in%20the%20world> (Accessed 18 May 2022)

NMDGF. "State Wildlife Action Plan." Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2016.

NMED. "Information for Lea County LF and Sandpoint LF" email (June 28, 2019) and attachments: SandPointAnnualReport(s).doc, AnnualReport.LeaCounty(3).doc, 2018LandfillCapacityWorkSheet.SandPoint.pdf, Capacity analysis, LCLF – Dec 2017.docx, from George Schuman, Permit Section Manager, Solid Waste Bureau, New Mexico Environment Department, to Nathan Hall, Southwest Research Institute. 2019.

NMED. New Mexico Solid Waste Management Plan, 2015. New Mexico Environment Department. Santa Fe, New Mexico. 2015.
<http://web.archive.org/web/20170218061006/https://www.env.nm.gov/swb/documents/SolidWasteManagementPlan.pdf>
(Accessed 28 June 2019)

NMEMNRD. "Applications, Permits, Notifications."
Santa Fe, New Mexico: New Mexico Energy, Minerals and Natural Resource Department.
2022. <https://www.emnrd.nm.gov/ocd/permitting-resources-how-tos/>
(Accessed 19 May 2022)

NMEMNRD. "Applications, Draft Permits, Public Notices and Notifications." Santa Fe, New Mexico: New Mexico Energy, Minerals and Natural Resource Department. 2021.
<http://web.archive.org/web/20210524015945/http://www.emnrd.state.nm.us/OCD/env-draftpublicetc.html> (Accessed 24 May 2021)

NMEMNRD. "RE: Tentative Decision Lea Land, LLC Landfill Major Modification Notice." 2020. ADAMS Accession No. ML22139A204. Santa Fe, New Mexico: New Mexico Energy, Minerals and Natural Resource Department.
<http://web.archive.org/web/20210626093631/http://www.emnrd.state.nm.us/OCD/documents/NM1-35LeaLandpermitmodificationtentativedecisiondraftpermitmodificationinterestedpartieslist.pdf>
(Accessed 5 December 2019)

NMEMNRD. "Applications, Permits, Notifications."
Santa Fe, New Mexico: New Mexico Energy, Minerals and Natural Resource Department.
2019a. <https://www.emnrd.nm.gov/ocd/permitting-resources-how-tos/ >
(Accessed 5 December 2019)

NMEMNRD. "Lea Land, LLC Landfill Major Modification Notice." Santa Fe, New Mexico: New Mexico Energy, Minerals and Natural Resource Department. 2019b.
<https://www.emnrd.nm.gov/ocd/wp-content/uploads/sites/6/20190730NM1-035LeaLandLLC-LeaLandLandfillNoticeforamajormodificationtoanexiatngpermit.pdf >
(Accessed 5 December 2019)

NMEMNRD. "Milestone Surface Waste Management Facility Notice." Santa Fe, New Mexico: New Mexico Energy, Minerals and Natural Resource Department. 2019c.
<https://www.emnrd.nm.gov/ocd/wp-content/uploads/sites/6/Milestonewebnotice.pdf >
(Accessed 5 December 2019)

NMEMNRD. “NGL Waste Services LLC North Ranch Surface Waste Management Facility Notice.” Santa Fe, New Mexico: New Mexico Energy, Minerals and Natural Resource Department. 2019d. <https://www.emnrd.nm.gov/ocd/wp-content/uploads/sites/6/20191022NM1-066NGLWasteSerivesLLCNorthRanchSWMFNoticefornewapplication.pdf> (Accessed 5 December 2019)

NMEMNRD. “NGL Waste Services LLC South Ranch Surface Waste Management Facility Notice.” Santa Fe, New Mexico: New Mexico Energy, Minerals and Natural Resource Department. 2019e. <https://www.emnrd.nm.gov/ocd/wp-content/uploads/sites/6/20191022NM1-067NGLWasteServicesLLCSouthRanchSWMFNoticefornewapplication.pdf> (Accessed 5 December 2019)

NMEMNRD. “New Mexico Clean Energy Map.” Santa Fe, New Mexico: State of New Mexico Energy Conservation and Management Division, Energy, Minerals and Natural Resources Department. 2017a. <https://www.emnrd.nm.gov/ecmd/wp-content/uploads/sites/3/CleanEnergyProjectMap2017.pdf> (Accessed 31 May 2019)

NMEMNRD. “RE: Commercial Surface Waste Management Facility Permit NM1-62. South ½ of Section 30, Township 21 South, Range 38 East NMPM, Lea County, New Mexico.” 2017b. ADAMS Accession No. ML22139A199. Santa Fe, New Mexico: New Mexico Energy, Minerals and Natural Resources Department. 2017b. <http://www.emnrd.state.nm.us/OCD/documents/SundanceWestTentativeDecision.pdf> (Accessed 5 December 2019)

NRC. NUREG–2239, “Final Environmental Impact Statement for Interim Storage Partners LLC’s License Application for a Consolidated Interim Storage Facility for Spent Nuclear Fuel in Andrews County, Texas.” ADAMS Accession No. ML21209A955. Washington, DC: U.S. Nuclear Regulatory Commission. 2021.

NRC. “IIFP Fluorine Extraction and Depleted Uranium Deconversion Plant Licensing.” Washington, DC: U.S. Nuclear Regulatory Commission. 2019. <https://www.nrc.gov/materials/fuel-cycle-fac/inisfacility.html#top> (Accessed 3 June 2019)

NRC. “Low-Level Waste Disposal Statistics.” Washington, DC: U.S. Nuclear Regulatory Commission. 2018. <https://www.nrc.gov/waste/llw-disposal/licensing/statistics.html> (Accessed 28 June 2019)

NRC. NUREG–2157, “Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel.” ADAMS Accession No. ML14196A105. Washington, DC: U.S. Nuclear Regulatory Commission. 2014a.

NRC. NUREG-2125, “Spent Fuel Transportation Risk Assessment, Final Report.” NUREG-2125. Accession No. 14031A323. Washington, DC: U.S. Nuclear Regulatory Commission. 2014b.

NRC. “Louisiana Energy Services Gas Centrifuge Facility The History of Licensing.” ADAMS Accession No. ML17076A061. Washington, DC: U.S. Nuclear Regulatory Commission. 2012a.

NRC. NUREG–2113, “Final Environmental Impact Statement for the Proposed Fluorine Extraction Process and Depleted Uranium Deconversion Plant in Lea County, New Mexico.” ADAMS Accession No. ML12220A380. Washington, DC: U.S. Nuclear Regulatory Commission. 2012b.

NRC. NUREG–1790, “Final Environmental Impact Statement for the Proposed National Enrichment Facility in Lea County, New Mexico.” ADAMS Accession No. ML15155B297 Package. Washington, DC: U.S. Nuclear Regulatory Commission. 2005.

NRC. NUREG–1748, “Environmental Review Guidance for Licensing Actions Associated with NMSS Programs.” Washington, DC: U.S. Nuclear Regulatory Commission. 2003.

Onsurez, Jessica. “Phase 3 of $12 Million Water Project Begins in Carlsbad.” Albuquerque, New Mexico: Albuquerque Journal. 2018. <https://www.abqjournal.com/1258675/phase-3-of-12-million-water-project-begins-in-carlsbad.html> (Accessed 23 May 2019)

OWL. “Facilities.” Oilfield Water Logistics. 2018a. <https://www.oilfieldwaterlogistics.com/facilities/> (Accessed 5 December 2019)

OWL. “Services.” Oilfield Water Logistics. 2018b. <https://www.oilfieldwaterlogistics.com/services/> (Accessed 5 December 2019)

PolyNatura. “Ochoa Project Overview.” Hobbs, New Mexico. 2017. <https://www.polynatura.com/project/> (Accessed 21 November 2019)

R360. “R360 Environmental Solutions.” R360 Environmental Solutions. 2022. <https://www.r360environmentalsolutions.com/locations> (Accessed 20 May 2022)

Rapier, Robert. “The Permian Basin is Now the World’s Top Oil Producer.” Forbes. 2019. <https://www.forbes.com/sites/rrapier/2019/04/05/the-permian-basin-is-now-the-worlds-top-oil-producer/#1bb017483eff> (Accessed 1 June 2019)

RES. “Portfolio.” Interactive Map. RES – Global Renewable Energy Company. 2019. <https://www.res-group.com/en/portfolio?ProjectID=1954> (Accessed 31 May 2019)

Rhatigan, R. “Update of the Census for Lea County: Population Dynamics.” Albuquerque, New Mexico: University of New Mexico Geospatial and Population Studies. 2015. <http://bber.unm.edu/media/publications/Lea_County_Population_Report.pdf> (Accessed 11 June 2019)

Richey, S.F., J.G. Wells, and K.T. Stephens. “Geohydrology of the Delaware Basin and Vicinity, Texas and New Mexico.” U.S. Geological Survey, Water-Resources Investigations Report 84-4077. Albuquerque, New Mexico: U.S. Department of the Interior. 1985.

Roberts, Billy J. “Global Horizontal Solar Irradiance Map.” U.S. Department of Energy Office of Energy Efficiency and Renewable Energy, National Renewable Energy Laboratory. 2018. <https://www.nrel.gov/gis/assets/images/nsrdb-v3-ghi-2018-01.jpg> (Accessed 2 June 2019)

SEC. “Edgar Company Search Results.” ADAMS Accession No. ML22126A031. Washington, DC: U.S. Securities and Exchange Commission. 2021. <https://www.sec.gov/edgar/browse/?CIK=1421461&owner=exclude> (Accessed 21 October 2021)

Sundance Services Inc. “Solutions: Materials Handled.” Sundance Services, Incorporated. 2015. <http://www.sundanceservices.com/06-materials-handled.html> (Accessed 3 June 2019)

SwRI. “Scientific Notebook #1333 for the Holtec Consolidated Interim Storage Facility EIS Supporting Calculations.” ADAMS Accession No. ML19352G685. San Antonio, Texas: Southwest Research Institute, Center of Nuclear Waste Regulatory Analyses. 2019.

TCEQ. “Waste Control Specialists Radioactive Material License R04100.” Austin, Texas: Texas Commission on Environmental Quality, Radioactive Materials Division. 2019. <https://www.tceq.texas.gov/permitting/radmat/licensing/wcs_license_app.html> (Accessed 14 July 2021)

TEP. “TEP Achieves Major Milestone at Oso Grande Wind Project.” Tucson, Arizona: Tucson Electric Power. 2020. <https://www.edf-re.com/project/oso-grande-wind-project/> (Accessed 2 May 2021)

Urenco. “UUSA Key Facts.” Urenco. 2019. <https://urenco.com/global-operations/uusa> (Accessed 3 June 2019)

URS Group Inc. “Air Resources Technical Support Document, Carlsbad Field Office, Oil and Gas Resource Management Plan Revision.” Denver, Colorado: URS Group Inc. 2013.

USGS. "Mineral Commodity Summaries 2021.” Reston, Virginia: U.S. Department of the Interior, U.S. Geological Survey. 2021. <https://doi.org/10.3133/mcs2021> (Accessed 25 April 2022)

USGS. “NHD View”. The National Map. 2019. <https://viewer.nationalmap.gov/basic/?basemap=b1&category=nhd&title=NHD%20View> (Accessed 28 May 2019)

WCS. “Stewardship Environmental Protection.” Dallas, Texas: Waste Control Specialists, LLC. 2019. <https://www.wcstexas.com/safety/environmental/> (Accessed 23 May 2022)

WCS. “Annual/Semi-Annual Radiological Environmental Monitoring Plan Report for January-December of 2014.” ADAMS Accession No. ML16330A085. Email communication (March 30) to Charles Maguire, Texas Commission on Environmental Quality. Andrews, Texas: Waste Control Specialists. 2015.

WIPP. “Waste Panels & Capacity.” Carlsbad, New Mexico: U.S. Department of Energy, Waste Isolation Pilot Plant. 2019a. <https://wipp.energy.gov/waste-panels-and-capacity.asp> (Accessed 1 June 2019)

WIPP. “WIPP Site.” Carlsbad, New Mexico: U.S. Department of Energy, Waste Isolation Pilot Plant. 2019b. <http://wipp.energy.gov/wipp-site.asp> (Accessed 1 June 2019)

WIPP. “About Us.” Carlsbad, New Mexico: U.S. Department of Energy, Waste Isolation Pilot Plant. 2019c. <http://wipp.energy.gov/about-us.asp> (Accessed 1 June 2019)

Xcel Energy. “About Power for the Plains.” Xcel Energy. 2019a. <https://www.powerfortheplains.com/About> (Accessed 2 June 2019)

Xcel Energy. “Power for the Plains SE New Mexico.” Map. Xcel Energy. 2019b. <https://www.powerfortheplains.com/staticfiles/microsites/powerfortheplains/files/NM-approve-NTC.pdf> (Accessed 2 June 2019)

Zhang, A., J. Lu, and J.W. Kim. “Detecting Mining-Induced Ground Deformation and Associated Hazards Using Spaceborne InSAR Techniques.” *Geomatics, Natural Hazards and Risk*. Vol. 9, No. 1. pp. 211–223. 2018.

6 MITIGATIONS

6.1 Introduction

This chapter summarizes mitigation measures that would reduce adverse impacts from the construction, operation, and decommissioning of the proposed Consolidated Interim Storage Facility (CISF) project.

Under Title 40 of the *Code of Federal Regulations* (CFR) 40 CFR 1508.20, the Council on Environmental Quality defines mitigation to include activities that

- avoid the impact altogether by not taking a certain action or parts of a certain action;
- minimize impacts by limiting the degree or magnitude of the action and its implementation;
- rectify the impact by repairing, rehabilitating, or restoring the affected environment;
- reduce or eliminate the impact over time by preservation and maintenance operations during the life of the action; and
- compensate for the impact by replacing or providing substitute resources or environments.

Mitigation measures are those actions or processes that could be implemented to control and minimize potential adverse impacts from construction and operation of the proposed CISF project. Potential mitigation measures can include general best management practices (BMPs) and more site-specific management actions.

BMPs are processes, techniques, procedures, or considerations that can be used to effectively avoid or reduce potential environmental impacts. While BMPs are not regulatory requirements, they can overlap with and support such requirements. BMPs will not replace any U.S. Nuclear Regulatory Commission (NRC) requirements or other Federal, State, or local regulations.

Management actions are active measures that an applicant specifically implements to reduce potential adverse impacts to a specific resource area. These actions include compliance with applicable government agency stipulations or specific guidance, coordination with governmental agencies or interested parties, and monitoring of relevant ongoing and future activities. If appropriate, corrective actions could be implemented to limit the degree or magnitude of a specific action leading to an adverse impact (reducing or eliminating the impact over time by preservation and maintenance operations) and repairing, rehabilitating, or restoring the affected environment. The applicant may also minimize potential adverse impacts by implementing specific management actions, such as programs, procedures, and controls for monitoring, measuring, and documenting specific goals or targets and, if appropriate, instituting corrective actions. The management actions may be established through standard operating procedures that appropriate local, State, and Federal agencies (including NRC) review and approve. The NRC may also establish requirements for management actions by identifying license conditions. These conditions are written specifically into the NRC license and then become commitments that are enforced through periodic NRC inspections.

The mitigation measures that Holtec proposed to reduce and minimize adverse environmental impacts at the proposed CISF project are summarized in this Environmental Impact Statement (EIS) in Section 6.2 and Table 6.3-1. Based on the potential impacts identified in Chapter 4 of this EIS, the NRC staff have identified additional potential mitigation measures for the proposed CISF project. These mitigation measures are summarized in EIS Section 6.3 and Table 6.3-2. The proposed mitigation measures provided in this chapter do not include environmental monitoring activities. Environmental monitoring activities are described in EIS Chapter 7.

6.2 Mitigation Measures Holtec Proposed

Holtec identified mitigation measures in its license application (Holtec, 2020a,b), as well as in response to the NRC staff's requests for additional information (RAIs) (Holtec, 2021, 2019). EIS Table 6.3-1 lists the mitigation measures that Holtec has committed to for each resource area. Because Holtec committed to these, they were included as appropriate in the resource area impact determinations in EIS Chapter 4.

6.3 Potential Mitigation Measures the NRC Identified

The NRC staff have reviewed the mitigation measures that Holtec proposed and identified additional mitigation measures that could potentially reduce impacts (EIS Table 6.3-2). The NRC has the authority to address unique site-specific characteristics by identifying license conditions, based on conclusions reached in the safety and environmental reviews. These license conditions could include additional mitigation measures, such as modifications to required monitoring programs. While the NRC cannot impose mitigation outside its regulatory authority under the Atomic Energy Act, the NRC staff have identified mitigation measures in EIS Table 6.3-2 that could potentially reduce the impacts of the proposed CISF project. These additional mitigation measures are not requirements being imposed upon Holtec. For the purpose of the National Environmental Policy Act, and consistent with 10 CFR 51.71(d) and 51.80(a), the NRC is disclosing measures that could potentially reduce or avoid environmental impacts of the proposed project. Because Holtec has not committed to these, they are not credited in the resource area impact determinations in EIS Chapter 4.

Table 6.3-1 Summary of Mitigation Measures Holtec Proposed

Resource Area	Activity	Proposed Mitigation Measures
Land Use	Land Disturbance	Restore and re-seed disturbed areas as soon as practicable with an approved seed mix designed to stabilize soils from erosion and reduce the potential for exotic invasive plants. Use common corridors when locating pipelines and utilities. Coordinate with Intrepid to relocate the existing potable water pipeline so that it would not interfere with construction and operation activities. Minimize the construction footprint to the extent practicable. Stabilize disturbed areas with natural and low-water maintenance landscaping. Protect undisturbed areas with silt fencing and straw bales, as appropriate.

Table 6.3-1	Summary of Mitigation Measures Holtec Proposed	
Resource Area	**Activity**	**Proposed Mitigation Measures**
	Access Restrictions	Construct security fencing around the 114.5-hectares (ha) [283-acres (ac)] protected area containing the storage pads and cask-handling building to restrict and control access. Maintain an adequate buffer between operational and construction areas to ensure that construction of additional spent nuclear fuel (SNF) storage pads would not adversely impact operations. Prohibit grazing on the 133.5-ha [330-ac] storage and operations area. Designate the proposed project area as "Off Limits" to prevent accidental public use, and post "No Trespassing" along the boundary of the property in accordance with State and Federal requirements for posting real estate property.
Transportation	Transportation Safety	Use of an onsite concrete batch plant would limit the shipment of large premanufactured concrete structures during construction. Staged construction and operations disperses impacts to traffic and SNF shipments over a 20-year period. Use of rail and constructed rail spur for SNF shipments reduces the number of shipments that would be needed and the risk of accidents.

Table 6.3-1 Summary of Mitigation Measures Holtec Proposed		
Resource Area	**Activity**	**Proposed Mitigation Measures**
Geology and Soils	Soil Disturbance, Contamination, and Mineral Extraction	Utilize materials from higher portions of the proposed site for fill at the lower portions of the site, to the extent possible, and reuse excavated materials whenever possible. Use earthen berms, dikes, and sediment fences to limit suspended solids in runoff. Stabilize cleared areas not covered by pavement or structures as soon as practicable. Stabilize drainage culverts and ditches by lining them with rock aggregate/riprap. Create berms with silt fencing/straw bales to reduce flow velocity and prohibit scouring. Implement a Spill Prevention, Control, and Countermeasures (SPCC) Plan to minimize the impacts of potential soil hazardous material contamination. Conduct routine monitoring and inspections of canisters and SNF storage systems during all phases to verify that the proposed Consolidated Interim Storage Facility (CISF) project is performing as expected. Construct above-ground storage tanks with secondary containment structures (e.g., concrete berms and floor sumps) to stop fluids from spilling on the ground immediately around the tank or fuel pump, or potentially impacting downstream environments.
Surface Water Resources	Erosion, Runoff, and Sedimentation	Control impacts to water quality during construction through compliance with the Construction General Permit requirements and a Storm Water Pollution Prevention Plan (SWPPP). Use silt fencing and/or sediment traps. Utilizing berms around all above ground diesel storage tanks. Disturbed areas and soil stockpiles would be stabilized with native grass species, pavement, and crushed stone to control erosion, and eroded areas would be repaired.
	Spills and Leaks	Maintenance of construction equipment to prevent leaks of oil, greases, or hydraulic fluids. Construct above-ground storage tanks with secondary containment structures (e.g., concrete berms and floor sumps) to stop fluids from spilling on the ground immediately around the tank or fuel pump, or potentially impacting downstream environments.

Table 6.3-1 Summary of Mitigation Measures Holtec Proposed		
Resource Area	**Activity**	**Proposed Mitigation Measures**
Groundwater Resources	Water Use	Use an environmental monitoring program to establish a baseline groundwater model. Immediate investigation and corrective action in the case of radioactive contaminant detection.
	Spills and Leaks	Obtain construction and industrial National Pollutant Discharge Elimination System (NPDES) permits, which require reporting of spills of petroleum products or hazardous chemicals. Develop and implement spill-response procedures to correct and remediate accidental spills. Report all regulated substance spills that occur at the site to the New Mexico Environment Department (NMED), and remediate in accordance with State requirements.

Table 6.3-1	Summary of Mitigation Measures Holtec Proposed	
Resource Area	**Activity**	**Proposed Mitigation Measures**
Ecology	Reduce Human Disturbances	Minimize the construction footprint to the extent practicable. Control invasive plant species and noxious weeds. Disturbed areas and soil stockpiles would be stabilized with native grass species, pavement, and crushed stone to control erosion, and eroded areas would be repaired. Compliance with a SWPPP as part of the NPDES permitting process would reduce the potential impacts to surface-water runoff receptors (i.e., playas). Monitor for and repair leaks and spills of oil and hazardous material from operating equipment. Minimize fugitive dust that may settle on forage and edible vegetation (rendering it undesirable to animals). Conduct most construction activities during daylight hours, limiting the disruption of nocturnal animals. Comply with the requirements of a U.S. Bureau of Land Management (BLM) permit, including BLM-required mitigation measures, and more thorough biological survey. Fence the protected area of the proposed CISF project to prevent large wildlife such as antelope and cattle from accessing the proposed CISF project. Down-shield security lighting for all ground-level facilities and equipment to keep light within the boundaries of the proposed CISF project during the operations stage, helping to minimize the potential for impacts on wildlife. Construct above-ground storage tanks with secondary containment structures (e.g., concrete berms and floor sumps) to stop fluids from spilling on the ground immediately around the tank or fuel pump, or potentially impacting downstream environments. Return the landscape to baseline contours, which would reduce the ecological impact by removing buildings and associated infrastructure.
Air Quality	Fugitive Dust	Suppress dust by spraying water or other techniques.
Noise	Exposure of Workers and Public to Noise	Use sound-abatement controls on operating equipment and facilities, such as locating process machinery inside, and restrict work to daytime hours (7 a.m. to 8 p.m.) in areas where the annoyance noise threshold could be exceeded at nearby residences.

Table 6.3-1 Summary of Mitigation Measures Holtec Proposed		
Resource Area	**Activity**	**Proposed Mitigation Measures**
Historic and Cultural Resources	Disturbance of Prehistoric Archaeological Sites and Sites Eligible for Listing on the National Register of Historic Places (NRHP)	Cease any work upon the inadvertent discovery of human remains during any phase of the project, as required by the Native American Graves Protection and Repatriation Act and the New Mexico Cultural Properties Act, until a professional archaeologist can evaluate the resources. Use existing roads, to the maximum extent feasible, to avoid additional surface disturbance. Apply erosion mitigation methods on disturbed lands, soil stockpiles, and unpaved roads.
Visual and Scenic	Potential Visual Intrusions in the Existing Landscape Character	Suppress dust along access roads. Down-shield all security lights at the CISF. Landscape using native plants. Re-vegetate and cover bare areas during construction. Minimize the removal of natural barriers, screens, and buffers.
Socioeconomics	Effects on Surrounding Communities	Preferentially source the labor force from the surrounding region to reduce any burden on public services and community infrastructure (e.g., housing, schools) in nearby towns.
Public and Occupational Health and Safety	Effects From Facility Construction and Operation	Both occupational and public radiation exposures would be monitored and controlled by Holtec following a radiation protection program that addresses the NRC safety requirements in 10 CFR 72 and 20. Transfer facilities and operations were designed to limit direct radiation exposure to workers by limiting direct exposure to the unshielded canister during transfer. Facility layout incorporates a setback distance of 400 meters (m) [1,300 feet (ft)] from the proposed storage pads to the controlled area fence to limit exposures to members of the public at the facility boundary. Inspect incoming transportation casks to ensure acceptance criteria are met. Return of canisters that do not meet acceptance criteria adds confidence that canisters stored at the CISF meet safety specifications.

Table 6.3-1	Summary of Mitigation Measures Holtec Proposed	
Resource Area	**Activity**	**Proposed Mitigation Measures**
Waste Management	Disposal Capacity	All waste will be stored in designated locations of the facility until administrative limits are reached, at which time waste would be shipped offsite to the appropriate licensed treatment, storage, and/or disposal facility.
	Waste Reduction	No waste will be disposed onsite at the proposed CISF. All waste will be stored in designated locations of the facility until administrative limits are reached, at which time waste would be shipped offsite to the appropriate, licensed treatment, storage, and/or disposal facility. Sanitary wastes generated during construction of the proposed CISF will be contained with an adequate number of portable systems until installed plant sanitary facilities are available. Administrative procedures will be implemented for the collection, temporary storage, processing, and disposal of categorized solid waste, in accordance with regulatory requirements. Recycling will be maximized to the extent possible. All hazardous wastes generated would be identified, stored, and disposed of in accordance with State and Federal requirements applicable to Conditionally Exempt Small Quantity Generators (CESQGs). Any contaminated storage casks would be decontaminated to levels at or below applicable NRC limits for unrestricted use.

Table 6.3-2	Summary of Additional Mitigation Measures the NRC Identified	
Resource Area	**Activity**	**Proposed Mitigation Measures**
Land Use	Land Disturbance	No additional mitigations identified.
Transportation	Transportation Safety	Apply a phased approach to site reclamation to disperse waste shipments over a longer period to reduce potential transportation impacts. Ship SNF using railcars that comply with the Association of American Railroads S-2043 standard. Ship SNF using dedicated trains.
Geology and Soils	Mineral Extraction	No additional mitigations identified.
Surface Water Resources	Spills and Leaks	No additional mitigations identified.
Groundwater Resources	Contamination	No additional mitigations identified.

Table 6.3-2	Summary of Additional Mitigation Measures the NRC Identified	
Resource Area	**Activity**	**Proposed Mitigation Measures**
Ecology	Reduce Human Disturbance	Conduct a more thorough biological survey of the proposed project area, and consult with New Mexico Department of Game and Fish (NMDGF) to develop an ecological baseline survey plan. Establish a buffer zone of 200 meters (m) [656 feet (ft)] around Laguna Gatuna that project activities would not disturb. Follow the New Mexico Department of Game of Fish (NMDGF) recommendation that construction activities occur outside the general bird-nesting season between March 1 and September 1 Follow the U.S. Fish and Wildlife Service (FWS) recommendation that construction activities avoid active bird nests. Follow the FWS Nationwide Standard Conservation Measures and BLM's recommended disturbance-free dates and spatial buffers to protect raptors and songbirds. Construct and abandon power lines following the practices the Avian Power Line Interaction Committee (APLIC, 2006) provided to prevent or minimize risk of avian collision or electrocution of raptors. Follow the NMDGF trenching guidelines to limit hazards to wildlife from open trenches and steep-sided pits. Construct wildlife exclusion fencing around the areas under active construction to minimize impediments to game and avian movement that follow site-specific NMDGF-provided fence designs. Follow FWS recommendations to educate all employees, contractors, and/or site visitors of relevant rules and regulations that protect wildlife. Develop a wildlife inspection plan to identify animals that may be present at the proposed Consolidated Interim Storage Facility (CISF) project and take action to remove animals found within the storage and operations area, if present. Consult with U.S. Bureau of Land Management (BLM) and NMDGF to determine appropriate mitigation measures to discourage wildlife use and habitation of the proposed project area, particularly near cask vents.

Table 6.3-2 Summary of Additional Mitigation Measures the NRC Identified		
Resource Area	**Activity**	**Proposed Mitigation Measures**
Air Quality	Fugitive Dust and Combustion Emissions from Construction Equipment and Mobile Sources	Apply erosion mitigation methods on disturbed lands, soil stockpiles, and unpaved roads. Limit access to construction sites and staging areas to authorized vehicles only, through designated roads. Pave or put gravel on dirt roads and parking lots, if appropriate. Develop and implement a fugitive dust-control plan. Cover trucks carrying soil and debris to reduce dust emissions from the back of trucks. Limit dust-generating activities during unfavorable weather conditions (e.g., high winds). Perform road maintenance (e.g., promptly remove earthen material on paved roads). Set appropriate speed limits throughout the proposed site. Clean vehicles and construction equipment to remove dirt, when appropriate. Ensure vehicle and equipment exit construction areas through designated and treated access points. Coordinate construction and transportation activities to reduce maximum dust levels. Train workers to comply with the speed limit, use good engineering practices, minimize disturbed areas, and employ other best management practices (BMPs), as appropriate. Minimize unnecessary travel. Develop and implement a construction traffic and parking management plan. Limit the numbers of hours in a day that effluent-generating activities can be conducted. Implement fuel-saving practices, such as minimizing vehicle and equipment idle time or utilizing a no-idle rule. If utilizing fossil-fuel vehicles, use those that meet the latest emission standards. Utilize newer, cleaner-running equipment (e.g., use construction equipment engines with the best available emissions control technologies). Ensure that equipment (e.g., construction equipment, generators) are properly tuned and maintained. Burn low-sulfur fuels in all diesel engines and generators. Consider using electric vehicles or other alternative fuels to reduce emissions of the National Ambient Air Quality Standards (NAAQS) pollutants and greenhouse gases. Encourage employee carpooling.

Table 6.3-2 Summary of Additional Mitigation Measures the NRC Identified		
Resource Area	**Activity**	**Proposed Mitigation Measures**
Noise	Exposure of Workers and the Public to Noise	Maintain noise levels in work areas to below Occupational Safety and Health Administration (OSHA) regulatory limits. Impose speed limits to reduce vehicle noise. Avoid construction activities during the night. Use personal hearing protection for workers in high noise areas.
Historic and Cultural Resources	Disturbance of Prehistoric Archaeological Sites and Sites Eligible for Listing on the National Register of Historic Places (NRHP)	Prepare an inadvertent discovery plan to manage Holtec's activities, in the event of a discovery of cultural resources during any phase of the project. Train all workers at the proposed Holtec CISF, including all contractors, in the protocols of the inadvertent discovery plan and deterrence of artifact hunting and vandalism, and document these training records. Cease work if paleontological finds are identified during construction and employ a paleontology monitor to oversee construction activities as needed.
Visual and Scenic	Potential Visual Intrusions in the Existing Landscape Character	Follow the land use mitigation measures for land disturbance activities, which will also minimize impacts to vegetation and wildlife. Reclaim disturbed areas, and remove debris after construction is complete. Remove and reclaim roads and structures after operations are complete. Select building materials and paint that complement the natural environment.
Socioeconomics	Effects on Surrounding Communities	Coordinate emergency response activities with local authorities, fire departments, medical facilities, and other emergency services before operations begin.
Public and Occupational and Health and Safety	Effects from Facility Construction and Operation	No additional mitigations identified.

Table 6.3-2	Summary of Additional Mitigation Measures the NRC Identified	
Resource Area	**Activity**	**Proposed Mitigation Measures**
Waste Management	Disposal Capacity	Use decontamination techniques that reduce waste generation. Institute preventive maintenance and inventory management programs to minimize waste from breakdowns and overstocking. Develop a standard operating procedure to maximize the amount of recycling; minimize the production of hazardous waste; and for the collection, sorting, and temporary storage of all solid, nonhazardous solid waste. Salvage extra materials and use them for other construction activities. Avoid using hazardous materials when possible. Store and properly label hazardous chemicals in an appropriate area away from byproduct material to prevent any potential release. Ensure that equipment is available to respond to spills, and identify the location of such equipment. Inspect and replace worn or damaged components.

6.4 References

10 CFR Part 20. *Code of Federal Regulations*, Title 10, *Energy*, Part 20. "Standards for Protection Against Radiation." Washington, DC: U.S. Government Publishing Office.

10 CFR 51.71(d). *Code of Federal Regulations*, Title 10, *Energy*, § 51.71. "Draft environmental impact statement—contents." Washington, DC: U.S. Government Publishing Office.

10 CFR 51.80(a). *Code of Federal Regulations*, Title 10, *Energy*, § 51.80. "Draft environmental impact statement—materials license." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 72. *Code of Federal Regulations*, Title 10, *Energy*, Part 72. "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste." Washington, DC: U.S. Government Publishing Office.

40 CFR 1508.20. *Code of Federal Regulations*, Title 40, *Protection of the Environment*, § 1508.20. "Mitigation." Washington, DC: U.S. Government Printing Office.

Avian Power Line Interaction Committee. "Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006." ADAMS Accession No. ML12243A391. Washington, DC: Edison Electric Institute, and Sacramento, California: Avian Power Line Interaction Committee and the California Energy Commission. 2006.

Holtec. "Responses to Request for Additional Information. ADAMS Accession No. ML21228A203. Marlton, New Jersey: Holtec International. 2021.

Holtec. "Environmental Report-HI-STORE Consolidated Interim Storage Facility, Rev 8." ADAMS Accession No. ML20295A485. Marlton, New Jersey: Holtec International. 2020a.

Holtec. "Safety Analysis Report-HI-STORE Consolidated Interim Storage Facility." ADAMS Accession No. ML19318G865. Marlton, New Jersey: Holtec International. 2020b.

Holtec. "Responses to Request for Additional Information." ADAMS Accession No. ML19081A075. Marlton, New Jersey: Holtec International. 2019.

7 ENVIRONMENTAL MEASURES AND MONITORING PROGRAMS

7.1 Introduction

This chapter describes Holtec's proposed monitoring programs to demonstrate compliance with regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20 and 10 CFR Part 72 regarding radiological effluent release limits, public and occupational dose limits, and reporting. Monitoring programs provide data on operational and environmental conditions so that prompt corrective actions can be implemented when adverse conditions are detected. Thus, these programs help to limit potential environmental impacts at Independent Spent Fuel Storage Installation (ISFSI) facilities and the surrounding areas.

Required monitoring programs or those proposed in the license application can be modified to address unique site-specific characteristics by adding license conditions to address findings from the U.S. Nuclear Regulatory Commission (NRC) safety and environmental reviews. The NRC staff are conducting the safety review of the proposed Consolidated Interim Storage Facility (CISF) project, which will be documented in a Safety Evaluation Report (SER), and any license conditions resulting from the safety review that are relevant to the environmental impacts of the proposed action would be discussed in the final environmental impact statement (EIS). The description of the proposed monitoring programs for the proposed CISF project is organized as follows:

- Radiological Monitoring and Reporting (Section 7.2)
- Other Monitoring (Section 7.3)

The management of spills and leaks is not part of the routine environmental monitoring program described herein. Rather, spills and leaks, including the design of the infrastructure to detect leaks, are described in the NRC SER.

Pursuant to 10 CFR Part 20, the NRC requires that licensees conduct surveys necessary to demonstrate compliance and to demonstrate that the amount of radioactive material present in effluent from the proposed facility is kept as low as reasonably achievable (ALARA). Specifically, the NRC, in 10 CFR 20.1301, requires each licensee to conduct operations so that the total effective dose equivalent (TEDE) to individual members of the public from the licensed operation does not exceed 0.1 rem in a year, exclusive of the dose contributions from background radiation. The dose in any unrestricted area from external sources may not exceed 0.002 rem in any 1 hour. In addition, pursuant to 10 CFR Part 72, the NRC requires that licensees submit annual reports specifying the quantities of the principal radionuclides released to unrestricted areas and other information needed to estimate the annual radiation dose to the public from operations.

7.2 Radiological Monitoring and Reporting

Radiation monitoring requirements are met by using area radiation monitors in the cask transfer building for monitoring general area dose rates from the casks and canisters during canister transfer operations, and with thermoluminescent dosimeters (TLDs) along the perimeters of the restricted and controlled areas (Holtec, 2020a). TLDs provide a passive means for continuous monitoring of radiation levels and provide a basis for assessing the potential impact on the environment.

Monitoring is expected to include the following:

- Continuous radiation monitoring at the project boundary fence (via TLDs)
- Continuous monitoring (via TLDs) on the outside of all buildings
- Continuous monitoring (via TLDs) at strategic work locations, as backup for personnel radiation exposure monitoring
- Each TLD location will have a backup (i.e., two TLDs) with quarterly retrieval and processing
- Local radiation monitors with audible alarms to be placed in the canister transfer building

The radiological environmental monitoring program (REMP) includes the collection of data during preoperational years, to establish baseline radiological information that would be used in determining and evaluating potential impacts from operation of the proposed CISF project on the local environment. The REMP would be initiated at least 1 year prior to the operations stage. Radionuclides would be identified using technically appropriate analytical instruments (e.g., liquid scintillation or gamma/alpha spectrometry). Data collected during the operational years would be statistically compared to the baseline preoperational data generated. These comparisons would provide a means of assessing the magnitude (if any) of potential radiological impacts on members of the public and demonstrate compliance with applicable radiation protection standards (Holtec, 2020a,b).

Revisions to the REMP may be necessary and appropriate to ensure reliable sampling and collection of environmental data. Any revisions to the program would be documented and reported to the NRC and other appropriate regulatory agencies, as required (Holtec, 2020a).

As previously stated, compliance would be demonstrated through project boundary monitoring and environmental sampling data. If a potential release should occur, then routine operational environmental data would be used to assess the extent of the release. Compliance with regulations in 10 CFR 20.1301 would be demonstrated using a calculation of the dose to the individual who is likely to receive the highest dose, in accordance with regulations in 10 CFR 20.1302(b)(1). Compliance with 10 CFR 72.104 and 10 CFR 72.106 would be demonstrated by the annual reporting required by 10 CFR 72.44(d)(3) (Holtec, 2020a).

Reporting procedures would comply with the requirements of 10 CFR 72.44(d)(3). Reports of the concentrations of any radionuclides released to unrestricted areas would be provided and would include the Minimum Detectable Concentration (MDC) for the analysis. Each year, Holtec would submit a summary report of the environmental sampling program to the NRC, including all associated data, as required by 10 CFR 72.44(d)(3). The report would include the types, numbers, and frequencies of environmental measurements and the identities and activity concentrations of facility-related nuclides found in environmental samples. The report would also include the MDC for the analyses (Holtec, 2020a).

7.3 Other Monitoring

External radiological exposure for the public from the operations stage of the proposed CISF project would be from the SNF storage pad through direct shine (i.e., direct radiation). Because the canisters are sealed and welded shut, there is no radiological exposure air pathway.

Continuous air monitors, if deemed necessary, would be located in the exhaust of the cask transfer building and also available as portable air samplers (Holtec, 2020b). There is no requirement for liquid monitoring, because there is also no potential for a liquid pathway and because there is no liquid component of SNF within the casks. The casks are sealed to prevent liquids from contacting the SNF assemblies (Holtec, 2020a,b).

Surface Water and Groundwater Monitoring

Since no pathways exist for exposures due to liquid effluents, administrative investigation and action levels are established for monitoring surface-water runoff as an additional step in the radiation-control process. However, at the proposed project area, the surface-water drainage paths are normally dry; therefore, it is not possible to monitor runoff on a continuous basis (Holtec, 2020a).

Detection of radionuclide impacts to surface-water runoff would be conducted in a two-step process. First, all casks would be checked for surface contamination during weekly surveys, and all storage pads would be checked for surface contamination during monthly surveys. Second, soil samples would be collected on a quarterly basis at the culverts leading to the proposed facility outfalls (Holtec 2020a,b).

Onsite sewage would be routed to holding tanks, which are periodically pumped; the sewage would then be sent offsite for disposal in a publicly owned treatment works. Each holding tank would be periodically sampled (prior to pumping) and analyzed for relevant radionuclides (Holtec, 2020a). In addition, there is a water pipeline within the proposed project area that would supply water for the facility. However, due to the lack of liquid effluent, there is no pathway for contamination during the operations stage that could contaminate this water supply (Holtec, 2020a).

Soil and Sediment Monitoring

Quarterly soil sampling conducted in surface-water drainage areas coupled with weekly and monthly radiological surveys on the casks and storage pad would be conducted (Holtec, 2020a).

Physiochemical Monitoring

Chemicals are not anticipated to be stored at the proposed CISF; therefore, no physicochemical monitoring would be required.

Ecological Monitoring

Ecological monitoring would not be required, given that the U.S. Fish and Wildlife Service has not reported any threatened or endangered species at the proposed project area that would be impacted during the construction and operation of the proposed CISF project.

7.4 References

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20. “Standards for Protection Against Radiation.” Washington, DC: U.S. Government Printing Office.

10 CFR 20.1301. Code of Federal Regulations, Title 10, *Energy*, § 20.1301. “Dose limits for individual members of the public.” Washington, DC: U.S. Government Printing Office.

10 CFR 20.1302(b)(1). Code of Federal Regulations, Title 10, *Energy*, § 20.1302. "Compliance with dose limits for individual members of the public." Washington, DC: U.S. Government Printing Office.

10 CFR Part 72. Code of Federal Regulations, Title 10, *Energy*, Part 72. "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste." Washington, DC: U.S. Government Publishing Office.

10 CFR 72.104. Code of Federal Regulations, Title 10, *Energy*, § 72.104. "Criteria for radioactive materials in effluents and direct radiation from an ISFSI or MRS." Washington, DC: U.S. Government Printing Office.

10 CFR 72.106. Code of Federal Regulations, Title 10, *Energy*, § 72.106. "Controlled area of an ISFSI or MRS." Washington, DC: U.S. Government Printing Office.

10 CFR 72.44(d)(3). Code of Federal Regulations, Title 10, *Energy*, § 72.44. "License conditions." Washington, DC: U.S. Government Printing Office.

Holtec. "Environmental Report-HI-STORE Consolidated Interim Storage Facility, Rev. 8." ADAMS Accession No. ML20295A485. Marlton, New Jersey: Holtec International. 2020a.

Holtec. "Safety Analysis Report-HI-STORE Consolidated Interim Storage Facility." ADAMS Accession No. ML20295A428. Marlton, New Jersey: Holtec International. 2020b.

8 COSTS AND BENEFITS OF THE PROPOSED CISF AND THE NO-ACTION ALTERNATIVE

This chapter presents the cost-benefit analysis for the proposed Consolidated Interim Storage Facility (CISF) and the No-Action alternative. Section 8.1 provides an introduction, Section 8.2 identifies high-level assumptions associated with the overall analysis, Section 8.3 describes the proposed CISF's costs and benefits, Section 8.4 describes the No-Action alternative's costs and benefits, and Section 8.5 compares the costs and benefits of the proposed CISF to those of the No-Action alternative.

8.1 Introduction

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 51.71(d), this environmental impact statement (EIS) includes a consideration of the economic, technical, and other benefits and costs of the proposed action and alternatives. The analysis in this chapter considers both environmental and economic costs and benefits. The purpose of the cost-benefit analysis is not to exhaustively identify and quantify all of the potential costs and benefits, but instead, focus on those benefits and costs of such magnitude or importance that their inclusion in this analysis can inform the decision-making process (e.g., distinguish the proposed action from the No-Action alternative). The analysis in this chapter was informed by the Environmental Review Guidance for Licensing Actions Associated with the Office of Nuclear Material Safety and Safeguards (NMSS) Programs (NUREG–1748). As described in NUREG–1748 (NRC, 2003), the cost-benefit analysis provides input to determine the relative merits of various alternatives; however, the U.S. Nuclear Regulatory Commission (NRC) will ultimately base its decision on the protection of public health and safety.

The NRC staff generated the cost estimates in the EIS Tables 8.3-3, 8.4-1, 8.5-1, and 8.5-2 and EIS Appendix C provides additional details associated with generating the cost estimates in the tables.

8.2 Assumptions

Benefits and costs in this analysis focus on the societal perspective, as opposed to the perspective of any particular individual, company, or industry. As described in EIS Section 2.2.1, the environmental analysis considers both the proposed action (i.e., Phase 1) and the subsequent license amendments (i.e., Phases 2-20), which are not part of the current proposed action, assuming NRC approved such amendments. Similarly, this cost-benefit analysis will also consider both the proposed action (i.e., Phase 1) as well as possible subsequent expansion. When analyzing possible subsequent expansion, the benefit cost analysis includes all phases (Phases 1-20) rather than just the expansion phases (i.e., Phases 2-20) because facilities and infrastructure completed as part of the proposed action (Phase 1) and their associated costs are integral to the additional phases.

As described in EIS Section 2.2.1, the proposed CISF would serve as an interim storage facility until the spent nuclear fuel (SNF) can be shipped to a permanent geologic repository or until the end of the 40-year license term. Therefore, transportation would take place in two campaigns. The first campaign would be transporting the SNF from the nuclear power plants and Independent Spent Fuel Storage Installation (ISFSIs) to the proposed CISF, and the second campaign would be transporting the SNF from the proposed CISF to the geologic repository. The No-Action alternative (i.e., the NRC would not grant a license for the proposed CISF) would include only a single campaign; specifically, transporting the SNF from nuclear power plants and ISFSIs to a geologic repository.

As described in EIS Section 5.1.1.3, the cumulative impacts analysis considers the potential presence of a second CISF as a reasonably foreseeable future action because the ISP CISF has been licensed, but not yet constructed. Therefore, the cost-benefit analysis will also consider the potential presence of a second CISF as it pertains to impacts (i.e., changes) to the costs and benefits associated with the proposed Holtec CISF project.

As described in EIS Section 2.2.1, the license term for the proposed CISF project is 40 years. Therefore, cost estimates are discounted so that costs incurred over the 40-year license term can be compared to today's costs (i.e., present values), are comparable at a single point in time, and are expressed in constant 2019 dollars. Discounting reduces future values in order to reflect the time value of money. In other words, costs and benefits have more value if they are experienced sooner rather than later. The higher the discount rate, the lower the corresponding present value of future cash flows. Consistent with the Office of Management and Budget guidance (OMB, 2003), this cost-benefit analysis uses discount rates of 3 and 7 percent.

The NRC staff's evaluation of issues related to Holtec's financial qualifications and decommissioning funding assurance will be addressed in the NRC's Safety Evaluation Report (SER) rather than this EIS.

8.3 Costs and Benefits of the Proposed CISF

8.3.1 Environmental Costs and Benefits of the Proposed CISF

In EIS Chapter 4, the NRC staff analyze the potential impacts for the proposed CISF, which includes both negative and positive environmental impacts. Negative environmental impacts are classified as environmental costs. In contrast, positive environmental impacts are classified as environmental benefits. EIS Tables 8.3-1 and 8.3-2 define examples of environmental costs and environmental benefits of the proposed CISF, respectively. As indicated in EIS Table 8.3-1, the Public and Occupational Health assessment considered both radiological and non-radiological impacts. For example, nonfatal cancer risk impacts are addressed in EIS Sections 3.12, 4.3.1.2.2, and 4.13).

Table 8.3-1 Examples of the Environmental Costs of the Proposed CISF

Resource	Description	Impact Assessment*
Land Use	For the duration of the license term, the proposed CISF would use approximately 133.5 hectares (ha) [330 acres (ac)] and unavailable for other uses such as grazing and recreation.	SMALL
Transportation	Vehicles transporting workers and construction materials would increase local traffic counts.	SMALL
Geology and Soils	Surface soils would be disturbed, primarily during (i) construction of the proposed Consolidated Interim Storage Facility (CISF) and (ii) reclamation, which would include replacing the topsoil.	SMALL
Groundwater	The proposed CISF consumptively uses groundwater for activities like operating the concrete batch plant.	SMALL

Table 8.3-1	Examples of the Environmental Costs of the Proposed CISF	
Resource	**Description**	**Impact Assessment***
Vegetation	Land the proposed CISF disturbs results in short-term loss of vegetation. Moderate impact for the operation and decommissioning stages until vegetation is reestablished.	SMALL to MODERATE
Wildlife	Project-related traffic could cause wildlife injuries and fatalities. Wildlife could also be temporarily displaced by CISF project traffic and noise.	SMALL
Air Quality	The proposed CISF generates air effluents like fugitive dust and combustion emissions, which degrade air quality.	SMALL
Historic and Cultural Resources	The U.S. Nuclear Regulatory Commission (NRC) staff does not recommend any sites within the direct or indirect area of potential effect (APE) as eligible for listing in the National Register of Historic Places (NRHP); therefore, historic and cultural resources would not be adversely impacted by the proposed project.	SMALL
Public and Occupational Health	Limited potential exists for radiological and non-radiological impacts.	SMALL
Waste Management	The proposed CISF project impacts the available waste disposal capacity in the region because of the volumes that would be disposed at permitted facilities. The waste management decommissioning impact is SMALL for the proposed action (Phase 1) and MODERATE for Phases 2-20 until a new landfill becomes available.	SMALL to MODERATE
*See EIS Table 2.4-1 for impact assessment by phases and stages.		

Table 8.3-2	Summary of the Environmental Benefits of the Proposed CISF	
Resource	**Description**	**Impact Assessment**
Socioeconomics	For the duration of the license term, the proposed CISF would provide a net or aggregate positive economic impact within the region.	SMALL to MODERATE and beneficial

8.3.2 Economic and Other Costs and Benefits of the Proposed CISF

8.3.2.1 Economic and Other Costs

Estimated costs for the proposed CISF include the following activities: constructing the proposed CISF, transporting the SNF from nuclear power plants and ISFSIs to the proposed CISF, operating and maintaining the proposed CISF, transporting the SNF from the proposed CISF to a permanent geologic repository, and decommissioning the proposed CISF.

EIS Table 8.3-3 contains the estimated costs the NRC staff generated for both the proposed action (Phase 1) and full build-out (Phases 1-20). In addition, the NRC staff generated two overall cost estimates for the proposed CISF based on two different scenarios: a lower CISF operations estimate (Scenario A), which is based on costs from currently decommissioning reactor sites and a higher CISF operations estimate (Scenario B) based on the costs the applicant identified. Changing the proposed CISF operating costs between lower and higher cost estimates would have more influence on the costs of Phase 1 compared to the full build-out

Table 8.3-3 Estimated Costs (millions of 2019 dollars) for the Proposed CISF for both Phase 1 and Full Build-out (Phases 1-20)				
Activity	**Phase 1**		**Full Build-out (Phases 1-20)**	
	Scenario A	**Scenario B**	**Scenario A**	**Scenario B**
CISF Construction	$234	$234	$2,198	$2,198
SNF Transport to CISF	$270	$270	$3,224	$3,224
CISF Operations and Maintenance	$179	$1,060	$179	$1,060
SNF Transport to a Repository	$270	$270	$3,006	$3,006
CISF Decommissioning	$25	$25	$496	$496
Total Cost*	$977	$1,858	$9,104	$9,985
3% Discounting†	$661	$1,152	$5,351	$5,842
7% Discounting†	$505	$773	$3,141	$3,408

*Due to rounding, total costs may appear slightly different than costs included in text
†Consistent with the Office of Management and Budget guidance (OMB, 2003), this cost benefit analysis uses discount rates of 3 and 7 percent. Source: Modified from Holtec, 2020. See EIS Appendix C, Section C–3 for details

(Phases 1-20) costs (EIS Table 8.3-3). For the proposed action (Phase 1) the total costs of Scenario A are approximately 50 percent less than those for Scenario B, whereas for the full build-out (Phases 1-20) the total costs increased about 10 percent for Scenario B over Scenario A. Details concerning the calculation of the EIS Table 8.3-3 cost estimates, including the discounting, are presented in Appendix C, Section C–3.

Discounting requires specifying when the various activities occur. EIS Table 8.3-4 contains the project schedule the NRC staff used to estimate the costs in EIS Table 8.3-3. With discounting, changing the timing of when an activity occurs also changes the estimated costs (i.e., the present values). Costs or benefits experienced closer to the present have more value than those experienced farther into the future. This means delaying or extending an activity results in lower estimated costs. From a discounting perspective, the estimated costs in EIS Table 8.3-3 are bounding because these costs are based on a project schedule prior to any delays.

A number of the activities in EIS Table 8.3-4 only occur for a short duration considering the 40-year license term. For the proposed action (Phase 1), CISF construction would last 2 years, and transporting SNF from nuclear power plants and ISFSIs to the proposed CISF would take 1 year. For each subsequent expansion phase, CISF construction would take 1 year, and transporting SNF from nuclear power plants and ISFSIs to the proposed CISF would take 1 year. However, operations and maintenance would occur over almost the entire license term of the proposed CISF. The applicant assumed that this cost would be the same, regardless of how much SNF was stored at the CISF (i.e., the estimated annual costs for this activity would be the same no matter how many phases were active during an individual project year). The NRC staff used two different estimated annual costs for the proposed CISF operations and maintenance because the applicant described two values for this activity, and there was a large differential (i.e., about six-fold or 600 percent) between these two values. The lower cost estimate (Scenario A) of $4,709,983 (2019 constant dollars) was based on the costs for this activity at currently decommissioned nuclear power plants (Holtec, 2018). The higher cost estimate (Scenario B) of $27,892,625 (2019 constant dollars) was based on applicant's project-

Table 8.3-4 Project Years when Activities Occur for the Proposed CISF for both Phase 1 and Full Build-out		
Activity	**Project Years when Activity Occurs***	
	Phase 1	**Full Build-out (Phase 1 to 20)**
CISF Construction	1 and 2	1 to 21
SNF Transportation from the Nuclear Power Plants and ISFSIs to CISF	3	3 to 22
CISF Operations and Maintenance	3 to 40	3 to 40
SNF Transportation from CISF to Repository	40	23 to 40
CISF Decommissioning	41	41

*Holtec specified the project years when the following activities occur: CISF construction, SNF transportation from nuclear power plants and ISFSIs to the CISF, and CISF operations and maintenance. For purposes of discounting the cost estimates, the NRC staff specified when the following activities occur: SNF transportation from the CISF to a repository and CISF decommissioning.
Source: Holtec, 2020

specific estimate (Holtec, 2020). The higher estimate provides an upper limit for the operation and maintenance costs in this EIS. For the proposed action (Phase 1), the NRC staff assumed that the proposed CISF would be utilized for the full license term, meaning that transporting SNF to a repository would occur during project year 40. For estimating the costs for full build-out (Phases 1-20), the NRC staff assumed that transporting SNF to a repository would occur during project years 23 to 40, which represents an early baseline schedule for this activity. This would bound the cost analysis from a discounting perspective because delaying removal of all the material on site to the end of the license would result in lower estimated costs. For both the proposed action (Phase 1) and full build-out (Phases 1-20), the NRC staff assumed that decommissioning would take 1 year and would occur immediately after transporting the SNF to a repository was complete. The NRC staff chose a 1- year time frame for decommissioning because this would bound the estimated costs for this activity from a discounting perspective.

The following are other cost considerations for the proposed CISF that have not been incorporated into EIS Table 8.3-3.

Presence of A Second CISF

As noted in EIS Section 5.1.1.3, the NRC has issued a license for a second CISF (the ISP CISF), so construction and operation of the facility is a reasonably foreseeable future action. As described in EIS Section 8.2, consideration of a second CISF in this EIS would be limited to the potential impacts on the costs and benefits of the proposed Holtec CISF. The presence of a second CISF could impact the costs for the proposed Holtec CISF in several ways.

A second CISF could delay the schedule for transporting SNF to the proposed Holtec CISF, because two CISF sites would be available to receive and store SNF, thereby resulting in a lower present value cost estimate. This means the SNF transportation costs in Table 8.3-3 are bounding from a discounting perspective because costs are based on a SNF transportation schedule prior to any delays. Changes to the SNF transportation schedule to the proposed CISF would likely affect the cost estimates for full build-out (Phases 1-20). Because of the timing of transport for full build-out (Phases 1-20), the applicant assumes that transport would occur from project years 3 to 22, whereas for the proposed action (Phase 1) transport occurs in project year 3.

The presence of a second CISF also could impact whether the proposed Holtec CISF would reach full capacity (i.e., storing 10,000 SNF canisters). This would potentially affect the full build-out rather than Phase 1. As described in EIS Section 2.2.1, the Holtec expansion plan consists of 19 separate license amendment requests, with each one requesting to increase the CISF capacity by an additional 500 SNF canisters. If the demand for SNF storage capacity decreases or no longer exists at some point in the future (e.g., because of the storage capacity provided by two CISFs), then the applicant has the option to either delay expansion or not expand. Again, because of discounting, the proposed action (Phase 1) cost estimate in EIS Table 8.3-3 bounds the estimated costs for any subsequent phases. Similarly, the full build-out (Phases 1-20) cost estimate in EIS Table 8.3-3 bounds the estimated costs if subsequent phases are delayed or not built.

Accidents at the Proposed CISF and During SNF Transport

For the proposed 40-year license term, the NRC staff's safety review will evaluate the potential for credible accidents at the proposed CISF. The EIS cost analysis concerning accidents at the proposed CISF was informed by the consideration of the absence of credible accidents with release of radiological material. With regard to the identification of credible accidents, the very low risk of accidents due to construction, operation, and decommissioning of the proposed CISF is addressed in EIS Section 4.15 and will be verified in the NRC staff's safety review (i.e., no credible accidents with release of radiological material at the proposed CISF). Therefore, this EIS will not estimate the costs of an accident specific to this proposed CISF. Holtec has proposed a license condition addressing liability and financial assurance arrangements with its customers that would be applicable to events occurring during CISF operations, which the NRC staff will consider in its safety review.

Concerning SNF transportation accidents, as described in EIS Section 4.3.1, the NRC staff considers the conclusion of NUREG–2125, Spent Fuel Transportation Risk Assessment (NRC, 2014), regarding the resiliency of the rail-steel cask to severe accident conditions (resulting in no release under severe accident conditions) applicable to the evaluation of potential CISF SNF transportation impacts under accident conditions. Therefore, the NRC staff has not attempted to quantify the economic cost of any particular accident in this EIS. The NRC staff note that for the Final Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, final Yucca Mountain EIS (DOE, 2008) the U.S. Department of Energy (DOE) estimated that the costs for a severe, maximum reasonably foreseeable SNF transportation accident could range from $1 million to $10 billion. The Price-Anderson Act provides accident liability insurance for incidents (including those caused by sabotage) involving the release of nuclear material for SNF transportation (NRC, 2019). Currently the amount of coverage per incident this Act provided is over $13 billion. In addition, Congress enacted legislation that developed a method to promptly consider compensation claims of the public for liabilities resulting from nuclear incidents that exceed this designated limit.

8.3.2.2 Economic and Other Benefits

Economic benefits for the proposed CISF are estimated as the costs society could save by using the proposed CISF. Potential savings are estimated by subtracting the costs associated with storing SNF at the proposed CISF from the costs of continuing to store SNF at reactor sites (i.e., the No-Action alternative). EIS Table 8.3-3 contains the estimated costs for the proposed CISF and EIS Table 8.4-1 contains the estimated costs for the No-Action alternative costs.

EIS Section 8.5 compares the estimated costs of the proposed CISF to the No-Action alternative and discusses the net economic outcome of this comparison.

As previously described, not all cost considerations for the proposed CISF are quantified and incorporated into EIS Table 8.3-3 cost estimates. One potential benefit of the proposed CISF is the repurposing of land use at the nuclear power plants and ISFSIs. For sites where the reactor is decommissioned and all the SNF is relocated (i.e., sent to a CISF), the NRC can terminate the license and release the property for other uses. This benefit was not quantified in this EIS because the cost of the land would be difficult to establish and would vary based on the individual nuclear power plant and ISFSI characteristics.

8.4 Costs and Benefits of the No-Action Alternative

This section describes the environmental and economic costs and benefits of the No-Action alternative. The No-Action alternative is described in EIS Section 2.2.2.

8.4.1 Environmental Costs and Benefits of the No-Action Alternative

Under the No-Action alternative, SNF would continue to be stored at the various nuclear power plants and ISFSIs. The environmental costs and benefits experienced at these nuclear power plants and ISFSIs are analyzed and documented in the EIS associated with those specific nuclear power plants and ISFSIs.

8.4.2 Economic and Other Costs and Benefits of the No-Action Alternative

8.4.2.1 Economic and Other Costs of the No-Action Alternative

EIS Table 8.4-1 contains the estimated costs the NRC staff generated for the No-Action alternative relevant to the proposed CISF for both the proposed action (Phase 1) and full build-out (Phases 1-20). The estimated costs for the No-Action alternative are based on two activities: the cost for operating and maintaining the SNF storage at the nuclear power plant and ISFSI sites and the cost for transporting the SNF from the nuclear power plants and ISFSIs to a geologic repository. Details concerning the calculation of the EIS Table 8.4-1 cost estimates including the discounting are presented in Appendix C, Section C–4.

Discounting requires specifying when the various activities occur. The operation and maintenance activities at the existing nuclear power plants and ISFSIs would occur during all 40 years associated with the proposed CISF. The schedule for transporting SNF to a repository would be the same as that for the proposed CISF described in EIS Table 8.3-4.

The estimated costs for the No-Action alternative are based on the amount of SNF that would be stored at the proposed CISF. The No-Action alternative costs relevant to the proposed action (Phase 1) of the proposed CISF were based on storing 500 SNF canisters at 14 reactor sites: 12 decommissioned sites and 2 active sites. The No-Action alternative costs relevant to full build-out of the proposed CISF were based on storing 10,000 SNF canisters at 72 reactor sites: 12 decommissioned sites and 60 active sites. It is important to identify whether the SNF is being stored at a decommissioned site or an active site because the estimated annual operations and maintenance costs vary for these two types of sites. Operations and maintenance costs at an active site are lower because of efficiencies gained by the presence of an operating reactor. The annual operation and maintenance costs for storing SNF at a decommissioned reactor site were estimated to be $6,984,013 (2019 constant dollars), whereas

Table 8.4-1 Estimated Costs (millions of 2019 dollars) for the No-Action Alternative Relevant to the Proposed CISF for both Phase 1 and Full Build-out*				
Activity	**Phase 1**		**Full Build-out (Phases 1-20)**	
	Scenario 1†	**Scenario 2‡**	**Scenario 1†**	**Scenario 2‡**
Operation and Maintenance at the Nuclear Power Plants and ISFSIs	$3,441	$3,676	$4,615	$8,345
SNF Transport to a Repository‡	$270	$270	$3,006	$3,006
Total Cost§	$3,712	$3,946	$7,622	$11,351
3% Discounting	$2,072	$2,168	$4,167	$5,857
7% Discounting	$1,165	$1,197	$2,245	$2,869

*The applicant specified that the SNF storage at the nuclear power plants and ISFSIs occur during CISF project years 1 to 40, and for purposes of discounting the estimated cost, the NRC staff specified that SNF transportation to a repository occur in project year 41.
†Scenario 1 assumes no more reactors are decommissioned over the 40-year license term of the proposed CISF.
‡Scenario 2 assumes all reactors are decommissioned in the year 2040.
§Due to rounding, total costs may appear slightly different than costs included in text.
Source: Holtec, 2020. See EIS Appendix C, Section C–4 for details

this cost was estimated at $1,117,442 (2019 constant dollars) for a site with an operating reactor (Holtec, 2020). For the No-Action alternative cost-benefit analysis, the NRC staff generated two different overall cost estimates based on two different scenarios. Scenario 1 assumes no more reactors are decommissioned over the 40-year license term for the proposed CISF. Scenario 2 assumes all reactors are decommissioned at year 2040. Scenario 2 bounds the storage costs for the No-Action alternative because the annual estimated operations and maintenance costs would increase from $1,117,442 to $6,984,013 (2019 constant dollars) at year 2040 for the active sites that transition to decommissioned sites. For the proposed action (Phase 1), this transition from active to decommissioned site occurs for two sites. For full build-out (Phases 1-20), this transition in cost occurs for 60 sites. As shown in EIS Table 8.4-1, this would have more of an influence on the full build-out (Phases 1-20) estimated costs compared to the proposed action (Phase 1) estimated costs.

8.4.2.2 Economic and Other Benefits

EIS Section 8.5 compares the estimated costs of the proposed CISF to the No-Action alternative and discusses the net economic outcome of this comparison. This quantitative comparison is based on the cost factors incorporated into EIS Tables 8.3-3 and 8.4-1. Under the No-Action alternative, SNF would continue to be stored at the various nuclear power plants and ISFSIs. Other benefits experienced at these nuclear power plants and ISFSIs are analyzed and documented in each EIS associated with those specific nuclear power plants and ISFSIs.

8.5 Comparison of the Proposed CISF to the No-Action Alternative

8.5.1 Comparison of the Environmental Costs and Benefits

For the environmental costs and benefits, the key distinction between the proposed CISF and the No-Action alternative is the location where the impacts occur. Under the proposed action (Phase 1), the environmental impacts of storing SNF would occur at a new location: the proposed Holtec site. In addition, environmental impacts would continue to occur at the nuclear power plants and ISFSIs with the exception of any sites that are fully decommissioned such that NRC terminates its license and releases the property for other uses. Under the No-Action alternative, environmental impacts from storing SNF would continue to occur at the nuclear power plants and ISFSIs and would not expand to the proposed Holtec site.

The proposed CISF consists of two SNF transportation campaigns, while the No-Action alternative consists of just one campaign. This affects more than just the estimated costs. EIS Section 4.3 contains a quantitative assessment of the proposed action SNF transportation impacts. This analysis estimated risk for the two proposed action transportation campaigns separately (i.e., transportation to and from the proposed CISF) because the two campaigns would involve different transportation routes and would occur at different times. EIS Section 4.3 also qualitatively compares the transportation impacts of the proposed action to the No-Action alternative. As described in EIS Section 4.3, the No-Action alternative results in a net reduction in overall occupational and public exposures from the transportation of SNF, because the overall distance traveled from reactor sites to a repository would likely be less than from reactor sites to the proposed CISF and then to a repository.

8.5.2 Comparison of the Economic and Other Costs and Benefits

For both the proposed action (Phase 1) and full build-out (Phases 1-20), the NRC staff compared the proposed CISF costs to the No-Action alternative costs. This quantitative comparison is based on the cost factors incorporated into EIS Tables 8.3-3 and 8.4-1. The NRC staff generated net values by subtracting the proposed CISF costs in EIS Table 8.3-3 from the associated No-Action alternative costs in EIS Table 8.4-1. If the results were positive, then the No-Action alternative costs were higher than the proposed CISF costs, and the proposed project generated a net benefit. If the results were negative, then the No-Action alternative costs were lower than the proposed CISF costs, and the proposed project generated a net cost. The proposed CISF costs included two scenarios: a low operation cost estimate (Scenario A) and a high operation cost estimate (Scenario B). The No-Action alternative costs also included two scenarios: no additional reactors decommissioned (Scenario 1) and all reactors decommissioning at 2040 (Scenario 2). Costs were also estimated with no discounting as well as discounting at 3 and 7 percent.

EIS Table 8.5-1 compares the proposed action (Phase 1) costs to the associated No-Action alternative costs. In all cases, the No-Action alternative costs exceed the proposed action (Phase 1) costs (i.e., a net benefit for the proposed CISF). As shown in EIS Table 8.5-1, the net values for proposed action (Phase 1) were influenced more by the estimated proposed CISF operation costs (Scenarios A and B) rather than the status of the reactor (i.e., active versus decommissioned) at which the SNF was stored (Scenarios 1 and 2).

EIS Table 8.5-2 compares the full build-out (Phases 1-20) costs to the associated No-Action alternative costs. The net values in EIS Table 8.5-2 reveal that for full build-out (Phases 1-20), some cases resulted in a net benefit, while other cases resulted in a net cost. As shown in EIS Table 8.5-2, the net values for full build-out (Phases 1-20) were influenced more by the status of the reactor (active versus decommissioned) at which the associated SNF was stored (Scenarios 1 and 2) rather than the estimated CISF operation costs (Scenarios A and B). Full build-out (Phases 1-20) universally resulted in net losses when compared to Scenario 1 (no additional reactors decommissioned) of the No-Action alternative. Full build-out (Phases 1-20) results in net benefits (except when discounted at seven percent) when compared to Scenario 2 (all reactors decommissioning at 2040) of the No-Action alternative.

Table 8.5-1 Phase 1 Net Values (millions of 2019 dollars) that Compares the Costs of the Proposed CISF to the No-Action Alternative.					
Discount Rate	Phase 1	No-Action Alternative		Net Value*	
	Scenario A	Scenario 1	Scenario 2	Scenario 1	Scenario 2
0	$977	$3,712	$3,946	$2,735	$2,969
3	$661	$2,072	$2,168	$1,411	$1,507
7	$505	$1,165	$1,197	$660	$692
Rate	Scenario B	Scenario 1	Scenario 2	Scenario 1	Scenario 2
0	$1,858	$3,712	$3,946	$1,854	$2,088
3	$1,152	$2,072	$2,168	$920	$1,016
7	$773	$1,165	$1,197	$392	$424

*NRC staff generated the net values by subtracting the Phase 1 estimates in this table from the appropriate No-Action alternative estimates in this table.
Source: EIS Tables 8.3-3 for the Phase 1 cost estimates and 8.4-1 for the No-Action alternative estimates

Table 8.5-2 Full Build-out (Phases 1-20) Net Values which Compares the Costs of the Proposed CISF to the No-Action Alternative					
Discount Rate	Full Build-out	No-Action Alternative		Net Value*	
	Scenario A	Scenario 1	Scenario 2	Scenario 1	Scenario 2
0	$9,104	$7,622	$11,351	−$1,482	$2,247
3	$5,351	$4,167	$5,857	−$1,184	$506
7	$3,141	$2,245	$2,869	−$896	−$272
Rate	Scenario B	Scenario 1	Scenario 2	Scenario 1	Scenario 2
0	$9,985	$7,622	$11,351	−$2,363	$1,366
3	$5,842	$4,167	$5,857	−$1,675	$15
7	$3,408	$2,245	$2,869	−$1,163	−$539

*NRC staff generated the net values by subtracting the full build-out estimates in this table from the appropriate No-Action alternative estimates in this table
Source: EIS Tables 8.3-3 for the full build-out estimates and 8.4-1 for the No-Action alternative estimates

The proposed CISF and the No-Action alternative also share or have in common other SNF transportation cost factors. A key difference between the proposed CISF and the No-Action alternative concerning these other common cost factors is the time these activities occur. For example, infrastructure improvements at or near nuclear power plants and ISFSIs would be needed for some nuclear power plants and ISFSIs (e.g., decommissioned sites) that no longer have the ability to transport SNF from the current storage location to the national rail route. This cost was not quantified in this EIS because it (i) would be difficult to establish, (ii) would vary based on the individual nuclear power plants and ISFSIs, and (iii) would be a common need for both the proposed CISF and the No-Action alternative.

It is also possible that transporting SNF across the country would require infrastructure improvements along the national rail route. This could be the case for both the proposed CISF and the No-Action alternative. However, because the routes for transportation have not yet been established, the need for (and hypothetical cost of) infrastructure upgrades is speculative and beyond the scope of this EIS.

Another cost factor the proposed CISF and the No-Action alternative shared is emergency preparedness along the SNF transportation route. States are recognized as responsible for protecting public health and safety during radiological transportation accidents. Federal agencies are prepared to monitor transportation accidents and provide assistance if requested by States to do so. Nationwide, there are many shipments of radioactive material each year for which the States already provide capable emergency response, and a discussion about funding for emergency response is in EIS Section 4.11.

8.6 References

10 CFR 51.71(d). Code of Federal Regulations, Title 10, *Energy*, § 51.71. "Draft environmental impact statement—contents." Washington, DC: U.S. Government Publishing Office.

DOE. "Final Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada." DOE/EIS-0250F-S1. ADAMS Accession No. ML081750191 Package. Washington, DC: U.S. Department of Energy, Office of Civilian Radioactive Waste Management. 2008.

Holtec. "Environmental Report-HI-STORE Consolidated Interim Storage Facility, Rev 8." ADAMS Accession No. ML20295A485. Marlton, New Jersey: Holtec International. 2020.

Holtec. "Responses to Request for Additional Information." ADAMS Accession No. ML18345A137. Marlton, New Jersey: Holtec International. 2018.

NRC. "Nuclear Insurance and Disaster Relief." Washington, DC: U.S. Nuclear Regulatory Commission. 2019. <https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/nuclear-insurance.html > (Accessed 10 June 2019)

NRC. NUREG–2125, "Spent Fuel Transportation Risk Assessment." ADAMS Accession No. ML14031A323. Washington, DC: U.S. Nuclear Regulatory Commission. 2014.

NRC. NUREG–1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs." ADAMS Accession No. ML032450279. Washington, DC: U.S. Nuclear Regulatory Commission. 2003.

OMB. "Circular A-4: Regulatory Analysis." NRC000060. ADAMS Accession No. ML11231A834. Washington, DC: Office of Management and Budget. 2003.

9 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

This chapter summarizes the potential environmental impacts of the proposed action (Phase 1, including the rail spur), Phases 2-20, and the No-Action alternative. The potential impacts of the proposed action (Phase 1) and Phases 2-20 are discussed in terms of (i) unavoidable adverse environmental impacts, (ii) irreversible and irretrievable commitments of resources, (iii) short-term impacts and uses of the environment, and (iv) long-term impacts and the maintenance and enhancement of productivity. The information is presented for each of the 13 resource areas that the proposed consolidated interim storage facility (CISF) project may affect. This information addresses the impacts during each phase of the project (i.e., construction, operations, and decommissioning and reclamation). The specific impacts are described in Environmental Impact Statement (EIS) Table 9-1.

The following terms are defined in NUREG–1748 (NRC, 2003).

- Unavoidable adverse environmental impacts: applies to impacts that cannot be avoided and for which no practical means of mitigation are available
- Irreversible: involves commitments of environmental resources that cannot be restored
- Irretrievable: applies to material resources and will involve commitments of materials that, when used, cannot be recycled or restored for other uses by practical means
- Short-term: represents the period from construction to the end of the decommissioning activities and, therefore, generally affects the present quality of life for the public
- Long-term: represents the period of time following the termination of the U.S. Nuclear Regulatory Commission (NRC) license, with the potential to affect the quality of life for future generations

As discussed in EIS Chapter 4, the significance of potential environmental impacts is categorized as follows:

SMALL: The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE: The environmental effects would be sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

LARGE: The environmental effects would be clearly noticeable and are sufficient to destabilize important attributes of the resource.

Section 9.1 describes the environmental impacts from implementing the proposed action (Phase 1) and Phases 2-20, and Section 9.2 describes the environmental impacts from implementing the No-Action alternative.

Table 9-1 Summary of Environmental Impacts of the Proposed CISF Project

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Impacts and Uses of the Environment and Long-Term Impacts and the Maintenance and Enhancement of Productivity
Land Use	For the proposed action (Phase 1) there would be a SMALL impact to land use. During construction, the total amount of land earthmoving activities to construct the storage pads, facilities, and associated infrastructure would be approximately 48.3 hectares (ha) [119.4 acres (ac)] within the proposed project boundary of 421 ha [1,040 ac]. For Phases 2-20, an additional 85.2 ha [210.6 ac] of land would be disturbed for additional storage pads. The 133.5 ha [330 ac] of total disturbed land would be fenced off from livestock grazing for the license term. During decommissioning and reclamation, land would be impacted by earthmoving activities to reclaim and reseed the affected areas.	No impact. There would be no irreversible and irretrievable commitment of land resources from implementing the proposed consolidated interim storage facility (CISF) project. The duration of the project would be the 40-year license term after which time the land would be reclaimed and made available for other uses.	There would be a SMALL impact to land use from implementing the proposed project. The proposed CISF project would cause temporary alteration of rangeland and short-term restricted access to adjacent lands. Approximately 133.5 ha [330 ac] would be controlled and unavailable for other uses, such as grazing and recreation. Oil and gas exploration and potash extraction could coexist with Holtec's proposed project. There would be no long-term impact to land resources from implementing the proposed CISF project. The land would be available for other uses following license termination and decommissioning.

Table 9-1 Summary of Environmental Impacts of the Proposed CISF Project

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Impacts and Uses of the Environment and Long-Term Impacts and the Maintenance and Enhancement of Productivity
Transportation	During the construction, operation, and decommissioning and reclamation stages of the proposed action (Phase 1) and at full build-out (Phases 1-20), there would be a SMALL increase in local traffic counts associated with project-related traffic on U.S. Highway 62/180 and other roadways from the proposed CISF project. The potential radiological and nonradiological impacts from operational spent nuclear fuel (SNF) shipments to and from the proposed CISF under incident-free and accident conditions would be SMALL.	No impact. There would be no irreversible and irretrievable commitment of resources, except for fuel resources consumed by vehicles and equipment operation, heating, commuter traffic, and regional transport. Use of transportation corridors would return to pre-project usage.	During the construction, operations, and decommissioning and reclamation stages of the proposed action (Phase 1) and at full build-out (Phases 1-20), there would be a SMALL increase in local traffic counts associated with project-related traffic on U.S. Highway 62/180 and other roadways from the proposed CISF project. The potential radiological and nonradiological impacts from operational SNF shipments to and from the proposed CISF under incident-free and accident conditions would be SMALL. There would be no long-term impacts to transportation following license termination.
Geology and Soils	There would be a SMALL impact on geology and soils for the proposed action (Phase 1) and Phases 2-20. The construction, operation, and decommissioning stages would disturb surface soils during construction of the proposed facility and infrastructure. These impacts would be temporary, and at the end of the decommissioning and reclamation stage, topsoil would be replaced and surfaces reseeded.	Soil layers would be irreversibly disturbed by the proposed CISF project; however, topsoil would be replaced during decommissioning and reclamation. Reseeding and recontouring would mitigate the impact to topsoil.	There would be a SMALL impact to geology and soils. No sinkhole or ground subsidence is expected, because no thick sections of soluble rocks are present at or near the land surface and the risk of subsidence from potash mining is low. Topsoil would be replaced during the reclamation and reseeding processes. There would be no long-term impacts to geology and soils following license termination and decommissioning and reclamation.

Table 9-1 Summary of Environmental Impacts of the Proposed CISF Project

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Impacts and Uses of the Environment and Long-Term Impacts and the Maintenance and Enhancement of Productivity
Surface Waters and Wetlands	There would be a SMALL impact to surface water and wetlands from the proposed project for the proposed action (Phase 1) and Phases 2-20. The occurrence of surface water is limited. Holtec would use erosion-control mitigation measures such as grading and contouring and implementation of a stormwater pollution management plan to ensure surface-water runoff from disturbed areas met National Pollutant Discharge Elimination System (NPDES) permit limits.	There would be no irreversible and irretrievable commitment of either surface water or wetlands from implementing the proposed CISF project. No drainage would be significantly altered by the proposed CISF project.	There would be a SMALL impact to surface waters. The proposed CISF project does not produce effluents, and the NPDES permits would regulate water runoff. There would be no long-term impacts to surface water and wetlands. The proposed project would discharge stormwater runoff into the closed playa system with no further outlet.
Groundwater	There would be a SMALL impact on groundwater from the proposed project due to consumptive use of groundwater, including for a concrete batch plant, for the proposed action (Phase 1) and Phases 2-20. The proposed CISF would have no effluents; therefore, groundwater quality would not be impacted.	There would be an impact on groundwater resources. In addition to consumptive use, groundwater would be used to operate the concrete batch plant. The proposed CISF would have no effluents; therefore, groundwater quality would not be impacted.	Short-term impacts to groundwater would include water used via a pipeline running from Carlsbad to the proposed facility. Water use would decrease after construction is complete. These impacts would be SMALL. There would be no long-term impacts to groundwater resources. Consumptive water use would cease after license termination and decommissioning. The proposed CISF would have no effluents; therefore, groundwater quality would not be impacted.

Table 9-1 Summary of Environmental Impacts of the Proposed CISF Project

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Impacts and Uses of the Environment and Long-Term Impacts and the Maintenance and Enhancement of Productivity
Ecological Resources	There would be SMALL to MODERATE impacts until vegetation has been reestablished, and then the impact would be SMALL. Construction, operation, and decommissioning of the proposed CISF project would result in short-term loss of vegetation on approximately 48.3 ha [119.4 ac] for the proposed action (Phase 1) and an additional 85.2 ha [210.6 ac] of land for Phases 2-20. The short-term loss of vegetation could stimulate the introduction and spread of undesirable and invasive, non-native species, and displacement of wildlife species.	Direct impacts to vegetative communities and wildlife injuries and mortalities because of earthmoving activities would be irreversible. However, the implementation of mitigation measures, such as the use of fencing to limit wildlife movement and the use of speed limits would reduce potential impacts to wildlife. Areas earthmoving activities impacted would be reclaimed and reseeded during decommissioning.	During any stage of the proposed CISF project, SMALL direct impacts to ecological resources could include injuries and fatalities to wildlife caused by either collisions with project-related traffic or habitat damage because of removal of topsoil. Wildlife could be temporarily displaced by increased noise and traffic during operations. Holtec has committed to implement mitigation measures to reduce the potential impact for wildlife species. Some of the vegetative communities that exist within the proposed CISF project could take years to be reestablished, resulting in MODERATE short-term impacts. Vegetation and wildlife species could experience SMALL long-term impacts if the composition and abundance of both plant and wildlife species in the proposed project area are altered or reduced in number. After license termination and decommissioning, the land would be regraded, reseeded, and released, so impacts would be SMALL.

Table 9-1 Summary of Environmental Impacts of the Proposed CISF Project

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Impacts and Uses of the Environment and Long-Term Impacts and the Maintenance and Enhancement of Productivity
Meteorology, Climatology, and Air Quality	There would be a SMALL impact to air quality. During all stages, the generation of air effluents results in the degradation of air quality. Effluent levels will be low, and the distance between the emission sources and receptors reduces the potential impacts.	There would be no irreversible or irretrievable commitment of air resources from the proposed CISF project.	There would be a SMALL impact. Fugitive dust generated primarily from the construction and decommissioning stages has the potential to result in short-term, intermittent impacts in and around the proposed CISF project area. The effect would be localized and temporary. Use of mitigation measures, such as applying water for dust suppression, would limit fugitive dust emissions. There would be no long-term impacts to air quality either from the proposed project or following license termination.
Noise	There would be a SMALL impact for the proposed action (Phase 1) and Phases 2-20. There would be no residences within the proposed project area. Any noise impacts would be short term, intermittent, and mitigated by sound-abatement controls on operating equipment.	Not applicable.	There would be a SMALL impact because of expected noise levels generated during construction and decommissioning activities, most notably in proximity to operating equipment, such as heavy trucks, bulldozers, or excavators. However, noise impacts would be short-term, intermittent, and mitigated by sound-abatement controls on operating equipment. There would be no long-term impacts to noise impact following license termination.

Table 9-1 Summary of Environmental Impacts of the Proposed CISF Project

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Impacts and Uses of the Environment and Long-Term Impacts and the Maintenance and Enhancement of Productivity
Historic and Cultural Resources	Historic and cultural resources would not be impacted by the proposed action (Phase 1) and Phases 2-20, resulting in a SMALL impact. Pending completion of consultation under the National Historic Preservation Act (NHPA) Section 106, the NRC staff's conclusion is that the proposed project would have no effect on historic properties.	Because no historic or cultural resources have been recommended eligible for the National Register of Historic Places (NRHP), there would not be an irreversible and irretrievable loss of cultural resources.	There would be no short- and long-term impacts to historic properties from the proposed action (Phase 1) or Phases 2-20.
Visual and Scenic Resources	There would be a SMALL impact on the visual landscape for the proposed action (Phase 1) and Phases 2-20. Visual impacts from earthmoving activities that generate fugitive dust would be short term. Mitigation measures would be implemented to reduce fugitive dust. In addition, disturbed areas would be reclaimed as soon as practicable, and debris would be removed after construction activities.	No impact.	There would be a SMALL short-term impact to the visual landscape from the proposed CISF project. The activities would be consistent with the Bureau of Land Management Visual Resource Management designation of the area and the existing natural resource exploration activities in the area. There would be no long-term impacts to the visual landscape following license termination and decommissioning.

Table 9-1 Summary of Environmental Impacts of the Proposed CISF Project

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Impacts and Uses of the Environment and Long-Term Impacts and the Maintenance and Enhancement of Productivity
Socioeconomics	The proposed project would have a SMALL to MODERATE and beneficial impact on employment, public services, and local finances (i.e., increased taxes and revenue), and a SMALL impact on population, housing, school enrollment, and utilities and public services because of the influx of workers and their families.	Not applicable.	The proposed project would have a SMALL impact on local communities. Following license termination, workers who supported activities at the proposed CISF project would need to find other employment. There would be a loss of revenue to nearby communities.
Environmental Justice	There would be no disproportionately high and adverse impacts to minority or low-income populations from constructing, operating, and decommissioning the proposed CISF project. While certain Indian Tribes may have a heightened interest in cultural resources the proposed CISF project potentially affects, the impacts to Indian Tribes in this and other areas is not expected to be disproportionately high and adverse.	Not applicable.	The proposed CISF project would have a SMALL impact on environmental justice. However, the impacts are short term and there would be no disproportionately high and adverse impacts to minority or low-income populations from any aspect of the proposed CISF project. There would be no long-term environmental justice impacts following license termination and decommissioning. While certain Indian Tribes may have a heightened interest in cultural resources the proposed CISF project potentially affects, the impacts to Indian Tribes in this and other areas is not expected to be disproportionately high and adverse.

Table 9-1 Summary of Environmental Impacts of the Proposed CISF Project

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Impacts and Uses of the Environment and Long-Term Impacts and the Maintenance and Enhancement of Productivity
Public and Occupational Health	There would be a SMALL impact on public and occupational health for the proposed action (Phase 1) and full build-out (Phases 1-20). Construction and decommissioning would involve typical occupational hazards associated with construction projects that would not affect the public health. The applicant's compliance with Federal and State occupational safety regulations would limit the potential impacts to workers. During operations, based on the facility design and the applicant's compliance with the required radiological safety program, the radiological health and safety impacts would be SMALL for workers and the public.	Not applicable.	There would be a SMALL impact on public and occupational health for the proposed action (Phase 1) and full build-out (Phases 1-20). Construction and decommissioning would involve typical occupational hazards associated with construction projects that would not affect the public health. The applicant's compliance with Federal and State occupational safety regulations would limit the potential impacts to workers. During operations, based on the facility design and the applicant's compliance with the required radiological safety program, the radiological health and safety impacts would be SMALL for workers and the public. There would be no long-term impact to public and occupational health following license termination.

Table 9-1 Summary of Environmental Impacts of the Proposed CISF Project

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Impacts and Uses of the Environment and Long-Term Impacts and the Maintenance and Enhancement of Productivity
Waste Management	There would be a SMALL impact on waste management for the proposed action (Phase 1) and Phases 2-20 for construction and operation, and MODERATE for decommissioning. Hazardous solid waste, sanitary liquid wastes, nonhazardous solid waste, and low-level radioactive waste (LLRW) the proposed CISF project generated would be handled and disposed appropriately and in accordance with all applicable New Mexico Environment Department (NMED) permits. The proposed CISF project would result in MODERATE impacts on available disposal capacity because of available capacity at permitted facilities.	The energy consumed during the proposed CISF project stages, the construction materials used that could not be reused or recycled, and the space used to properly handle and dispose of all waste streams would represent an irretrievable commitment of resources.	During all stages of the proposed CISF, hazards associated with handling and transport of wastes would represent a short term and SMALL impact. There would be no long-term impact to waste management following license termination and decommissioning.

9.1 Proposed Action

The proposed action (Phase 1) is the issuance, under the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 72, of an NRC license authorizing the construction and operation of the proposed Holtec CISF in southeastern New Mexico. Holtec requests authorization for the initial phase (Phase 1) of the proposed project to store 5,000 metric tons of uranium (MTUs) [5,512 short tons] in 500 canisters for a license period of 40 years. However, because the capacity of individual canisters can vary, the 500 canisters proposed in the Holtec license application have the potential to hold up to 8,680 MTUs [9,568 short tons]. Therefore, the analysis in this EIS analyzes the storage of up to 8,680 MTUs [9,568 short tons] for the proposed action (Phase 1). Holtec anticipates subsequently requesting amendments to the license to store an additional 5,000 MTUs [5,512 short tons] for each of 19 expansion phases of the proposed CISF to be completed over the course of 20 years to expand the facility to eventually store up to 10,000 canisters of SNF (Holtec, 2020a,b, 2019). Holtec's expansion of the proposed project (i.e., Phases 2-20) is not part of the proposed action currently pending before the agency. However, as a matter of discretion, the NRC staff considered these expansion phases in its description of the affected environment and impact determination where appropriate to conduct a bounding analysis for the proposed CISF project. For the bounding analysis, the NRC staff assumes the storage of up to 10,000 canisters of spent nuclear fuel (SNF). Therefore, this EIS will analyze the impacts from the proposed action (Phase 1) as well as subsequent phases of the proposed CISF project (i.e., Phases 2-20). A connected action to the proposed CISF project includes construction and operation of a rail spur on land leased from the U.S. Bureau of Land Management (BLM) to transport SNF from the main rail line to the proposed facility. Impacts resulting from the construction of this rail spur are also considered throughout this EIS.

The construction stage of the proposed CISF project would include the construction of the proposed facility and associated buildings and infrastructure as well as the construction of infrastructure that would support the proposed rail spur for transporting SNF to and from the proposed CISF project. The operations stage of the proposed CISF project would include receipt of SNF, operation of the proposed facility (i.e., passive storage), and also removal of the SNF inventory (defueling) for transport to a final repository. Decommissioning of the proposed facility would include the dismantling of the proposed facility and rail spur.

The decommissioning and reclamation evaluation in this EIS is based on currently available information and plans. Because decommissioning and reclamation are likely to take place well into the future, all technological changes that could improve the decommissioning or reclamation process cannot be predicted. As a result, the NRC requires that licensees applying to decommission an Independent Spent Fuel Storage Installation (ISFSI) (such as the proposed CISF project) submit a Decommissioning Plan. The requirements for the Final Decommissioning Plan are delineated in 10 CFR 72.54(d), (g), and (i). The NRC staff would undertake a separate evaluation and National Environmental Policy Act (NEPA) review and prepare an environmental assessment or EIS, as appropriate, at the time the Decommissioning Plan is submitted to the NRC.

The potential environmental impacts from the proposed CISF project are summarized in EIS Table 9-1.

9.2 No-Action Alternative

Under the No-Action alternative, the NRC would not license the proposed CISF project. Therefore, impacts such as land disturbance and access restrictions on current land use would not occur. Construction impacts would be avoided because SNF storage pads, buildings, and transportation infrastructure would not be built. Operational impacts would also be avoided because no SNF canisters would arrive for storage. Impacts to land use from decommissioning and reclamation activities would not occur, because there would be no facility to decommission and land would not need to be reclaimed. The current land uses on and near the project, including grazing and natural resource extraction, would remain essentially unchanged under the No-Action alternative. In the absence of a CISF, the NRC staff assume that SNF would remain onsite in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue as detailed in generic (NRC, 2013, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available.

9.3 References

10 CFR Part 72. *Code of Federal Regulations*, Title 10, *Energy*, Part 72. "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste." Washington, DC: U.S. Government Publishing Office.

10 CFR 72.54(d). *Code of Federal Regulations*, Title 10, *Energy*, 72.54(d), "Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas." Washington, DC: U.S. Government Publishing Office.

10 CFR 72.54(g). *Code of Federal Regulations*, Title 10, *Energy*, 72.54(g), "Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas." Washington, DC: U.S. Government Publishing Office.

10 CFR 72.54(i). *Code of Federal Regulations*, Title 10, *Energy*, 72.54(i), "Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas." Washington, DC: U.S. Government Publishing Office.

Holtec. "Environmental Report-HI-STORE Consolidated Interim Storage Facility, Rev 8." ADAMS Accession No. ML20295A485. Marlton, New Jersey: Holtec International. 2020a.

Holtec. "Safety Analysis Report-HI-STORE Consolidated Interim Storage Facility." ADAMS Accession No. ML20295A428. Marlton, New Jersey: Holtec International. 2020b.

Holtec. "Responses to Request for Additional Information." ADAMS Accession No. ML19081A075. Marlton, New Jersey: Holtec International. 2019.

NRC. NUREG–1437. "Generic Environmental Impact Statement for License Renewal of Nuclear Plants." Accession No. ML13106A241. Washington, DC: U.S. Nuclear Regulatory Commission. 2013.

NRC. NUREG–1748, “Environmental Review Guidance for Licensing Actions Associated with NMSS Programs.” Washington, DC: U.S. Nuclear Regulatory Commission. 2003.

NRC. “Environmental Assessment and Finding of No Significant Impact for the Storage of Spent Nuclear Fuel in NRC-Approved Storage Casks at Nuclear Power Reactor Sites.” ADAMS Accession No. ML051230231. Washington, DC: U.S. Nuclear Regulatory Commission. 1989.

10 LIST OF PREPARERS

This section documents all individuals who were involved with the preparation of this final Environmental Impact Statement (EIS). Contributors include staff from the U.S. Nuclear Regulatory Commission (NRC) and consultants. Each individual's role, education, and experience are outlined next.

10.1 U.S. Nuclear Regulatory Commission Contributors

Jill Caverly: Environmental Project Manager
B.S., Civil Engineering, George Washington University, 1992
M.S., Civil Engineering, George Washington University, 1996
Years of Experience: 28

Jose Cuadrado-Caraballo: Safety Project Manager
B.S., Chemical Engineering, University of Puerto Rico, Mayagüez Campus, 2002
M.B.A., Finance, University of Maryland, College Park, 2007
Years of Experience: 19

Stacey Imboden: Environmental Project Manager
B.S., Meteorology, Pennsylvania State University, 1999
M.S., Environmental Engineering, Clemson University, 2001
Years of Experience: 20

10.2 Center for Nuclear Waste Regulatory Analyses (CNWRA®) Contributors

Nathan B. Hall: Waste Management
B.S., Fire Protection Engineering, University of Maryland, 2006
M.B.A., Business Administration, Johns Hopkins University, 2012
Years of Experience: 15

Taylor Holt: Water Resources, Cumulative Impacts
B.S., Biological and Agricultural Engineering, Texas A&M University 2014
M.E., Biological and Agricultural Engineering, Texas A&M University 2017
Years of Experience: 5

Lane Howard: National Environmental Policy Act (NEPA) Reviewer, Public and Occupational Health
B.S., Civil Engineering, Texas A&M University 1988.
M.S., Nuclear Engineering, Texas A&M University 1995.
Years of Experience: 33

Miriam Juckett: Senior Program Manager, NEPA Reviewer, Public Outreach, Waste Management
B.S., Chemistry, University of Texas at San Antonio, 2003
M.S., Environmental Sciences, University of Texas at San Antonio, 2006
Years of Experience: 18

Patrick LaPlante: Transportation, Public and Occupational Health
B.S., Environmental Studies, Western Washington University, 1988
M.S., Biostatistics and Epidemiology, Georgetown University, 1994
Years of Experience: 32

Amy Hester Minor: Ecological Resources, Socioeconomics, Environmental Justice
B.A., Environmental Studies, University of Kansas, 1998
Years of Experience: 22

Marla Morales: Principal Investigator, Land Use, Noise, Visual and Scenic, Geology and Soils
B.A., Geology, Vanderbilt University, 2001
M.S., Geology, University of Texas at San Antonio, 2007
Years of Experience: 20

James Prikryl: Geology and Soils, Water Resources
B.S., Geology, University of Texas at Austin, 1984
M.A., Geology, University of Texas at Austin, 1989
Years of Experience: 36

Bradley Werling: Meteorology, Climatology, Air Quality, Cost Benefit
B.A., Engineering Physics, Westmont College, Santa Barbara, 1985
B.S., Chemistry, Southwest Texas State University, 1999
M.S., Environmental Science, University of Texas at San Antonio, 2000
Years of Experience: 25

10.3 CNWRA Consultants and Subcontractors

Hope Luhman: National Historic Preservation Act Section 106 Support
B.A., Anthropology, Muhlenberg College, 1980
M.A., Social Relations, Lehigh University, 1982
M.A., Anthropology, Bryn Mawr College, 1988
Ph.D., Anthropology, Bryn Mawr College, 1991
Years of Experience: 32

Andrew Wilkins: Cultural and Historic Resources
B.A., Historic Preservation, University of Mary Washington, 2006
M.A., Historical Archaeology, University of Massachusetts Boston, 2009
Ph.D., Anthropology, University of Tennessee, 2017
Years of Experience: 13

11 DISTRIBUTION LIST

The U.S. Nuclear Regulatory Commission (NRC) is providing copies of this Environmental Impact Statement (EIS) to the organizations and individuals listed as follows. The NRC will provide copies to other interested organizations and individuals upon request.

11.1 Federal Agency Officials

Tessa Cisneros
U.S. Bureau of Land Management
Carlsbad Field Office
620 E Greene St
Carlsbad, NM 88220

Mel Massaro
U.S. Department of Transportation
Federal Railroad Administration
Office of Safety
526 Mountain Ave
Altoona, PA 16602

U.S. Environmental Protection Agency
Region 6
1201 Elm Street, Suite 500
Dallas, TX 75270

11.2 Tribal Government Officials

Apache Tribe of Oklahoma
Bobby Komardley, Chairman
P.O. Box 1220
Anadarko, OK 73005

Comanche Nation
William Nelson, Chairman
P.O. Box 908
Lawton, OK 73502

Jim Arterberry, THPO
Marina Callahan, THPO
P.O. Box 908
Lawton, OK 73502

Hopi Tribe
Timothy L. Nuvangyaoma, Chairman
P.O. Box 123
Kykotsmovi, AZ 86039

Carmalita Coochyumptewa, Secretary
P.O. Box 123
Kykotsmovi, AZ 86039

Jicarilla Apache Nation
Darrell Paiz, President
P.O. Box 507
Dulce, NM 87528

Dr. Jeffrey Blythe, THPO
P.O. Box 1367
Dulce, NM 87528

Kiowa Tribe of Oklahoma
Matthew Komalty, Chairman
P.O. Box 369
Carnegie, OK 73015

Kellie J. Poolaw, acting THPO
P.O. Box 50
Carnegie, OK 73015

Mescalero Apache Tribe
Gabe Aguilar, President
P.O. Box 227
Mescalero, NM 88340

Holly Houghton, THPO
P.O. Box 227
Mescalero, NM 88340

Navajo Nation
Jonathan Nez, President
P.O. Box 7440
Window Rock, AZ 86515

Richard M. Begay, THPO
P.O. Box 4950
Window Rock, AZ 86515

Pawnee Nation of Oklahoma
Walter Echo-Hawk, President
P.O. Box 470
Pawnee, OK 74058

Michael Knife Chief, THPO
Matt Reed, THPO
P.O. Box 470
Pawnee, OK 74058

Pueblo of Isleta
Joe Pat Padilla, Council President P.O. Box 1270
Isleta, NM 87022

Dr. Henry Walt, THPO
P.O. Box 1270
Isleta, NM 87022

Pueblo of Tesuque
Frederick Vigil, Governor
Tesuque Pueblo Rt. 4, Box 360-T
Santa Fe, NM 87506

Mark Mitchell, THPO
Route 42, Box 360-T
Santa Fe, NM 87506

Ysleta del Sur Pueblo
E. Michael Silvas, Governor
P.O. Box 17579
117 S. Old Pueblo Rd.
El Paso, TX 79907

11.3 State Agency Officials

Secretary of New Mexico Environment Department
Harold L. Runnels Building
1190 St. Francis Drive, Suite N4050
Santa Fe, NM 87505

Jeff Pappas, Ph.D.
State Historic Preservation Officer and Director
New Mexico State Historic Preservation Division
407 Galisteo St., Suite 236
Santa Fe, NM 87501

Ron Kellermueller
New Mexico Department of Game and Fish
P.O. Box 25112
One Wildlife Way
Santa Fe, NM 87507

11.4 Local Agency Officials

Sam Cobb
Mayor of Hobbs
City Hall
200 E. Broadway
Hobbs, NM 88240

Lea County Commissioners
City Hall
200 E. Broadway
Hobbs, NM 88240

Dale Janway
Mayor of Carlsbad
City Hall
101 N. Halaqueno
Carlsbad, NM 88221

Carlsbad City Council
City Hall
101 N. Halaqueno
Carlsbad, NM 88221

Eddy County Commissioners
101 West Greene Street
Carlsbad, NM 88220

Mayor of Artesia
511 W. Texas Ave.
Artesia, NM 88210

Mayor of Roswell
City Hall
425 N Richardson
Roswell, NM 88201

Mayor of Lovington
City Hall
214 S. Love
Lovington, NM 88260

Carlsbad Soil and Water Conservation Service
3219 S Canal
Carlsbad, NM 88220

Eddy-Lea Energy Alliance
100 N. Main Street
Lovington, NM 88260

Eddy-Lea Energy Alliance
City of Carlsbad
101 N. Halagueno
Carlsbad, NM 88220

11.5 Other Organizations and Individuals

Steve Vierck
Economic Development Corporation of Lea County
200 E. Broadway St., Suite A201
Hobbs, NM 88240

Roswell Public Library
301 N. Pennsylvania
Roswell, NM 88201

Hobbs Public Library
509 N Shipp St.
Hobbs, NM 88240

Carlsbad Public Library
101 S. Halagueno Street
Carlsbad, NM 88220

12 INDEX

R

S

T

U

W

APPENDIX A

CONSULTATION CORRESPONDENCE

APPENDIX A CONSULTATION CORRESPONDENCE

The Endangered Species Act of 1973, as amended, and the National Historic Preservation Act of 1966 require that Federal agencies consult with applicable State and Federal agencies and groups prior to taking action that may affect threatened and endangered species, essential fish habitat, or historic and archaeological resources. This appendix contains consultation documentation related to these Federal laws.

Table A–1 Chronology of Consultation Correspondence

Author	Recipient	Date of Letter	ADAMS Accession Number
U.S. Nuclear Regulatory Commission (C. Román)	U.S. Bureau of Land Management (J. Stovall)	October 1, 2018	ML18248A133
U.S. Nuclear Regulatory Commission (C. Román)	U.S. Bureau of Land Management Memorandum of Understanding (MOU)	October 1, 2018	ML18290A458
U.S. Nuclear Regulatory Commission (C. Erlanger)	Apache Tribe of Oklahoma (B. Komardley)	April 2, 2018	ML17339A865
U.S. Nuclear Regulatory Commission (C. Erlanger)	Mescalero Apache Tribe (B. Blazer)	April 2, 2018	ML18089A626
U.S. Nuclear Regulatory Commission (C. Erlanger)	Pawnee Nation of Oklahoma (B. Pratt)	April 2, 2018	ML18089A629
U.S. Nuclear Regulatory Commission (C. Erlanger)	Ysleta del Sur Pueblo (C. Hisa)	April 2, 2018	ML18089A635
U.S. Nuclear Regulatory Commission (C. Erlanger)	Pueblo of Tesuque (F. Vigil)	April 2, 2018	ML18089A641
U.S. Nuclear Regulatory Commission (C. Erlanger)	Pueblo of Isleta (R. Benavides)	April 2, 2018	ML18089A645
U.S. Nuclear Regulatory Commission (C. Erlanger)	Jicarilla Apache Nation (L. Pesata)	April 2, 2018	ML18089A647

Table A–1 Chronology of Consultation Correspondence			
Author	**Recipient**	**Date of Letter**	**ADAMS Accession Number**
U.S. Nuclear Regulatory Commission (C. Erlanger)	Navajo Nation (R. Begaye)	April 2, 2018	ML18089A648
U.S. Nuclear Regulatory Commission (C. Erlanger)	Kiowa Tribe of Oklahoma (M. Komalty)	April 2, 2018	ML18089A649
U.S. Nuclear Regulatory Commission (C. Erlanger)	Hopi Tribe (T. Nuvangyaoma)	April 2, 2018	ML18089A650
U.S. Nuclear Regulatory Commission (C. Erlanger)	Comanche Nation (W. Nelson)	April 2, 2018	ML18089A651
U.S. Nuclear Regulatory Commission (J. Caverly)	U.S. Nuclear Regulatory Commission (C. Román)	May 24, 2018	ML18141A483
U.S. Nuclear Regulatory Commission (S. Imboden)	U.S. Nuclear Regulatory Commission (C. Román)	June 19, 2018	ML18157A171
U.S. Nuclear Regulatory Commission (J. Caverly)	U.S. Nuclear Regulatory Commission (C. Román)	June 21, 2018	ML18164A215
U.S. Nuclear Regulatory Commission (J. Caverly)	U.S. Nuclear Regulatory Commission (C. Román)	July 21, 2018	ML18164A215
U.S. Nuclear Regulatory Commission (J. Caverly)	Keeper of the National Register of Historic Places (J. Beasley)	August 28, 2018	ML18240A207
State of NM Department of Game and Fish (C. Hayes)	U.S. Nuclear Regulatory Commission (J. Caverly)	August 31, 2018	ML18247A573
National Park Service Keeper of the National Register of Historic Places	U.S. Nuclear Regulatory Commission (C. Erlanger)	September 10, 2018	ML17338B232

Table A–1 Chronology of Consultation Correspondence			
Author	**Recipient**	**Date of Letter**	**ADAMS Accession Number**
U.S. Nuclear Regulatory Commission	U.S. Bureau of Land Management (J. Stovall)	October 1, 2018	ML18248A133
New Mexico State Historic Preservation Office	U.S. Nuclear Regulatory Commission	October 15, 2018	ML19346F971
CNWRA (A. Minor)	U.S. Bureau of Land Management (C. Brooks)	May 9, 2019	ML19218A163
U.S. Nuclear Regulatory Commission (S. Imboden)	U.S. Nuclear Regulatory Commission (C. Román)	June 13, 2019	ML19121A295
U.S. Nuclear Regulatory Commission (C. Román)	New Mexico Environment Department Memorandum of Understanding (MOU)	July 24, 2019	ML19206A094
U.S. Nuclear Regulatory Commission (K. Brock)	Kiowa Tribe of Oklahoma (M. Komalty)	August 29, 2019	ML19239A241
U.S. Nuclear Regulatory Commission (K. Brock)	Hopi Tribe (T. Nuvangyaoma)	August 29, 2019	ML19003A181
U.S. Nuclear Regulatory Commission (K. Brock)	Pueblo of Tesuque (M. Herrera)	August 29, 2019	ML19239A240
U.S. Nuclear Regulatory Commission (K. Brock)	Navajo Nation (J. Nez)	August 29, 2019	ML19239A242
Hopi Tribe (S. Koyiyumtewa)	U.S. Nuclear Regulatory Commission (K. Brock)	September 16, 2019	ML19275F380

Table A–1 Chronology of Consultation Correspondence			
Author	**Recipient**	**Date of Letter**	**ADAMS Accession Number**
U.S. Nuclear Regulatory Commission (K. Brock)	Hopi Cultural Preservation Office (S. Koyiyumtewa); Kiowa Tribe of Oklahoma Tribal Historic Preservation Officer (P. Dupont); Navajo Nation Tribal Historic Preservation Officer (R. Begay); Pueblo of Tesuque Tribal Historic Preservation Officer (M. Mitchell)	December 12, 2019	ML19344B782
U.S. Nuclear Regulatory Commission (C. Román)	Holtec International (K. Manzione)	March 11, 2020	ML20062C496
U.S. Nuclear Regulatory Commission (C. Román)	Mayor of Hobbs, New Mexico (S. Cobb)	March 11, 2020	ML20064E797
U.S. Nuclear Regulatory Commission (C Román)	Mayor of Carlsbad, New Mexico (D. Janway)	March 11, 2020	ML20064E799
U.S. Nuclear Regulatory Commission (C. Román)	Mayor of Artesia, New Mexico (R. Miller)	March 11, 2020	ML20064E802
U.S. Nuclear Regulatory Commission (C. Román)	Mayor of Roswell, New Mexico (D. Kintigh)	March 11, 2020	ML20064E805
U.S. Nuclear Regulatory Commission (C. Román)	Mayor of Lovington, New Mexico (D. Trujillo)	March 11, 2020	ML20064E806
U.S. Nuclear Regulatory Commission (C Román)	County Commissioners, Eddy County, New Mexico	March 11, 2020	ML20064E807
U.S. Nuclear Regulatory Commission (C. Román)	County Commissioners, Lea County, New Mexico	March 11, 2020	ML20064E810

Table A–1 Chronology of Consultation Correspondence			
Author	**Recipient**	**Date of Letter**	**ADAMS Accession Number**
U.S. Nuclear Regulatory Commission (C. Román)	Hopi Tribe (T. Nuvangyaoma)	March 11, 2020	ML20063J853
U.S. Nuclear Regulatory Commission (C. Román)	Apache Tribe of Oklahoma (B. Komardley)	March 11, 2020	ML20063J853
U.S. Nuclear Regulatory Commission (C. Román)	Comanche Nation (W. Nelson)	March 11, 2020	ML20063J853
U.S. Nuclear Regulatory Commission (C. Román)	Jicarilla Apache Nation (J. Pesata)	March 11, 2020	ML20063J853
U.S. Nuclear Regulatory Commission (C. Román)	Kiowa Tribe of Oklahoma (M. Komalty)	March 11, 2020	ML20063J853
U.S. Nuclear Regulatory Commission (C. Román)	Mescalero Apache Tribe (A. Blazer)	March 11, 2020	ML20063J853
U.S. Nuclear Regulatory Commission (C. Román)	Navajo Nation (R. Begay)	March 11, 2020	ML20063J853
U.S. Nuclear Regulatory Commission (C. Román)	Pawnee Nation of Oklahoma (B. Pratt)	March 11, 2020	ML20063J853
U.S. Nuclear Regulatory Commission (C. Román)	Pueblo of Isleta (J.R. Benavides)	March 11, 2020	ML20063J853
U.S. Nuclear Regulatory Commission (C. Román)	Ysleta de Sur Pueblo (C. Hisa)	March 11, 2020	ML20063J853
U.S. Nuclear Regulatory Commission (C. Román)	Advisory Council on Historic Preservation (R. Nelson)	March 11, 2020	ML20063K290

Table A–1 Chronology of Consultation Correspondence			
Author	**Recipient**	**Date of Letter**	**ADAMS Accession Number**
U.S. Nuclear Regulatory Commission (C. Román)	New Mexico State Historic Preservation Division (B. Estes)	March 11, 2020	ML20062D860
U.S. Nuclear Regulatory Commission (J. Quintero)	Navajo Nation Tribal Historic Preservation Officer (R. Begay)	August 26, 2020	ML20237F347
U.S. Nuclear Regulatory Commission (J. Quintero)	Pueblo of Tesuque Tribal Historic Preservation Officer (M. Mitchell)	August 26, 2020	ML20237F360
U.S. Nuclear Regulatory Commission (J. Quintero)	Kiowa Tribe of Oklahoma Tribal Historic Preservation Officer (P. Dupoint);	August 26, 2020	ML20237F377
U.S. Nuclear Regulatory Commission (J. Quintero)	Hopi Cultural Preservation Office (S. Koyiyumtewa)	August 26, 2020	ML20237F387
Hopi Cultural Preservation Office (S. Koyiyumtewa)	U.S. Nuclear Regulatory Commission (J. Quintero)	September 7, 2020	ML21155A211
Holtec International (K. Manzione)	U.S. Nuclear Regulatory Commission (J. Cuadrado)	September 16, 2020	ML20260H140
Environmental Protection Agency (A. Blanco)	U.S. Nuclear Regulatory Commission	September 17, 2020	ML20262G991
New Mexico Environment Department (J. Kenney)	U.S. Nuclear Regulatory Commission (J. Tappert)	September 22, 2020	ML20268C322
New Mexico State Legislature (J. Steinborn, *et.al*)	Nuclear Regulatory Commission (L. Svinicki)	September 22, 2020	ML20274A027
U.S. Nuclear Regulatory Commission (A. Vietti-Cook)	New Mexico State Legislature (J. Steinborn, *et.al*)	October 1, 2020	ML20280A722
U.S. Nuclear Regulatory Commission (J. Tappert)	Governor of New Mexico (L. Grisham)	October 22, 2020	ML20281A487

Table A–1 Chronology of Consultation Correspondence			
Author	**Recipient**	**Date of Letter**	**ADAMS Accession Number**
U.S. Nuclear Regulatory Commission (J. Quintero)	New Mexico State Historic Preservation Officer (J. Pappas)	November 30, 2020	ML20303A330
New Mexico State Historic Preservation Officer (J. Pappas)	U.S. Nuclear Regulatory Commission (J. Quintero)	December 15, 2020	ML21004A023

APPENDIX B

SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

APPENDIX B SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

B.1 Worker Characterization Methodology

This section provides additional explanation of the methodology used in the socioeconomic analysis described in Chapter 4 of this Environmental Impact Statement (EIS).

An NRC staff study, Migration and Residential Location of Workers at Nuclear Power Plant Construction Sites, NUREG/CR–2002 (Malhotra, 1981) evaluated behaviors and characteristics of nuclear construction projects and provides a methodology for estimating in-migrating workforce sizes and residential distribution patterns at nuclear sites. The information provided in NUREG/CR–2002 regarding the estimated migration of a workforce was reaffirmed in NRC's most recent EIS for an application to obtain a combined operating license (NRC, 2016) and in NRC's EIS for the International Isotope Fluorine Products (IIFP) site (NRC, 2012). Therefore, the NRC staff considers that the methodology for evaluating behaviors and characteristics of nuclear construction projects described in NUREG/CR–2002 is appropriate to use in this EIS. In addition to the previously mentioned NRC documents, the NRC analysis conducted for the Private Fuel Storage (PFS) Facility EIS (NRC, 2001) also contributed to the worker characteristics presented in EIS Table 4.11-2.

The following considerations serve as an example of how the NRC staff derived the information in EIS Section 4.11, including EIS Table 4.11-2. Specifically, the following steps were taken to determine the range of construction workers (10 percent to 30 percent) that may move into the socioeconomic region of influence (ROI) presented in EIS Table 4.11-2:

Step 1: The NRC staff began with Holtec's estimate of the peak number of construction workers that would be employed at any given time during the proposed CISF license term, which is equal to 80 construction workers (see first row of EIS Table 4.11-2).

Step 2: The NRC staff noted the estimated percentage of construction workers that, based on previous NRC socioeconomic analyses listed below, would move into the socioeconomic ROI. An inclusive range of 10 to 30 percent was determined for this EIS (see second row of EIS Table 4.11-2) (Malhotra, 1981; NRC, 2001, 2012).

Step 3: The range of construction workers for this EIS that NRC concluded may move into the socioeconomic ROI during peak employment with concurrent construction and operation stages of the proposed action (Phase 1) was determined (8-24 workers) by calculating 10 percent of 80 construction workers (8 workers) and 30 percent of 80 construction workers (24 workers) (see fourth row of EIS Table 4.11-2).

The U.S. Department of Commerce Bureau of Economic Analysis (BEA), Economic and Statistics Division uses an economic model called RIMS II. The NRC staff applied the BEA Type II multipliers and methodology for this EIS analysis, as explained in EIS Section 4.11.1.1. The RIMS II multipliers used for the socioeconomic ROI are available from the BEA in four tables, with two tables for Type I multipliers and two for Type II multipliers. Type I multipliers include only inter-industry direct and indirect impacts. The Type II multipliers account for these same direct and indirect impacts as well as for induced impacts that are associated with the purchases employees made. Type II multipliers are needed for this EIS analysis, as explained in EIS Section 4.11.1.1. One table for Type II multipliers provides multipliers for 369 detailed industries. Another table for Type II multipliers, BEA RIMS II Table 2.5, provides multipliers for 64 aggregated industries. While both sets of industry detail can be used in the same analysis, the NRC staff determined that the multipliers in BEA RIMS II Table 2.5 for aggregated industries are appropriate for this EIS.

Further clarification is provided regarding the employment multipliers for this EIS analysis. The estimated workers that would move into the socioeconomic ROI would create indirect jobs within the study area, as described in EIS Section 4.11.1. In this analysis, the NRC staff used the BEA direct effect employment multiplier for the “Construction” classification to estimate the number of jobs that would be created as a result of construction workers moving into the socioeconomic ROI, and the “Professional, scientific, and technical services” classification to estimate the number of jobs that would be created as a result of non-construction workers moving into the socioeconomic ROI.

When the number of estimated Holtec workers that would move into the socioeconomic ROI is multiplied by the direct effect employment multiplier provided in the BEA RIMS II Table 2.5, the result is the total change of jobs in the socioeconomic ROI, including the workers that would move into the socioeconomic ROI. However, by subtracting 1 from the direct effect employment multiplier before multiplying by the number of estimated Holtec workers that would move into the socioeconomic ROI, only the indirect number of jobs is captured. This explains why the multipliers provided in the BEA RIMS II Table 2.5 for the proposed project differ from the multiplier that NRC provides in EIS Table 4.11-2 to determine indirect jobs. The direct effect employment multipliers used for this project are provided in EIS Appendix B, Table B–1.

Final demand multipliers are used to provide an estimate of the total economic impact from a proposed action across all industries in the region. The final demand multipliers used to describe the economic impact in the socioeconomic ROI in EIS Section 4.11.1.1 are shown in Table B–2, followed by a brief description of the three types of final demand multipliers that the NRC staff used to estimate economic impacts in the socioeconomic ROI.

Table B–1 Direct Effect Employment Multipliers (Type II Table 2.5) for the Proposed CISF

Aggregate Industry	Direct Effect Employment Multiplier	Direct Effect Employment Multiplier (indirect portion only)
Construction	1.562	0.562
Professional, scientific, and technical services	1.4746	0.4746

Source: BEA, 2021

Table B–2 Final Demand Multipliers (Type II Table 2.5) for the Proposed CISF			
Aggregate Industry	**Final Demand Total Output**	**Final Demand Value Added**	**Final Demand Earnings**
Construction (Applied to Holtec expenditures during the construction stage)	1.5001	0.7862	0.4869
Professional, scientific, and technical services (Applied to Holtec expenditures during the operations stage)	1.4051	0.9023	0.5835
Source BEA, 2021			

- **Total Output**: Output is the base multiplier from which all other multipliers are derived. The output multiplier describes the total output generated as a result of $1 spent in a particular industry. In this case, for every dollar that Holtec spends in the socioeconomic ROI to construct the proposed CISF, there is $1.5001 worth of economic activity in the socioeconomic ROI – the original dollar Holtec spent and an additional $0.5001.

- **Value added**: The value-added multiplier is a portion of the total output that provides an estimate of the additional value added to the economy as a result of the activity in an industry (i.e., the economic valued added to the socioeconomic ROI from the construction of the proposed CISF). Earnings are a part of value added. The rest of value added consists of taxes on production and imports and of gross operating surplus, which is a profits-like measure similar to gross domestic product.

- **Earnings**: The earnings multiplier measures the total increase in worker income in the local economy resulting from a $1 increase in income workers received in a particular industry (i.e., the increase of all workers in the socioeconomic ROI from the wages that Holtec pays their workers).

B.2 Environmental Justice Supporting Data

This section provides additional information about the methodology that the NRC staff follows to determine environmental justice populations, and material for the assessment of the potential for disproportionately high and adverse human health or environmental effects on minority and low-income populations resulting from the proposed construction, operation, and decommissioning of the proposed CISF.

On February 11, 1994, the President signed Executive Order 12898 (59 FR 76290), “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” which directs Federal agencies to develop strategies that consider environmental justice in their programs, policies, and activities. Environmental justice is described in the Executive Order as “identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low income populations.” On December 10, 1997, the Council on Environmental Quality (CEQ) issued Environmental Justice Guidance under the National Environmental Policy Act (CEQ, 1997). As an independent agency, the Executive Order does not automatically apply to the NRC. But the NRC strives to meet the goals of EO 12898 through its normal and traditional NEPA review process. The NRC has provided general guidelines on the evaluation of environmental analyses in "Environmental Review Guidance for Licensing Actions Associated with NMSS [Nuclear Material Safety and Safeguards] Programs" (NUREG–1748) (NRC, 2003), and issued a final policy statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions (69 FR 52040) and environmental justice procedures to be followed in NEPA documents the NRC's Office of Nuclear Material Safety and Safeguards (NMSS) prepared. NRC's NMSS environmental justice guidance, as found in Appendix C to NUREG–1748 (NRC, 2003), recommends that the area for assessment for a facility in a rural area be a circle with a radius of approximately 6.4 km [4 mi] whose centroid is the facility being considered. However, the guidance also states that the scale should be commensurate with the potential impact area. Therefore, for the proposed CISF project, the NRC staff determined that an environmental justice assessment area with an 80-km [50-mi] radius would be appropriate to be inclusive of (i) locations where people could live and work in the vicinity of the proposed project and (ii) of other sources of radiation or chemical exposure. As such, New Mexico and Texas and each county with land area within the 80-km [50-mi] radius from the center of the proposed CISF project are considered in the comparative analysis.

EIS Appendix B, Table B–3 presents the detailed census data for the environmental justice review and provides the minority and low-income population data for each census block group within 80 km [50 mi] of the center of the proposed Holtec CISF site (USCB, 2019). The State percentages of minority and low-income populations and the threshold that the NRC staff considered in this EIS are provided in Table B–3. Block groups that meet or exceed a threshold for a minority group or low-income population are identified with a grey background.]

The following information was used in the environmental justice analysis described in Chapter 3 and Chapter 4 of this EIS.

- Land Use—The land in and surrounding the proposed project area is currently used for oil and gas development, grazing, and potash mining projects. Approximately 48.3 ha [119.4 ac] for the site access road, the rail spur, the security building, administration building, parking lot, and concrete batch plant and laydown area would be disturbed during construction. Cattle grazing would not be permitted within the protected area. Within the protected area, Holtec estimates that approximately 44.5 ha [110 ac] would be disturbed by the construction of the concrete pads once all 20 phases are completed (Holtec, 2020). At full build-out, the approximate133.5 ha [330 ac] of disturbed land from construction would be relatively small compared to the 421-ha [1,040-ac] proposed project area, which would result in a loss of 0.01 percent of the land available for grazing. The proposed project would not conflict with any existing Federal, State, local, or Indian Tribe land use plans, or planned development in the area. The NRC staff concluded in EIS Section 4.2 that the land use impacts resulting from the proposed action (Phase 1) and Phases 2-20, including the rail spur, from conversion from current land use to industrial use would be SMALL.

- Transportation—Impacts such as increases in traffic, potential changes to traffic safety, and increased degradation of roads would result from the use of roads for shipping equipment, supplies, and produced wastes, as well as because of commuting workers during the lifecycle of the proposed CISF project. The NRC staff concluded in EIS Section 4.3 that the impacts resulting from the proposed action (Phase 1) and Phases 2-20, including the rail spur, on transportation would be SMALL on the daily Highway 62/180 traffic near the proposed CISF project site. Further away from the proposed project area, for example, near Carlsbad, the existing car traffic is higher and the proposed CISF shipments would represent a smaller percentage of existing traffic and therefore would be less noticeable. The NRC staff concluded that this minor increase in local and regional car traffic would not significantly increase traffic safety problems or road degradation relative to existing conditions (EIS Section 4.3.1.1).

- Soils—The largest potential for impacts on soils from the lifecycle of the proposed CISF project would result from clearing and grading, which loosens soil and increases the potential for wind and water erosion. Best management practices (e.g., earthen berms) would be implemented during construction-related activities during the proposed action (Phase 1) and Phases 2-20, including the rail spur, to limit soil loss. The NRC staff concluded in EIS Section 4.4 that the impacts resulting from the proposed action (Phase 1) and Phases 2-20, including the rail spur, on soils would be SMALL and confined to the proposed project area.

- Groundwater quality—Groundwater beneath the proposed project area is unconfined and recharged by natural precipitation. The nearest groundwater has been measured at depths ranging from 10.4 m to 11.49 m [34 ft to 37.7 ft] (ELEA, 2007; GEI Consultants, 2017), which is below the lower limit of the proposed facility. Due to the natural drainage of the proposed project area, any spill (e.g., of oils or lubricants) would enter the onsite ephemeral drainages with a potential to infiltrate the subsurface. However, a site-specific spill prevention and cleanup plan would be developed with procedures to manage spills. In addition, Holtec's required National Pollutant Discharge Elimination System permits would set limits on the amounts of pollutants entering ephemeral drainages that may be in hydraulic communication with alluvial aquifers at or near the site. Therefore, the NRC staff concluded in EIS Section 4.5.2 that impacts from the proposed action (Phase 1) and Phases 2-20, including the rail spur, on groundwater quality would be SMALL, localized, and temporary.

- Groundwater quantity—Potable water for domestic use and stock watering in the vicinity of the proposed project area site is generally obtained from pipelines that convey water to area potash refineries from the Ogallala Aquifer on the High Plains area of eastern Lea County. Consumptive water use during construction of the proposed CISF project would include dust control, cement mixing for construction, and worker consumption (Holtec, 2020). Potable water for construction and operation of the proposed CISF project would be provided by the City of Carlsbad (Holtec, 2020). Therefore, the NRC staff concluded in EIS Section 4.5.2.1.1 that impacts to groundwater quantity from the construction stage of the proposed action (Phase 1) and Phases 2-20 would be SMALL.

- Ecology—Approximately 48.3 ha [119.4 ac] of land would be disturbed from of the proposed action (Phase 1), and at full build-out, approximately 133.5 ha [330 ac] of land would be disturbed. The proposed action (Phase 1) and Phases 2-20, including the rail spur, would disturb and displace local wildlife. No impacts to rare or unique habitats, threatened or endangered species, or commercially or recreationally valuable species would result from activities at the proposed CISF project. The NRC staff concluded in EIS Section 4.6 that potential impacts to ecological resources from the proposed action (Phase 1) and Phases 2-20, including the rail spur, would be SMALL to MODERATE and localized based on the small area that would be impacted, compared to the available comparable habitat within the region.

- Air quality—EIS Section 4.7.1 reports that peak-year emissions, which represent the highest emission levels associated with the proposed CISF project for each individual pollutant in any one year and therefore also represent the greatest potential impact to air quality. The NRC staff concludes in EIS Section 4.7.1 that due to the existing air quality, the proximity of emission sources to receptors, and the proposed CISF project emission levels during the peak-year emissions, including the rail spur, for Phase 1 would be SMALL. The proposed CISF project emission levels for the peak-year impact level determination for Phases 2-20 are comparable to the description of the key factors for the peak year proposed action (Phase 1) impact level determination; therefore, the NRC staff concludes that the potential impacts to air quality during the peak year for Phases 1-20, including the rail spur, would be SMALL.

- Socioeconomics—The NRC staff evaluated peak employment in EIS Section 4.11, assuming concurrent construction and operation of proposed action (Phase 1) for EIS evaluation purposes, and provided an explanation of a maximum number of workers (i.e., 135) that would be employed by any one phase. The NRC staff estimated that up to 148 new residents would move into the socioeconomic 4-county study area, including workers, which would represent an increase of 0.1 to 1 percent in employment, and an increase in less than 0.1 percent in population growth. Concurrent construction and operations activities of the proposed action (Phase 1), including the rail spur, would generate more than 1 percent of local revenues within the socioeconomic ROI, which would result in a moderate impact. The NRC staff concluded in EIS Section 4.11 that this small increase in the population, employment, and revenues within the study area as the result of the proposed action (Phase 1) and Phases 2-20 would have a SMALL to MODERATE impact on socioeconomics.

- Human health—A potential consideration under environmental justice is the possibility that, while the potential impact on the physical environment from the proposed CISF project would not be large, the impact on a minority or low-income community is disproportionately high and adverse because the group (i) is being currently affected by other facilities or environmental problems that leave them disproportionately vulnerable to adverse environmental effects of the facility in question; (ii) has been disproportionately affected by past projects or environmental practices, leaving them more vulnerable now; or (iii) has language barriers, geographical immobility, or inherently poorer access to health care or other response mechanisms than the general population, again leaving them more vulnerable to any environmental or socioeconomic impact from the proposed project (NRC, 2001). In this case, the expected radiological and nonradiological health impact from the proposed action (Phase 1) and Phases 2-20, including the rail spur, is SMALL for the general public for either normal operations or credible accidents (EIS Section 4.15); thus, the enhanced vulnerability concern does not apply, because minority and low-income populations would not be more obviously at risk than the general population from the proposed action (Phase 1) and Phases 2-20, including the rail spur.

No credible accident scenarios for the proposed CISF project could be found resulting in the release of radionuclides to air or ground that could result in significant effects to any offsite populations. The overall environmental impact of the accidents at the proposed CISF project during the license term for the proposed action (Phase 1) and Phases 2-20 is SMALL because safety-related structures, systems, and components are designed to function during and after these accidents. Thus, there is no mechanism for disproportionate environmental effects through accidents on minority and low-income residents near the proposed CISF project.

Table B–3 Census Block Groups Within 80 Kilometers [50 Miles] of the Proposed CISF Project

County/Tract	Block Group	Individuals Below Poverty Level (%)	Families Below Poverty Level (%)	African American (%)	American Indian and Alaskan Native (%)	Asian (%)	Native Hawaiian or Other Pacific Islander (%)	Some Other Race (%)	Two or More Races (%)	Hispanic Ethnicity (%)
State of New Mexico		19.1	14.5	1.8	8.7	1.5	0.1	0.2	1.6	48.8
Threshold for Environmental Justice Concerns		39.1	34.5	21.8	28.7	21.5	20.1	20.2	21.6	48.8
Chaves County, NM		19.4	15.0	1.4	1.1	0.9	0.0	0.3	0.7	56.7
Threshold for Environmental Justice Concerns		39.1	34.5	21.4	21.1	20.9	20.0	20.3	20.7	48.8
Census Tract 12	2	11.4	6.6	0.0	1.6	0.0	0.0	0.0	3.2	45.1
Census Tract 13	2	26.1	25.2	4.4	2.1	0.0	0.0	0.0	0.2	60.9
Census Tract 14	1	18.1	15.2	0.0	0.3	0.0	0.0	0.0	0.0	59.2
Census Tract 14	2	13.4	11.6	0.8	1.4	1.0	0.0	0.0	0.7	65.7
Eddy County, NM		14.6	11.2	1.4	1.4	0.5	0.0	0.0	0.7	49.1
Threshold for Environmental Justice Concerns		34.6	31.2	21.4	21.4	20.5	20.0	20.0	20.7	48.8
Census Tract 1	1	22.0	26.5	7.0	0.2	0.0	0.0	0.0	0.9	53.4
Census Tract 2	1	2.0	1.7	0.0	0.0	1.7	0.0	0.0	0.0	27.2
Census Tract 2	2	21.3	10.1	0.0	3.4	0.0	0.0	0.0	0.0	54.2
Census Tract 2	3	3.5	3.7	0.0	0.5	2.8	0.0	0.0	0.0	43.1
Census Tract 2	4	11.6	10.6	2.4	0.0	8.4	0.0	0.0	2.0	16.6
Census Tract 3	1	5.2	0.0	2.8	0.1	0.0	0.0	0.0	1.1	40.5
Census Tract 3	2	3.1	0.0	0.3	0.5	0.0	0.0	0.0	0.0	47.3
Census Tract 3	3	8.3	8.7	0.0	0.0	0.0	0.0	0.0	0.0	63.9
Census Tract 3	4	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	38.6
Census Tract 3	5	11.0	7.6	0.0	0.0	0.0	0.0	0.0	0.0	39.3
Census Tract 4.01	1	11.1	6.5	0.0	5.2	0.0	0.0	0.0	0.0	26.4
Census Tract 4.01	2	16.5	11.6	0.0	5.8	2.2	0.0	0.0	0.0	65.3
Census Tract 4.01	3	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.0
Census Tract 4.02	1	42.2	33.2	0.0	1.5	0.0	0.0	0.0	0.0	75.5
Census Tract 4.02	2	26.1	30.7	0.0	0.0	0.0	0.0	0.0	0.0	60.9

Table B–3 Census Block Groups Within 80 Kilometers [50 Miles] of the Proposed CISF Project

County/Tract	Block Group	Individuals Below Poverty Level (%)	Families Below Poverty Level (%)	African American (%)	American Indian and Alaskan Native (%)	Asian (%)	Native Hawaiian or Other Pacific Islander (%)	Some Other Race (%)	Two or More Races (%)	Hispanic Ethnicity (%)
Census Tract 4.02	3	26.1	25.8	2.1	0.4	0.0	0.0	1.2	0.0	56.8
Census Tract 4.02	4	8.9	0.0	3.2	0.9	0.0	0.0	0.0	0.0	35.5
Census Tract 5	1	20.1	8.9	8.2	0.0	0.0	0.0	0.0	0.5	69.7
Census Tract 5	2	9.2	0.0	3.6	0.0	0.0	0.0	0.0	2.4	43.0
Census Tract 5	3	25.9	16.8	0.9	0.0	0.0	0.0	0.0	0.0	61.7
Census Tract 6	1	10.3	7.9	4.5	0.0	0.0	0.0	0.0	5.6	41.9
Census Tract 6	2	5.1	0.0	0.0	2.6	1.4	0.0	0.0	1.7	52.5
Census Tract 6	3	2.7	0.0	0.0	0.3	0.0	0.0	0.0	0.0	37.6
Census Tract 6	4	34.9	30.1	0.4	0.0	0.0	0.0	0.0	9.7	38.1
Census Tract 7	1	8.6	3	5.0	0.0	0.0	0.0	0.0	0.0	69.6
Census Tract 7	2	1.4	0.0	0.0	2.8	0.0	0.0	0.0	0.1	25.8
Census Tract 7	3	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.9
Census Tract 7	4	19.2	9.8	3.5	3.2	0.0	0.0	0.8	0.0	32.5
Census Tract 8	1	16.6	13.9	0.0	0.0	0.0	0.0	0.0	0.0	44.5
Census Tract 8	2	10.2	11.3	0.0	9.4	0.0	0.0	0.0	0.5	73.6
Census Tract 9	1	6.4	3.8	0.0	2.9	0.0	0.0	0.0	1.0	35.3
Census Tract 9	2	11.8	13.3	1.5	0.0	0.0	0.0	0.0	0.0	45.0
Census Tract 9	3	18	12.2	0.0	1.5	0.4	0.0	0.0	0.0	50.5
Census Tract 10	1	31.6	26.3	0.0	0.2	0.0	0.0	0.0	0.0	73.0
Census Tract 10	2	52.7	50.5	0.0	30.6	0.0	0.0	0.0	0.0	64.2
Census Tract 10	3	54.6	32.6	0.0	0.0	0.0	0.0	0.0	0.0	67.1
Census Tract 10	4	32.4	12.7	10.3	0.0	0.0	0.0	0.0	0.0	34.4
Census Tract 10	5	13.5	14.1	3.2	0.0	0.0	0.0	0.0	0.0	61.9
Census Tract 10	6	8.3	11.4	0.0	0.0	0.0	0.0	0.0	0.0	57.3
Census Tract 11	1	0.0	0.0	1.1	0.0	0.0	0.0	0.0	5.3	37.3
Census Tract 11	2	35.9	40.4	0.0	0.0	0.0	0.0	0.0	0.0	55.5
Census Tract 11	3	37.7	38.3	0.0	0.0	0.0	0.0	0.0	0.0	77.2
Census Tract 11	4	31.2	23.9	0.9	0.0	0.0	0.0	0.0	0.0	40.3
Census Tract 11	5	8.7	0.0	1.7	0.0	0.0	0.0	0.0	0.0	47.2

Table B–3 Census Block Groups Within 80 Kilometers [50 Miles] of the Proposed CISF Project

County/Tract	Block Group	Individuals Below Poverty Level (%)	Families Below Poverty Level (%)	African American (%)	American Indian and Alaskan Native (%)	Asian (%)	Native Hawaiian or Other Pacific Islander (%)	Some Other Race (%)	Two or More Races (%)	Hispanic Ethnicity (%)
Lea County, NM		15.8	12.4	3.4	0.8	0.6	0.0	0.2	0.9	58.7
Threshold for Environmental Justice Concerns		35.8	32.4	21.8	20.8	20.6	20.0	20.2	20.9	48.8
Census Tract 1	1	13.2	12.7	1.2	1.0	0.2	0.0	5.0	0.0	82.6
Census Tract 1	2	18	3.6	0.0	0.0	0.0	1.1	0.0	0.0	76.5
Census Tract 1	3	34.2	40.0	5.5	0.3	0.0	0.0	0.0	0.0	71.6
Census Tract 2	1	5.5	5.7	0.0	0.0	0.0	0.0	0.0	0.0	76.1
Census Tract 2	2	27.6	27.9	0.0	0.0	0.0	0.0	0.0	0.0	74.2
Census Tract 2	3	31.6	28.7	1.7	3.4	0.0	0.0	0.0	9.9	77.4
Census Tract 3	1	44.3	32.4	28.5	0.0	0.0	0.0	0.0	0.0	70.2
Census Tract 3	2	21.3	16.7	3.7	0.0	0.0	0.0	0.0	0.0	79.6
Census Tract 3	3	21.5	23.8	9.5	0.0	0.0	0.0	0.0	0.0	87.9
Census Tract 3	4	20.9	26.8	1.7	0.0	0.0	0.0	0.0	2.0	71.4
Census Tract 4	1	36.3	35.7	32.5	0.0	0.0	0.0	0.0	0.0	54.6
Census Tract 4	2	27.1	23.0	1.5	0.9	0.0	0.0	0.0	0.0	88.5
Census Tract 4	3	40.4	46.3	6.9	0.0	0.0	0.0	0.0	0.0	89.8
Census Tract 5.02	1	19.9	14.1	0.0	0.7	6.2	0.0	0.0	0.0	52.4
Census Tract 5.02	2	24.7	23.6	16.6	0.0	0.0	0.0	0.0	0.0	58.3
Census Tract 5.02	3	6.3	6.0	0.0	2.6	0.0	0.0	0.0	0.0	80.9
Census Tract 5.02	4	10.7	4.9	2.6	2.6	0.0	0.0	0.0	3.4	48.1
Census Tract 5.02	5	23.3	16.1	0.0	0.0	0.0	0.0	0.0	0.0	50.5
Census Tract 5.02	6	43.1	49.7	2.3	0.0	4.2	0.0	0.0	0.0	64.7
Census Tract 5.03	1	4.5	5.4	6.4	0.0	2.8	0.0	0.0	3.6	35.4
Census Tract 5.03	2	8.1	3.4	10.4	0.7	0.0	0.0	0.0	1.6	34.6
Census Tract 5.03	3	4.2	6.3	2.4	1.9	0.0	0.0	0.0	0.0	46.5

Table B–3 Census Block Groups Within 80 Kilometers [50 Miles] of the Proposed CISF Project

County/Tract	Block Group	Individuals Below Poverty Level (%)	Families Below Poverty Level (%)	African American (%)	American Indian and Alaskan Native (%)	Asian (%)	Native Hawaiian or Other Pacific Islander (%)	Some Other Race (%)	Two or More Races (%)	Hispanic Ethnicity (%)
Census Tract 5.04	1	1	0.0	4.9	2.0	12.2	0.0	1.0	0.0	21.1
Census Tract 5.04	2	3.9	4.3	0.0	1.0	0.0	0.0	0.0	0.0	30.6
Census Tract 5.04	3	16.4	19.6	3.5	0.0	0.0	0.0	0.0	18.6	37.7
Census Tract 6	1	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.0
Census Tract 6	2	23.2	17.2	2.8	0.0	0.0	0.0	0.0	7.0	35.8
Census Tract 6	3	4.3	0.0	0.0	3.5	0.0	0.0	0.0	0.0	65.5
Census Tract 6	4	12.1	0.0	8.3	0.2	0.0	0.0	0.0	0.0	61.1
Census Tract 6	5	35.2	32.4	6.3	0.0	0.0	0.0	0.0	0.0	87.9
Census Tract 6	6	10.9	6.0	11.3	0.0	0.0	0.0	0.0	0.0	63.7
Census Tract 6	7	4.8	0.0	0.1	0.0	0.0	0.0	0.0	0.0	43.6
Census Tract 7.01	1	8.8	4.6	0.6	0.0	0.9	0.0	0.0	0.0	72.0
Census Tract 7.01	2	6.3	3.9	0.0	0.0	0.0	0.0	0.7	0.5	34.0
Census Tract 7.02	1	15.4	19.6	0.0	0.0	0.0	0.0	0.0	0.0	62.4
Census Tract 7.02	2	14.4	15.7	3.2	5.8	1.3	0.0	0.0	0.7	49.6
Census Tract 7.03	1	6.3	4.7	1.7	0.0	0.0	0.0	0.0	3.0	40.9
Census Tract 7.04	1	8.1	2.6	0.5	0.0	0.7	0.0	0.0	0.0	43.4
Census Tract 8	1	6.5	4.0	0.0	0.0	0.0	0.0	0.0	0.0	48.7
Census Tract 8	2	17	9.4	0.0	9.6	0.0	0.0	0.0	0.0	34.1
Census Tract 8	3	35.0	24.8	0.0	0.0	0.0	0.0	0.0	0.0	90.0
Census Tract 8	4	9.1	6.1	0.0	0.0	0.0	0.0	0.0	0.0	42.3
Census Tract 9	1	16.7	8.9	0.0	0.0	0.0	0.0	0.0	0.0	59.7
Census Tract 9	2	10.2	0.0	0.0	1.8	0.0	0.0	0.0	0.0	68.5
Census Tract 9	3	12.2	10.9	2.5	0.4	0.0	0.0	0.0	0.0	52.9
Census Tract 10.03	1	3.1	4.7	11.8	0.0	0.0	0.0	0.0	0.0	68.7
Census Tract 10.03	2	21.8	13.9	0.0	0.0	0.0	0.0	0.0	0.0	70.4

Table B–3 Census Block Groups Within 80 Kilometers [50 Miles] of the Proposed CISF Project

County/Tract	Block Group	Individuals Below Poverty Level (%)	Families Below Poverty Level (%)	African American (%)	American Indian and Alaskan Native (%)	Asian (%)	Native Hawaiian or Other Pacific Islander (%)	Some Other Race (%)	Two or More Races (%)	Hispanic Ethnicity (%)
Census Tract 10.03	3	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.8	65.5
Census Tract 10.03	4	16.3	16.3	0.0	0.0	0.0	0.0	0.0	6.9	36.3
Census Tract 10.04	1	9.8	7.0	0.0	0.0	0.0	0.0	0.0	0.0	78.5
Census Tract 10.04	2	4	2.2	0.0	0.0	0.0	0.0	0.0	0.0	82.9
Census Tract 10.04	3	16.4	7.5	4.5	0.0	0.0	0.0	0.0	0.0	44.9
Census Tract 10.05	1	20.9	14.0	5.9	0.0	0.0	0.0	0.0	0.0	47.9
Census Tract 10.05	2	20	11.2	0.0	0.0	0.0	0.0	0.0	0.0	67.6
Census Tract 10.05	3	25.4	17.8	0.0	0.5	0.0	0.0	1.4	0.0	90.6
Census Tract 11	1	8.9	9.2	0.0	0.0	0.0	0.0	0.0	0.0	37.9
Census Tract 11	3	23.9	16.1	0.0	0.0	0.0	0.0	0.0	0.0	48.1
Census Tract 11	4	22.3	27.1	0.0	0.0	0.0	0.0	0.0	0.0	56.4
Census Tract 11	5	2.9	5.6	0.0	0.0	0.0	0.0	0.0	0.0	64.8
State of Texas		14.7	11.3	11.8	0.3	4.7	0.1	0.2	1.7	39.3
Threshold for Environmental Justice Concerns		34.7	31.3	31.8	20.3	24.7	20.1	20.0	21.7	39.3
Andrews County, TX		9.2	7.3	0.7	0.0	0.4	0.2	0.0	2.3	56.3
Threshold for Environmental Justice Concerns		29.2	27.3	20.7	20.0	20.4	20.2	20.0	21.7	39.3
Census Tract 9501	1	12.9	11.2	0.3	0.0	0.0	0.0	0.0	0.2	49.5
Culberson County, TX		29.6	21.2	0.1	0.0	0.6	0.0	0.0	2.8	71.0
Threshold for Environmental Justice Concerns		34.7	31.3	20.1	20.0	20.6	20.0	20.0	21.7	39.3
Census Tract 9503	1	60.9	47.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table B–3 Census Block Groups Within 80 Kilometers [50 Miles] of the Proposed CISF Project

County/Tract	Block Group	Individuals Below Poverty Level (%)	Families Below Poverty Level (%)	African American (%)	American Indian and Alaskan Native (%)	Asian (%)	Native Hawaiian or Other Pacific Islander (%)	Some Other Race (%)	Two or More Races (%)	Hispanic Ethnicity (%)
Gaines County, TX		15.3	11.4	2.2	0.3	0.5	0.0	0.0	0.0	41.5
Threshold for Environmental Justice Concerns		34.7	31.83	22.2	20.3	20.5	20.0	20.0	20.0	39.3
Census Tract 9502	1	30.1	21.9	0.0	0.3	0.0	0.0	0.0	0.0	22.9
Census Tract 9502	2	18.9	12.8	0.1	1.0	0.8	0.2	0.0	0.0	27.7
Loving County, TX		15.3	0.0	0.0	3.1	0.0	0.0	0.0	0.0	12.2
Threshold for Environmental Justice Concerns		34.7	20.0	20.0	23.1	20.0	20.0	20.0	20.0	32.2
Census Tract 9501	1	15.3	0.0	0.0	3.1	0.0	0.0	0.0	0.0	12.2
Reeves County, TX		15.0	15.4	1.3	0.0	1.3	0.1	0.0	0.2	74.7
Threshold for Environmental Justice Concerns		34.7	31.3	21.3	20.0	21.3	20.1	20.0	20.2	39.3
Census Tract 9501	1	27.7	29.6	1.3	0.0	1.3	0.1	0.0	0.2	77.3
Winkler County, TX		15.0	12.0	2.2	1.0	0.0	0.0	0.0	0.7	61.0
Threshold for Environmental Justice Concerns		34.7	31.3	22.2	20.3	20.0	20.0	20.0	20.7	39.3
Census Tract 9504	1	6.6	2.7	1.9	0.7	0.0	0.0	0.0	2.2	33.9
Yoakum County, TX		8.4	5.4	0.4	0.2	0.0	0.0	0.4	0.7	66.5
Threshold for Environmental Justice Concerns		28.4	25.4	20.4	20.2	20.0	20.0	20.4	20.7	39.3
Census Tract 9502	5	6.6	5.0	0.0	0.0	0.0	0.0	0.0	3.9	47.3

B.3 References

59 FR 7629. *Federal Register*. Vol. 59, No. 32. p. 7,629. “Executive Order 12898—Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations.” The White House. Government Printing Office. 1994.

BEA. “RIMS II Multipliers (2012/2017) Table 2.5 Total Multipliers for Output, Earnings, Employment, and Value Added by Industry Aggregation Proposed Holtec CISF Socioeconomic Region of Influence (Type II).” ADAMS Accession No. ML21195A392. Washington, DC: U.S. Department of Commerce, Bureau of Economic Analysis. 2020.

CEQ. “Environmental Justice Guidance Under the National Environmental Policy Act.” ADAMS Accession No. ML12199A438. Washington, DC: Council on Environmental Quality. 1997.

ELEA. “GNEP Siting Report.” ADAMS Accession Nos. ML17310A225, ML17310A227, ML17310A230, and ML17310A231. Hobbs, New Mexico: Eddy-Lea Energy Alliance. 2007.

GEI Consultants. “Geotechnical Data Report Hi-Store CISF Phase 1 Site Characterization, Lea County, New Mexico.” ADAMS Accession No. ML18023A958. Woburn, Massachusetts: GEI Consultants. 2017.

Holtec. “Environmental Report-HI-STORE Consolidated Interim Storage Facility, Rev 8.” ADAMS Accession No. ML20295A485. Marlton, New Jersey: Holtec International. 2020.

Malhotra, S. and D. Manninen. NUREG/CR–2002, Volume 1, “Migration and Residential Location of Workers at Nuclear Power Plant Construction Sites.” ADAMS Accession No. ML19094B801. PNL–3757. Washington, DC: U.S. Nuclear Regulatory Commission. 1981.

NRC. NUREG–2176, “Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Nuclear Plant Units 6 and 7 (NUREG–2176).” Washington, DC: U.S. Nuclear Regulatory Commission. 2016.

NRC. NUREG–2113, “Environmental Impact Statement for the Proposed Fluorine Extraction Process and Depleted Uranium Deconversion Plant in Lea County, New Mexico.” ADAMS Accession No. ML12220A380. Washington, DC: U.S. Nuclear Regulatory Commission. 2012.

NRC. NUREG–1748, “Environmental Review Guidance for Licensing Actions Associated with NMSS Programs.” ADAMS Accession No. ML032450279. Washington, DC: U.S. Nuclear Regulatory Commission. 2003.

NRC. NUREG–1714, “Final Environmental Impact Statement for the Construction and Operation of an Independent Spent Fuel Storage Installation on the Reservation of the Skull Valley Band of Goshute Indians and the Related Transportation Facility in Tooele County, Utah.” Washington, DC: U.S. Nuclear Regulatory Commission. 2001.

USCB. 2015-2019 5-year American Community Survey; Table DP03: Selected Economic Characteristics; Table DP05: ACS Demographic and Housing Estimates 2015-2019; Table B03002: Hispanic or Latino Origin by Race; Table B17010: Poverty Status in the Past 12 Months of Families by Family Type by Presence of Related Children Under 18 Years by Age of Related Children; Table B17021: Poverty Status of Individuals by Living Arrangement; Table S2001: Earnings in the Past 12 Months (in 2019 Inflation-Adjusted Dollars)s. 2019. Washington, DC: U.S. Department of Commerce, U.S. Census Bureau. <https://data.census.gov/cedsci/> (Accessed 22 April 2020)

APPENDIX C

COST BENEFIT

APPENDIX C COST BENEFIT

This appendix presents the details associated with the estimated costs the NRC staff generated for the proposed Consolidated Interim Storage Facility (CISF) [both the proposed action (Phase 1) and full build-out] as well as the No-Action alternative. As described in the Environmental Impact Statement (EIS) Section 8.2, the quantified cost estimates for the proposed CISF and the No-Action alternative are discounted. Discounting costs requires information on when activities occur (i.e., the project years when the activities occur). EIS Appendix C, Section C.1 describes the project schedule the U.S. Nuclear Regulatory Commission (NRC) staff used for discounting the estimated costs. The discounting calculation also required estimating annual costs for the various activities. In this EIS, costs were expressed in 2019 constant dollars so that these costs were comparable at a single point in time. EIS Appendix C, Section C.2 identifies the estimated annual costs for the activities and describes methodology the NRC staff used to convert these costs in 2019 constant dollars. EIS Appendix C, Section C.3 provides the details on how the NRC staff estimated the costs of the proposed CISF presented in EIS Table 8.3-3 using the information in this appendix. EIS Appendix C, Section C.4 provides the details on how the NRC staff estimated the costs of the No-Action alternative presented in EIS Table 8.4-1 using the information contained in this appendix. EIS Appendix C, Section C.5 contains references.

C.1 Project Schedule Used for Discounting Calculations

Under the No-Action alterative, SNF would continue to be stored at existing nuclear power plants and ISFSIs. Two activities are included in the quantified cost estimate in this EIS for the No-Action alternative: (i) operations and maintenance for storing SNF at the nuclear power plants and ISFSIs, and (ii) SNF transportation from the nuclear power plants and ISFSIs to a repository. Nuclear power plants and ISFSIs operations and maintenance would occur during all 40 years of the proposed CISF license term. For the purpose of discounting the cost estimate in this EIS, the NRC staff assumed that the schedule for transporting SNF from the nuclear power plants and ISFSIs to a repository would be the same as the schedule for transporting SNF from the proposed CISF to a repository described in EIS Appendix C, Table C–1.

Table C–1 Project Years when Activities Occur for the Proposed CISF for Both Phase 1 and Full Build-out (All Phases)

Activity	Project Years when Activity Occurs*	
	Phase 1	Full Build-out
CISF Construction	1 and 2	1 to 21
SNF Transportation from Nuclear Power Plants and ISFSIs to CISF	3	3 to 22
CISF Operations and Maintenance	3 to 40	3 to 40
SNF Transportation from CISF to Repository	40	23 to 40
CISF Decommissioning	41	41

*The applicant specified the project years when the following activities occur: CISF construction, SNF transportation from nuclear power plants and ISFSIs to the CISF, and CISF operations and maintenance. For the purpose of discounting the cost estimates, the NRC staff specified when the following activities occur: SNF transportation from the CISF to a repository and CISF decommissioning.
Source: Holtec, 2020

As described in EIS Section 8.3.2.1, the cost estimates generated from these project schedules would be considered bounding from a discounting perspective since (i) these are considered to be the baseline schedules without any delays and (ii) delaying activities results in lower estimates for today's costs (i.e., lower present values).

C.2 Estimated Activity Costs Expressed in Constant 2019 Dollars

For this EIS, the estimated costs for the various activities are expressed in constant 2019 dollars. The estimated costs for the various activities quantified in the cost benefit analysis in the EIS (Chapter 8) were not initially expressed in 2019 dollars. Cost estimates from sources or documents older than 2019 needed to be adjusted to constant 2019 dollars. The NRC staff calculated the value for the constant 2019 dollars for these costs by following the Bureau of Labor Statistics (BLS) inflation calculator method (BLS, 2019), which uses the annual average Consumer Price Index (CPI) for a given year. The BLS CPI inflation calculator uses the following formula (hereafter called Equation 1):

$$2019\ Constant\ Dollars = \left(\frac{Current\ Month\ 2019\ CPI}{Annual\ Average\ CPI\ from\ Year\ X}\right) Cost\ in\ Year\ X \qquad \text{Eq. 1}$$

The August 2019 CPI was 256.558 (BLS, 2019). The NRC staff recognize that this single CPI value may not fully capture the changes in costs for various construction, operation, and transportation activities; however, using the CPI provides the NRC staff with a method of developing more comparable estimates than using non-adjusted figures from disparate years.

EIS Appendix C, Table C–2, identifies the various activities for both the proposed CISF and the No-Action alternative. In addition, this table also (i) specifies the initial annual cost estimate for the activities, (ii) identifies the year associated with this initial estimate (i.e., the year this cost estimate was made), (iii) specifies the CPI for the year associated with this initial estimate, and (iv) identifies the 2019 constant dollars the NRC staff calculated using the information in this table and Equation 1.

The cost estimates for the activities in EIS Appendix C, Table C–1 were expressed as annual costs. However, the ER (Holtec, 2020) did not express the estimated costs for some activities as annual costs. Next, information detailing the method the NRC staff used to generate the annual costs for those activities is described.

In the ER (Holtec, 2020), the proposed CISF construction cost estimates for both the proposed action (Phase 1) and full build-out were expressed as total costs rather than annual costs. As described in EIS Appendix C, Table C–1, the applicant stated that the proposed action (Phase 1) CISF construction would last 2 years and the construction for each of the 19 subsequent expansion phases would last 1 year. The NRC staff calculated the initial estimated annual cost for the proposed action (Phase 1) CISF construction by dividing the total cost for proposed action (Phase 1) CISF construction ($223.3 million) (Holtec, 2020) by two (the number of years this activity would take). The NRC staff calculated the initial estimated total cost for all of the subsequent expansion phases by subtracting this proposed action (Phase 1) CISF construction cost from the full build-out construction cost ($2.1 billion) (Holtec, 2020). Then, NRC staff calculated the initial estimated annual cost for each individual subsequent expansion phase by dividing the total cost for all of the subsequent expansion phases ($1.877 billion) by 19 (the number of expansion phases, with each expansion phase taking 1 year for construction).

Table C–2 Initial Annual Estimated Costs and 2019 Constant Dollar Values for the Various Activities for the Proposed CISF and the No-Action Alternative					
Activity		**Initial Cost Estimates**			**2019 Constant Dollars**
		Annual Value	**Year***	**Consumer Price Index†**	
CISF Construction	Phase 1	$111,650,000	2017	245.120	$116,859,908
	Subsequent Phase	$98,789,473	2017	245.120	$103,399,272
SNF Transportation - Nuclear Power Plants and ISFSIs to Repository	Phase 1	$225,680,000	2009	214.537	$269,883,561
	Subsequent Years	$130,000,000	2009	214.537	$155,462,880
CISF Operation and Maintenance	Low estimate	$4,500,000	2017	245.120	$4,709,983
	High estimate	$27,300,000	2018	251.107	$27,892,625
CISF Decommissioning	Phase 1	$23,716,000	2017	245.120	$24,822,656
	Full Build-out	$474,320,000	2017	245.120	$496,453,127
SNF Transportation - CISF to Repository	Phase 1	$225,680,000	2009	214.537	$269,883,561
	Subsequent Years	$139,665,882	2009	214.537	$167,022,002
Nuclear Power Plants and ISFSIs Operation and Maintenance	Low estimate	$1,000,000	2012	229.594	$1,117,442
	High estimate	$6,250,000	2012	229.594	$6,984,013
SNF Transportation from Nuclear Power Plants and ISFSIs to Repository	Phase 1	$225,680,000	2009	214.537	$269,883,561
	Subsequent Years	$139,665,882	2009	214.537	$167,022,002

*Year associated with the estimated cost
†The annual average Consumer Price Index for the year associated with the estimated cost.
Sources: Cost Estimates = (Holtec, 2018a) for the proposed CISF lower cost estimate, (Holtec, 2018b) for Phase 1 CISF decommissioning, and (Holtec, 2020) for all other activities. Consumer Price Index yearly values = (BLS, 2019)

The ER (Holtec, 2020) estimated the SNF transportation costs based on the amount of SNF being transported [i.e., $26,000 per metric tons of uranium (MTU)]. For the proposed CISF, two SNF transportation campaigns would occur: first, from the nuclear power plants and ISFSIs to the CISF, and second, from the CISF to the repository. As described in EIS Section 2.2.1, the proposed action (Phase 1) transports up to 8,680 MTU of SNF, and each subsequent phase transports up to 5,000 MTU of SNF {i.e., because the capacity of individual canisters can vary, the 500 canisters proposed in the Holtec license application have the potential to hold up to 8,680 MTUs [9,568 tons]}. As described in EIS Appendix C, Table C–1, the applicant stated that it would take 1 year to transport SNF from the nuclear power plants and ISFSIs to the proposed CISF for the proposed action (Phase 1) and each subsequent phase. The NRC staff calculated the annual costs for transporting the SNF from the nuclear power plants and ISFSIs to the proposed CISF by multiplying the cost per MTU times the appropriate amount of SNF transported.

As described in EIS Appendix C, Table C–1, the NRC staff assumed that transporting SNF from the proposed CISF to a repository would take 1 year for Phase 1 and 18 years for full build-out. The NRC staff assumed this in order to (i) discount the costs in the EIS and (ii) bound these costs from a discounting perspective. First, the NRC staff calculated the total transportation costs for the proposed action (Phase 1) as well as the total transportation costs for all of the remaining SNF by multiplying the cost per MTU ($26,000) times the appropriate amount of SNF transported {8,680 MTU for the proposed action (Phase 1) and 91,320 MTU for the remaining SNF} (Holtec, 2020). Next, the NRC staff calculated the annual costs. For the proposed action (Phase 1), the total cost ($225,680,000) and the annual cost was the same since this activity would take 1 year to accomplish. The NRC staff calculated the annual transportation cost for the remaining SNF by dividing the total cost for the remaining SNF ($2,374,320,000) by the number of remaining years (17). The estimated costs for transporting SNF for the No-Action alternative (i.e., from the nuclear power plants and ISFSIs to a repository) would be the same as the estimated costs for transporting the SNF from the proposed CISF to a repository since the SNF transportation schedules and the amount of SNF transported would be the same.

The applicant expressed all of the operation and maintenance costs as annual cost estimates. As described in EIS Section 8.3.2.1, the applicant assumed that this cost would be the same, regardless of how much SNF was stored at the proposed CISF (i.e., the estimated annual costs for this activity would be the same no matter how many phases were active during an individual year).

For CISF decommissioning, the NRC staff assumed this activity would take 1 year for both the proposed action (Phase 1) and full build-out. The NRC staff chose a 1-year timeframe for decommissioning because this would bound the estimated costs for this activity from a discounting perspective. The applicant estimated the proposed action (Phase 1) total decommissioning cost at $23,716,000 (Holtec, 2018b); however, no estimate was provided for the full build-out decommissioning. For the purpose of the EIS cost benefit analysis, the NRC staff prorated the decommissioning costs based on the amount of SNF associated with the proposed action (Phase 1) and full build-out. The NRC staff used the proposed action (Phase 1) value of 5,000 MTU [5,512 tons] of SNF for this prorating rather than 8,680 MTU [9,568 tons] to generate a more conservative estimate. The proposed action (Phase 1) total decommissioning cost was multiplied by a prorating factor of 20 (100,000 MTU divided by 5,000 MTU) to obtain the full build-out decommissioning cost. The total decommissioning costs were also the annual costs since the NRC staff assumed that this activity would take 1 year to accomplish.

C.3 Generating the Estimated Costs for the Proposed CISF

This section provides details on how the NRC staff generated the estimated costs for the proposed CISF in EIS Table 8.3-3. The NRC staff calculated the costs for the proposed CISF for four cases in EIS Table 8.3-3: Phase 1 Scenario A (low operations cost estimate); Phase 1 Scenario B (high operations cost estimate); full build-out Scenario A (low operations cost estimate); and full build-out Scenario B (high operations cost estimate). For the proposed CISF, each of the four cases consists of the following five cost factors (hereafter called activities): constructing the proposed CISF, transporting the SNF from nuclear power plants and ISFSIs to the proposed CISF, operating and maintaining the CISF, transporting the SNF from the proposed CISF to a permanent geologic repository, and decommissioning the proposed CISF. EIS Table 8.3-3 contains the undiscounted total cost for each of these five activities as well as an overall total cost (i.e., the total cost when the costs for all five activities are combined). In addition, EIS Table 8.3-3 contains the overall total cost at discount rates of 3 and 7 percent.

First, the NRC staff calculated the undiscounted costs for each case using the following steps:

- Creating tables that both (i) identified which activities occur in each project year (from EIS Table C–1), and (ii) specified the undiscounted annual cost for that activity (from EIS Table C–2).

- Generating the total costs for each activity by adding up the costs of each activity over the entire proposed CISF license term.

- Generating the total project costs for each case by adding up the costs of all activities for that case.

EIS Tables C–3, C–4, C–5, and C–6 contain the undiscounted cost estimates for Phase 1 Scenario A; Phase 1 Scenario B; full build-out Scenario A; and full build-out Scenario B, respectively. The NRC generated the contents of these four tables by identifying which activities would be active during each project year and entering the appropriate annual costs. As described in the preceding bullet points, EIS Table C–1 presents the project schedule which specifies by year when each of the activities occurs and EIS Table C–2 presents the annual cost in 2019 dollars for each activity. As described in the preceding bullet points, the NRC staff generated total costs over the 40-year license term for each of the five activities as well as an overall total cost. The NRC staff used information in these four tables to complete the undiscounted costs in EIS Table 8.3-3. More specifically, the undiscounted estimated costs in EIS Table 8.3-3 are the total costs from EIS Tables C–3, C–4, C–5, and C–6. In EIS Table 8.3-3, these total costs are rounded off and expressed in millions of dollars to acknowledge the uncertainty associated with these cost estimates.

Table C–3 Undiscounted Cost Estimates for Phase 1 Scenario A (Lower CISF Operations Cost Estimate)

Project Year	CISF Construction 2019 dollars)	SNF Transportation to CISF (2019 dollars)	CISF Operations (2019 dollars)	SNF Transportation to Repository (2019 dollars)	CISF Decommissioning (2019 dollars)	Total Cost (2019 dollars)
1	116,859,908	0	0	0	0	116,859,908
2	116,859,908	0	0	0	0	116,859,908
3	0	269,883,561	4,709,983	0	0	274,593,543
4	0	0	4,709,983	0	0	4,709,983
5	0	0	4,709,983	0	0	4,709,983
6	0	0	4,709,983	0	0	4,709,983
7	0	0	4,709,983	0	0	4,709,983
8	0	0	4,709,983	0	0	4,709,983
9	0	0	4,709,983	0	0	4,709,983
10	0	0	4,709,983	0	0	4,709,983
11	0	0	4,709,983	0	0	4,709,983
12	0	0	4,709,983	0	0	4,709,983
13	0	0	4,709,983	0	0	4,709,983
14	0	0	4,709,983	0	0	4,709,983
15	0	0	4,709,983	0	0	4,709,983
16	0	0	4,709,983	0	0	4,709,983
17	0	0	4,709,983	0	0	4,709,983
18	0	0	4,709,983	0	0	4,709,983
19	0	0	4,709,983	0	0	4,709,983
20	0	0	4,709,983	0	0	4,709,983
21	0	0	4,709,983	0	0	4,709,983
22	0	0	4,709,983	0	0	4,709,983
23	0	0	4,709,983	0	0	4,709,983
24	0	0	4,709,983	0	0	4,709,983

Table C–3	Undiscounted Cost Estimates for Phase 1 Scenario A (Lower CISF Operations Cost Estimate)					
Project Year	CISF Construction 2019 dollars)	SNF Transportation to CISF (2019 dollars)	CISF Operations (2019 dollars)	SNF Transportation to Repository (2019 dollars)	CISF Decommissioning (2019 dollars)	Total Cost (2019 dollars)
25	0	0	4,709,983	0	0	4,709,983
26	0	0	4,709,983	0	0	4,709,983
27	0	0	4,709,983	0	0	4,709,983
28	0	0	4,709,983	0	0	4,709,983
29	0	0	4,709,983	0	0	4,709,983
30	0	0	4,709,983	0	0	4,709,983
31	0	0	4,709,983	0	0	4,709,983
32	0	0	4,709,983	0	0	4,709,983
33	0	0	4,709,983	0	0	4,709,983
34	0	0	4,709,983	0	0	4,709,983
35	0	0	4,709,983	0	0	4,709,983
36	0	0	4,709,983	0	0	4,709,983
37	0	0	4,709,983	0	0	4,709,983
38	0	0	4,709,983	0	0	4,709,983
39	0	0	4,709,983	0	0	4,709,983
40	0	0	4,709,983	269,883,561	0	274,593,543
41	0	0	0	0	24,822,656	24,822,656
TOTAL*	233,719,816	269,883,561	178,979,349	269,883,561	24,822,656	977,288,943

*These totals appear in EIS Table 8.3-3, and in that table these values are rounded off and expressed in millions of dollars.
Sources: EIS Tables C–1 for the project schedule and C–2 for the estimated costs

Table C–4	Undiscounted Cost Estimates for Phase 1 Scenario B (Higher CISF Operations Cost Estimate)					
Project Year	CISF Construction (2019 dollars)	SNF Transportation to CISF (2019 dollars)	CISF Operations (2019 dollars)	SNF Transportation to Repository (2019 dollars)	CISF Decommissioning (2019 dollars)	Total Cost (2019 dollars)
1	116,859,908	0	0	0	0	116,859,908
2	116,859,908	0	0	0	0	116,859,908
3	0	269,883,561	27,892,625	0	0	297,776,186
4	0	0	27,892,625	0	0	27,892,625
5	0	0	27,892,625	0	0	27,892,625
6	0	0	27,892,625	0	0	27,892,625
7	0	0	27,892,625	0	0	27,892,625
8	0	0	27,892,625	0	0	27,892,625
9	0	0	27,892,625	0	0	27,892,625
10	0	0	27,892,625	0	0	27,892,625
11	0	0	27,892,625	0	0	27,892,625
12	0	0	27,892,625	0	0	27,892,625
13	0	0	27,892,625	0	0	27,892,625
14	0	0	27,892,625	0	0	27,892,625
15	0	0	27,892,625	0	0	27,892,625
16	0	0	27,892,625	0	0	27,892,625
17	0	0	27,892,625	0	0	27,892,625
18	0	0	27,892,625	0	0	27,892,625
19	0	0	27,892,625	0	0	27,892,625
20	0	0	27,892,625	0	0	27,892,625
21	0	0	27,892,625	0	0	27,892,625
22	0	0	27,892,625	0	0	27,892,625
23	0	0	27,892,625	0	0	27,892,625
24	0	0	27,892,625	0	0	27,892,625
25	0	0	27,892,625	0	0	27,892,625
26	0	0	27,892,625	0	0	27,892,625
27	0	0	27,892,625	0	0	27,892,625

Table C–4	Undiscounted Cost Estimates for Phase 1 Scenario B (Higher CISF Operations Cost Estimate)					
Project Year	**CISF Construction (2019 dollars)**	**SNF Transportation to CISF (2019 dollars)**	**CISF Operations (2019 dollars)**	**SNF Transportation to Repository (2019 dollars)**	**CISF Decommissioning (2019 dollars)**	**Total Cost (2019 dollars)**
28	0	0	27,892,625	0	0	27,892,625
29	0	0	27,892,625	0	0	27,892,625
30	0	0	27,892,625	0	0	27,892,625
31	0	0	27,892,625	0	0	27,892,625
32	0	0	27,892,625	0	0	27,892,625
33	0	0	27,892,625	0	0	27,892,625
34	0	0	27,892,625	0	0	27,892,625
35	0	0	27,892,625	0	0	27,892,625
36	0	0	27,892,625	0	0	27,892,625
37	0	0	27,892,625	0	0	27,892,625
38	0	0	27,892,625	0	0	27,892,625
39	0	0	27,892,625	0	0	27,892,625
40	0	0	27,892,625	269,883,561	0	297,776,186
41	0	0	0	0	24,822,656	24,822,656
TOTAL*	233,719,816	269883561	1,059,919,752	269,883,561	24,822,656	1,858,229,346

*These totals appear in EIS Table 8.3-3, and in that table these values are rounded off and or expressed in millions of dollars.
Sources: EIS Tables C–1 for the project schedule and C–2 for the estimated costs

Table C–5	Undiscounted Cost Estimates for Full Build-out Scenario A (Lower CISF Operations Cost Estimate)					
Project Year	**CISF Construction (2019 dollars)**	**SNF Transportation to CISF (2019 dollars)**	**CISF Operations (2019 dollars)**	**SNF Transportation to Repository (2019 dollars)**	**CISF Decommissioning (2019 dollars)**	**Total Cost (2019 dollars)**
1	116,859,908	0	0	0	0	116,859,908
2	116,859,908	0	0	0	0	116,859,908
3	103,399,272	269,883,561	4,709,983	0	0	377,992,816
4	103,399,272	155,462,880	4,709,983	0	0	263,572,135
5	103,399,272	155,462,880	4,709,983	0	0	263,572,135
6	103,399,272	155,462,880	4,709,983	0	0	263,572,135
7	103,399,272	155,462,880	4,709,983	0	0	263,572,135
8	103,399,272	155,462,880	4,709,983	0	0	263,572,135
9	103,399,272	155,462,880	4,709,983	0	0	263,572,135
10	103,399,272	155,462,880	4,709,983	0	0	263,572,135
11	103,399,272	155,462,880	4,709,983	0	0	263,572,135
12	103,399,272	155,462,880	4,709,983	0	0	263,572,135
13	103,399,272	155,462,880	4,709,983	0	0	263,572,135
14	103,399,272	155,462,880	4,709,983	0	0	263,572,135
15	103,399,272	155,462,880	4,709,983	0	0	263,572,135
16	103,399,272	155,462,880	4,709,983	0	0	263,572,135
17	103,399,272	155,462,880	4,709,983	0	0	263,572,135
18	103,399,272	155,462,880	4,709,983	0	0	263,572,135
19	103,399,272	155,462,880	4,709,983	0	0	263,572,135
20	103,399,272	155,462,880	4,709,983	0	0	263,572,135
21	103,399,272	155,462,880	4,709,983	0	0	263,572,135
22	0	155,462,880	4,709,983	0	0	160,172,863
23	0	0	4,709,983	167,022,002	0	171,731,985
24	0	0	4,709,983	167,022,002	0	171,731,985
25	0	0	4,709,983	167,022,002	0	171,731,985
26	0	0	4,709,983	167,022,002	0	171,731,985
27	0	0	4,709,983	167,022,002	0	171,731,985
28	0	0	4,709,983	167,022,002	0	171,731,985
29	0	0	4,709,983	167,022,002	0	171,731,985

Table C–5 Undiscounted Cost Estimates for Full Build-out Scenario A (Lower CISF Operations Cost Estimate)						
Project Year	**CISF Construction (2019 dollars)**	**SNF Transportation to CISF (2019 dollars)**	**CISF Operations (2019 dollars)**	**SNF Transportation to Repository (2019 dollars)**	**CISF Decommissioning (2019 dollars)**	**Total Cost (2019 dollars)**
30	0	0	4,709,983	167,022,002	0	171,731,985
31	0	0	4,709,983	167,022,002	0	171,731,985
32	0	0	4,709,983	167,022,002	0	171,731,985
33	0	0	4,709,983	167,022,002	0	171,731,985
34	0	0	4,709,983	167,022,002	0	171,731,985
35	0	0	4,709,983	167,022,002	0	171,731,985
36	0	0	4,709,983	167,022,002	0	171,731,985
37	0	0	4,709,983	167,022,002	0	171,731,985
38	0	0	4,709,983	167,022,002	0	171,731,985
39	0	0	4,709,983	167,022,002	0	171,731,985
40	0	0	4,709,983	167,022,002	0	171,731,985
41	0	0	0	0	496,453,127	496,453,127
TOTAL*	2,198,305,989	3,223,678,281	178,979,349	3,006,396,036	496,453,127	9,103,812,782
*These totals appear in EIS Table 8.3-3, and in that table these values are rounded off and or expressed in millions of dollars. Sources: EIS Tables C–1 for the project schedule and C–2 for the estimated costs						

Table C–6 Undiscounted Cost Estimates for Full Build-out Scenario B (Higher CISF Operations Cost Estimate)						
Project Year	**CISF Construction (2019 dollars)**	**SNF Transportation to CISF (2019 dollars)**	**CISF Operations (2019 dollars)**	**SNF Transportation to Repository (2019 dollars)**	**CISF Decommissioning (2019 dollars)**	**Total Cost (2019 dollars)**
1	116,859,908	0	0	0	0	116,859,908
2	116,859,908	0	0	0	0	116,859,908
3	103,399,272	269,883,561	27,892,625	0	0	401,175,458
4	103,399,272	155,462,880	27,892,625	0	0	286,754,777
5	103,399,272	155,462,880	27,892,625	0	0	286,754,777
6	103,399,272	155,462,880	27,892,625	0	0	286,754,777
7	103,399,272	155,462,880	27,892,625	0	0	286,754,777
8	103,399,272	155,462,880	27,892,625	0	0	286,754,777
9	103,399,272	155,462,880	27,892,625	0	0	286,754,777
10	103,399,272	155,462,880	27,892,625	0	0	286,754,777
11	103,399,272	155,462,880	27,892,625	0	0	286,754,777
12	103,399,272	155,462,880	27,892,625	0	0	286,754,777
13	103,399,272	155,462,880	27,892,625	0	0	286,754,777
14	103,399,272	155,462,880	27,892,625	0	0	286,754,777
15	103,399,272	155,462,880	27,892,625	0	0	286,754,777
16	103,399,272	155,462,880	27,892,625	0	0	286,754,777
17	103,399,272	155,462,880	27,892,625	0	0	286,754,777
18	103,399,272	155,462,880	27,892,625	0	0	286,754,777
19	103,399,272	155,462,880	27,892,625	0	0	286,754,777
20	103,399,272	155,462,880	27,892,625	0	0	286,754,777
21	103,399,272	155,462,880	27,892,625	0	0	286,754,777
22	0	155,462,880	27,892,625	0	0	183,355,505
23	0	0	27,892,625	167,022,002	0	194,914,627
24	0	0	27,892,625	167,022,002	0	194,914,627
25	0	0	27,892,625	167,022,002	0	194,914,627
26	0	0	27,892,625	167,022,002	0	194,914,627
27	0	0	27,892,625	167,022,002	0	194,914,627
28	0	0	27,892,625	167,022,002	0	194,914,627
29	0	0	27,892,625	167,022,002	0	194,914,627
30	0	0	27,892,625	167,022,002	0	194,914,627

Table C–6 Undiscounted Cost Estimates for Full Build-out Scenario B (Higher CISF Operations Cost Estimate)						
Project Year	**CISF Construction (2019 dollars)**	**SNF Transportation to CISF (2019 dollars)**	**CISF Operations (2019 dollars)**	**SNF Transportation to Repository (2019 dollars)**	**CISF Decommissioning (2019 dollars)**	**Total Cost (2019 dollars)**
31	0	0	27,892,625	167,022,002	0	194,914,627
32	0	0	27,892,625	167,022,002	0	194,914,627
33	0	0	27,892,625	167,022,002	0	194,914,627
34	0	0	27,892,625	167,022,002	0	194,914,627
35	0	0	27,892,625	167,022,002	0	194,914,627
36	0	0	27,892,625	167,022,002	0	194,914,627
37	0	0	27,892,625	167,022,002	0	194,914,627
38	0	0	27,892,625	167,022,002	0	194,914,627
39	0	0	27,892,625	167,022,002	0	194,914,627
40	0	0	27,892,625	167,022,002	0	194,914,627
41	0	0	0	0	496,453,127	496,453,127
TOTAL*	2,198,305,989	3,223,678,281	1,059,919,752	3,006,396,036	496,453,127	9,984,753,185

*These totals appear in EIS Table 8.3-3, and in that table these values are rounded off and expressed in millions of dollars.
Sources: EIS Tables C–1 for the project schedule and C–2 for the estimated costs

Next, the NRC staff calculated the discounted costs at both 3 and 7 percent for the four cases in EIS Table 8.3-3: Phase 1 Scenario A (low operations cost estimate); Phase 1 Scenario B (high operations cost estimate); full build-out Scenario A (low operations cost estimate); and full build-out Scenario B (high operations cost estimate). To start, the NRC staff calculated the discounted costs for each project year for each case using the following formula (hereafter called Equation 2):

$$\mathrm{PV} = \frac{Cost}{(1+\ i)T} \qquad \text{Eq. 2}$$

where
PV = present values
$Cost$ = annual cost in 2019 constant dollars
i = discount rate (0.03 or 0.07)
T = project year (1-40)

The last column (i.e., the undiscounted total costs for each project year) in Table C–3 (Phase 1 Scenario A), Table C–4 (Phase 1 Scenario B), Table C–5 (full build-out Scenario A), and Table C–6 (full build-out Scenario B) provides the cost input for Equation 2 (i.e., "Cost"). The first column in Tables C–3 to C–6 provides the project year input for this equation (i.e., "T"). Consistent with the Office of Management and Budget guidance (OMB, 2003), this cost benefit analysis uses discount rates of 3 percent (i.e., i = 0.03 for Equation 2) and 7 percent (i.e., I = 0.07 for Equation 2). Based on these inputs, the NRC staff calculated the proposed CISF discounted estimated cost for each project year for each case at a 3 percent discount rate in EIS Table C–7 and at the 7 percent discount rate in EIS Table C–8. To obtain the overall discounted costs for each case over the entire license term, the NRC staff added together all of the individual project year discounted costs. The NRC staff used information in Tables C–7 and C–8 to complete the discounted costs in EIS Table 8.3-3. More specifically, the estimated costs discounted at 3 percent in EIS Table 8.3-3 are the total costs from EIS Table C–7 and the estimated costs discounted at 7 percent in EIS Table 8.3-3 are the total costs from EIS Table C–8. In EIS Table 8.3-3, these total costs are rounded off and expressed in millions of dollars to acknowledge the uncertainty associated with these cost estimates.

Table C–7	Proposed CISF Estimated Cost Discounted at 3 Percent			
Project Year	**Phase 1 Scenario A (2019 dollars)**	**Phase 1 Scenario B (2019 dollars)**	**Full Build-out Scenario A (2019 dollars)**	**Full Build-out Scenario B (2019 dollars)**
1	113,456,222	113,456,222	113,456,222	113,456,222
2	110,151,671	110,151,671	110,151,671	110,151,671
3	251,291,991	272,507,393	345,916,973	367,132,374
4	4,184,759	24,782,236	234,180,428	254,777,906
5	4,062,873	24,060,423	227,359,639	247,357,190
6	3,944,536	23,359,634	220,737,514	240,152,612
7	3,829,647	22,679,257	214,308,266	233,157,875
8	3,718,104	22,018,696	208,066,277	226,366,869
9	3,609,810	21,377,375	202,006,095	219,773,659
10	3,504,670	20,754,733	196,122,422	213,372,485
11	3,402,592	20,150,226	190,410,118	207,157,752
12	3,303,487	19,563,326	184,864,193	201,124,031
13	3,207,269	18,993,520	179,479,799	195,266,050
14	3,113,854	18,440,311	174,252,232	189,578,689
15	3,023,159	17,903,215	169,176,924	184,056,980
16	2,935,106	17,381,762	164,249,441	178,696,097
17	2,849,617	16,875,497	159,465,476	173,491,356
18	2,766,619	16,383,978	154,820,851	168,438,210
19	2,686,037	15,906,774	150,311,506	163,532,243
20	2,607,803	15,443,470	145,933,501	158,769,168
21	2,531,848	14,993,660	141,683,010	154,144,823
22	2,458,105	14,556,952	83,593,016	95,691,863
23	2,386,509	14,132,963	87,015,180	98,761,633
24	2,316,999	13,721,323	84,480,757	95,885,081
25	2,249,514	13,321,673	82,020,152	93,092,311
26	2,183,994	12,933,663	79,631,216	90,380,885
27	2,120,383	12,556,955	77,311,860	87,748,432
28	2,058,624	12,191,218	75,060,058	85,192,652
29	1,998,664	11,836,134	72,873,843	82,711,313
30	1,940,451	11,491,392	70,751,304	80,302,246
31	1,883,933	11,156,691	68,690,586	77,963,345
32	1,829,061	10,831,739	66,689,890	75,692,568
33	1,775,787	10,516,252	64,747,466	73,487,930
34	1,724,065	10,209,953	62,861,617	71,347,505
35	1,673,850	9,912,576	61,030,696	69,269,422
36	1,625,097	9,623,860	59,253,103	67,251,866
37	1,577,764	9,343,553	57,527,285	65,293,074
38	1,531,810	9,071,411	55,851,733	63,391,334
39	1,487,194	8,807,195	54,224,983	61,544,985
40	84,178,529	91,285,327	52,645,615	59,752,412
41	7,387,918	7,387,918	147,758,352	147,758,352
TOTAL*	660,569,922	1,152,072,127	5,350,971,268	5,842,473,472

*These totals appear in EIS Table 8.3-3, and in that table these values are rounded off and expressed in millions of dollars.
Sources: EIS Tables C–3 to C–6. Information from these four tables (i.e., the total undiscounted costs for each project year) serve as input for Equation 2, and EIS Table C–7 contains the results of Equation 2 (i.e., the estimated costs discounted at 3 percent).

Table C–8 Proposed CISF Estimated Cost Discounted at 7 Percent				
Project Year	**Phase 1 Scenario A (2019 dollars)**	**Phase 1 Scenario B (2019 dollars)**	**Full Build-out Scenario A (2019 dollars)**	**Full Build-out Scenario B (2019 dollars)**
1	109,214,867	109,214,867	109,214,867	109,214,867
2	102,069,970	102,069,970	102,069,970	102,069,970
3	224,150,127	243,074,068	308,554,733	327,478,675
4	3,593,223	21,279,150	201,077,920	218,763,847
5	3,358,153	19,887,056	187,923,290	204,452,193
6	3,138,460	18,586,034	175,629,243	191,076,816
7	2,933,141	17,370,125	164,139,479	178,576,464
8	2,741,253	16,233,762	153,401,382	166,893,891
9	2,561,919	15,171,740	143,365,778	155,975,599
10	2,394,316	14,179,196	133,986,708	145,771,588
11	2,237,679	13,251,585	125,221,223	136,235,129
12	2,091,289	12,384,659	117,029,180	127,322,550
13	1,954,475	11,574,448	109,373,066	118,993,038
14	1,826,613	10,817,241	102,217,818	111,208,447
15	1,707,115	10,109,571	9,553,0671	103,933,128
16	1,595,434	9,448,197	89,281,001	97,133,764
17	1,491,060	8,830,091	83,440,188	90,779,219
18	1,393,514	8,252,421	77,981,484	84,840,391
19	1,302,350	7,712,543	72,879,892	79,290,085
20	1,217,149	7,207,984	68,112,048	74,102,884
21	1,137,523	6,736,434	63,656,120	69,255,031
22	1,063,105	6,295,733	36,153,124	41,385,751
23	993,556	5,883,862	36,226,327	41,116,633
24	928,557	5,498,937	33,856,380	38,426,760
25	867,810	5,139,193	31,641,477	35,912,860
26	811,038	4,802,984	29,571,474	33,563,420
27	757,979	4,488,770	27,636,891	31,367,683
28	708,392	4,195,113	25,828,870	29,315,591
29	662,048	3,920,666	24,139,131	27,397,749
30	618,737	3,664,174	22,559,936	25,605,373
31	578,259	3,424,461	21,084,052	23,930,255
32	540,429	3,200,431	19,704,722	22,364,724
33	505,074	2,991,057	18,415,628	20,901,611
34	472,031	2,795,381	17,210,867	19,534,216
35	441,151	2,612,505	16,084,922	18,256,277
36	412,291	2,441,594	15,032,638	17,061,941
37	385,318	2,281,863	14,049,194	15,945,739
38	360,110	2,132,582	13,130,088	14,902,560
39	336,552	1,993,068	12,271,110	13,927,626
40	18,337,461	19,885,607	11,468,327	13,016,473
41	1,549,221	1,549,221	30,984,420	30,984,420
TOTAL*	505,438,748	772,588,346	3,141,135,640	3,408,285,238

*These totals appear in EIS Table 8.3-3 and in that table these values are rounded off and or expressed in millions of dollars.
Sources: EIS Tables C–3 to C–6. Information from these four tables (i.e., the total undiscounted costs for each project year) serve as input for Equation 2, and EIS Table C–7 contains the results of Equation 2 (i.e., the estimated costs discounted at 7 percent)

C.4 Generating the Estimated Costs for the No-Action Alternative

This section provides details on how the NRC staff estimated costs generated for the No-Action alternative in EIS Table 8.4-1. The NRC staff calculated the costs for the proposed CISF for four cases in EIS Table 8.4-1: Phase 1 Scenario 1 (no additional reactors shut down); Phase 1 Scenario 2 (all reactors shut down in 2040); full build-out Scenario 1 (no additional reactors shut down); and full build-out Scenario 2 (all reactors shut down in 2040). For the No-Action alternative, each of these four cases consists of the following two activities: i) operating and maintaining the SNF storage at the nuclear power plants and ISFSI sites and ii) transporting the SNF from the nuclear power plants and ISFSI sites to a geologic repository. Operation costs at the nuclear power plants and ISFSIs vary depending on whether the reactor is operating or shut down. EIS Table 8.4-1 contains the undiscounted total cost for these two activities as well as an overall total cost (i.e., the total cost when the costs for these two activities are combined). In addition, EIS Table 8.4-1 contains the overall total cost at discounted rates of 3 and 7 percent.

First, the NRC staff calculated the undiscounted costs for each case using the following steps:

- Creating a table that identifies the operational costs for the various project years for each of the four cases based on (i) the number and types of reactors (i.e., active or decommissioned) associated with the SNF at the nuclear power plants and ISFSIs (EIS Section 8.4.2.1) and (ii) the undiscounted annual cost for storing SNF at nuclear power plants and ISFSIs (from EIS Table C–2).

- Creating tables that both (i) identified which activities occur in each project year (from EIS Table C–1 and EIS Section 8.3.1.1) and (ii) specified the undiscounted annual cost for that activity (the table generated by the preceding bullet point).

- Generating the total costs for each activity by adding up the costs of each activity over the entire proposed CISF time frame.

- Generating the total project costs for each case by adding up the costs of all activities for that case.

EIS Table C–9 identifies the annual operational costs for storing SNF at the nuclear power plants and ISFSIs for the various CISF project years for all four cases. EIS Section 8.4.2.1 contains information about the assumptions used in EIS Table C–9 concerning the number and type of reactors associated with the current SNF storage sites. The annual decommissioned and active reactor site operating costs in EIS Table C–9 come from EIS Table C–2.

EIS Table C–10 contains the undiscounted cost estimates for the Phase 1 scenarios and EIS Table C–11 contains the undiscounted cost estimates for the full build-out scenarios. The project schedule used for EIS Tables C–10 and C–11 come from EIS Table C–1. The SNF transportation costs in EIS Tables C–10 and C–11 come from EIS Table C–2. The annual operation costs in EIS Tables C–10 and C–11 come from EIS Table C–9 with a modification to the operation costs during the last 18 years for the full build-out cases in EIS Table C–11. For full build-out, the NRC staff assumed the SNF transportation campaign lasts 18 years. The cost for storing SNF at the nuclear power plants and ISFSIs is eliminated because the SNF is relocated to the proposed CISF. To account for this, the NRC staff reduced the nuclear power plants and ISFSIs operation costs by 5.5 percent each year in EIS Table C–11, which evenly drops the cost for this activity over the 18-year

Table C–9 Annual Operation Costs for Storing SNF at Nuclear Power Plants and ISFSIs by CISF Project Year								
CASE	Project Years	Decommissioned Reactor Sites			Active Reactor Sites			Total Annual Cost
		Number	Cost per Site	Decom Cost	Number	Cost per Site	Active Cost	
Phase 1 Scenario 1	1-40	12	$6,984,013	$83,808,156	2	$1,117,442	$2,234,884	$86,043,040
Phase 1 Scenario 2	1-20	12	$6,984,013	$83,808,156	2	$1,117,442	$2,234,884	$86,043,040
	21-40	14	$6,984,013	$97,776,182	0	$1,117,442	$0	$97,776,182
Full Build-out Scenario 1	1-40	12	$6,984,013	$83,808,156	60	$1,117,442	$67,046,520	$150,854,676
Full Build-out Scenario 2	1-20	12	$6,984,013	$83,808,156	60	$1,117,442	$67,046,520	$150,854,676
	21-40	72	$6,984,013	$502,848,936	0	$1,117,442	$0	$502,848,936

Source: EIS Table C–2 for the estimated cost per site for decommissioned and active reactor sites

Table C–10 The No-Action Alternative Undiscounted Cost Estimates for the Phase 1 Scenarios						
	Phase 1 – Scenario 1			Phase 1 – Scenario 2		
Project Year	Operations (2019 dollars)	SNF Transportation (2019 dollars)	Total Cost (2019 dollars)	Operations (2019 dollars)	SNF Transportation (2019 dollars)	Total Cost (2019 dollars)
1	86,043,040	0	86,043,040	86,043,040	0	86,043,040
2	86,043,040	0	86,043,040	86,043,040	0	86,043,040
3	86,043,040	0	86,043,040	86,043,040	0	86,043,040
4	86,043,040	0	86,043,040	86,043,040	0	86,043,040
5	86,043,040	0	86,043,040	86,043,040	0	86,043,040
6	86,043,040	0	86,043,040	86,043,040	0	86,043,040
7	86,043,040	0	86,043,040	86,043,040	0	86,043,040
8	86,043,040	0	86,043,040	86,043,040	0	86,043,040
9	86,043,040	0	86,043,040	86,043,040	0	86,043,040
10	86,043,040	0	86,043,040	86,043,040	0	86,043,040
11	86,043,040	0	86,043,040	86,043,040	0	86,043,040
12	86,043,040	0	86,043,040	86,043,040	0	86,043,040
13	86,043,040	0	86,043,040	86,043,040	0	86,043,040
14	86,043,040	0	86,043,040	86,043,040	0	86,043,040
15	86,043,040	0	86,043,040	86,043,040	0	86,043,040
16	86,043,040	0	86,043,040	86,043,040	0	86,043,040
17	86,043,040	0	86,043,040	86,043,040	0	86,043,040
18	86,043,040	0	86,043,040	86,043,040	0	86,043,040
19	86,043,040	0	86,043,040	86,043,040	0	86,043,040
20	86,043,040	0	86,043,040	86,043,040	0	86,043,040
21	86,043,040	0	86,043,040	97,776,182	0	97,776,182
22	86,043,040	0	86,043,040	97,776,182	0	97,776,182
23	86,043,040	0	86,043,040	97,776,182	0	97,776,182
24	86,043,040	0	86,043,040	97,776,182	0	97,776,182
25	86,043,040	0	86,043,040	97,776,182	0	97,776,182
26	86,043,040	0	86,043,040	97,776,182	0	97,776,182
27	86,043,040	0	86,043,040	97,776,182	0	97,776,182
28	86,043,040	0	86,043,040	97,776,182	0	97,776,182
29	86,043,040	0	86,043,040	97,776,182	0	97,776,182
30	86,043,040	0	86,043,040	97,776,182	0	97,776,182
31	86,043,040	0	86,043,040	97,776,182	0	97,776,182
32	86,043,040	0	86,043,040	97,776,182	0	97,776,182
33	86,043,040	0	86,043,040	97,776,182	0	97,776,182
34	86,043,040	0	86,043,040	97,776,182	0	97,776,182
35	86,043,040	0	86,043,040	97,776,182	0	97,776,182
36	86,043,040	0	86,043,040	97,776,182	0	97,776,182
37	86,043,040	0	86,043,040	97,776,182	0	97,776,182
38	86,043,040	0	86,043,040	97,776,182	0	97,776,182
39	86,043,040	0	86,043,040	97,776,182	0	97,776,182
40	86,043,040	269,883,561	355,926,601	97,776,182	269,883,561	367,659,743

Table C–10 The No-Action Alternative Undiscounted Cost Estimates for the Phase 1 Scenarios						
	Phase 1 – Scenario 1			Phase 1 – Scenario 2		
Project Year	Operations (2019 dollars)	SNF Transportation (2019 dollars)	Total Cost (2019 dollars)	Operations (2019 dollars)	SNF Transportation (2019 dollars)	Total Cost (2019 dollars)
Total*	3,441,721,600	269,883,561	3,711,605,161	3,676,384,440	269,883,561	3,946,268,001

*These totals appear in EIS Table 8.4-1, and in that table these values are rounded off and expressed in millions of dollars.
Sources: EIS Tables C–1 for the project schedule and C–2 for the estimated costs

Table C–11 The No-Action Alternative Undiscounted Cost Estimates for the Full Build-out Scenarios						
	Full Build-out Scenario 1			Full Build-out Scenario 2		
Project Year	Operations (2019 dollars)	SNF Transportation (2019 dollars)	Total Cost (2019 dollars)	Operations (2019 dollars)	SNF Transportation (2019 dollars)	Total Cost (2019 dollars)
1	150,854,676	0	150,854,676	150,854,676	0	150,854,676
2	150,854,676	0	150,854,676	150,854,676	0	150,854,676
3	150,854,676	0	150,854,676	150,854,676	0	150,854,676
4	150,854,676	0	150,854,676	150,854,676	0	150,854,676
5	150,854,676	0	150,854,676	150,854,676	0	150,854,676
6	150,854,676	0	150,854,676	150,854,676	0	150,854,676
7	150,854,676	0	150,854,676	150,854,676	0	150,854,676
8	150,854,676	0	150,854,676	150,854,676	0	150,854,676
9	150,854,676	0	150,854,676	150,854,676	0	150,854,676
10	150,854,676	0	150,854,676	150,854,676	0	150,854,676
11	150,854,676	0	150,854,676	150,854,676	0	150,854,676
12	150,854,676	0	150,854,676	150,854,676	0	150,854,676
13	150,854,676	0	150,854,676	150,854,676	0	150,854,676
14	150,854,676	0	150,854,676	150,854,676	0	150,854,676
15	150,854,676	0	150,854,676	150,854,676	0	150,854,676
16	150,854,676	0	150,854,676	150,854,676	0	150,854,676
17	150,854,676	0	150,854,676	150,854,676	0	150,854,676
18	150,854,676	0	150,854,676	150,854,676	0	150,854,676
19	150,854,676	0	150,854,676	150,854,676	0	150,854,676
20	150,854,676	0	150,854,676	150,854,676	0	150,854,676
21	150,854,676	0	150,854,676	502,848,936	0	502,848,936
22	150,854,676	0	150,854,676	502,848,936	0	502,848,936
23	142,557,669	167,022,002	309,579,671	475,192,245	167,022,002	642,214,247
24	134,260,662	167,022,002	301,282,664	447,535,553	167,022,002	614,557,555
25	125,963,654	167,022,002	292,985,656	419,878,862	167,022,002	586,900,864
26	117,666,647	167,022,002	284,688,649	392,222,170	167,022,002	559,244,172
27	109,369,640	167,022,002	276,391,642	364,565,479	167,022,002	531,587,481
28	101,072,633	167,022,002	268,094,635	336,908,787	167,022,002	503,930,789
29	92,775,626	167,022,002	259,797,628	309,252,096	167,022,002	476,274,098
30	84,478,619	167,022,002	251,500,621	281,595,404	167,022,002	448,617,406
31	76,181,611	167,022,002	243,203,613	253,938,713	167,022,002	420,960,715
32	67,884,604	167,022,002	234,906,606	226,282,021	167,022,002	393,304,023
33	59,587,597	167,022,002	226609599	198,625,330	167,022,002	365,647,332
34	51,290,590	167,022,002	218312592	170,968,638	167,022,002	337,990,640
35	42,993,583	167,022,002	210015585	143,311,947	167,022,002	310,333,949
36	34,696,575	167,022,002	201718577	115,655,255	167,022,002	282,677,257
37	26,399,568	167,022,002	193421570	87,998,564	167,022,002	255,020,566
38	18,102,561	167,022,002	185124563	60,341,872	167,022,002	227,363,874
39	9,805,554	167,022,002	176827556	32,685,181	167,022,002	199,707,183
40	1,508,547	167,022,002	168530549	5,028,489	167,022,002	172,050,491
Total*	4,615,398,812	3,006,396,036	7,621,794,848	8,344,777,997	3,006,396,036	11,351,174,033

*These totals appear in EIS Table 8.4-1, and in that table these values are rounded off and or expressed in millions of dollars.
Sources: EIS Tables C–1 for the project schedule and C–2 for the estimated costs

period. The NRC staff used information in these tables to complete the undiscounted costs in EIS Table 8.4-1. More specifically, the undiscounted estimated costs in EIS Table 8.4-1 are the total costs from EIS Tables C–10 and C–11. In EIS Table 8.4-1, these total costs are rounded off and expressed in millions of dollars to acknowledge the uncertainty associated with these cost estimates. Next, the NRC staff calculated the discounted costs for each project year at both 3 and 7 percent for the four cases in EIS Table 8.4-1 using Equation 2. The total cost columns (i.e., the undiscounted total costs for each project year) in Tables C–10 and C–11 provide the cost input for Equation 2 and the first column in these tables provides the project year input for this equation. Consistent with the Office of Management and Budget guidance (OMB, 2003), this cost benefit analysis uses discount rates of 3 percent (i.e., i = 0.03 for Equation 2) and 7 percent (i.e., I = 0.07 for Equation 2). Based on these inputs, the NRC staff calculated the No-Action alternative discounted estimated cost for each project year at a 3 percent discount rate in EIS Table C–12 and at the 7 percent discount rate in EIS Table C–13. To obtain the overall discounted costs for each case over the entire license term, the NRC staff added together all of the individual project year discounted costs. The NRC staff used information in Tables C–12 and C–13 to complete the discounted costs in EIS Table 8.4-1. More specifically, the estimated costs discounted at 3 percent in EIS Table 8.4-1 are the total costs from EIS Table C–12 and the estimated costs discounted at 7 percent in EIS Table 8.4-1 are the total costs from EIS Table C–13. In EIS Table 8.4-1, these total costs are rounded off and expressed in millions of dollars to acknowledge for the uncertainty associated with these cost estimates.

Table C–12 No-Action Alternative Estimated Cost Discounted at 3 Percent

Project Year	Phase 1 Scenario 1 (2019 dollars)	Phase 1 Scenario 2 (2019 dollars)	Full Build-out Scenario 1 (2019 dollars)	Full Build-out Scenario 2 (2019 dollars)
1	83,536,932	83,536,932	146,460,850	146,460,850
2	81,103,818	81,103,818	142,195,000	142,195,000
3	78,741,570	78,741,570	138,053,399	138,053,399
4	76,448,127	76,448,127	134,032,426	134,032,426
5	74,221,482	74,221,482	130,128,569	130,128,569
6	72,059,691	72,059,691	126,338,416	126,338,416
7	69,960,865	69,960,865	122,658,657	122,658,657
8	67,923,170	67,923,170	119,086,074	119,086,074
9	65,944,826	65,944,826	115,617,548	115,617,548
10	64,024,102	64,024,102	112,250,046	112,250,046
11	62,159,323	62,159,323	108,980,628	108,980,628
12	60,348,857	60,348,857	105,806,435	105,806,435
13	58,591,123	58,591,123	102,724,694	102,724,694
14	56,884,586	56,884,586	99,732,712	99,732,712
15	55,227,753	55,227,753	96,827,876	96,827,876
16	53,619,178	53,619,178	94,007,647	94,007,647
17	52,057,454	52,057,454	91,269,560	91,269,560
18	50,541,218	50,541,218	88,611,223	88,611,223
19	49,069,143	49,069,143	86,030,314	86,030,314
20	47,639,945	47,639,945	83,524,577	83,524,577
21	46,252,374	52,559,516	81,091,822	270,306,081
22	44,905,217	51,028,656	78,729,924	262,433,089
23	43,597,298	49,542,385	156,861,465	325,404,659
24	42,327,474	48,099,403	148,211,106	302,321,594
25	41,094,635	46,698,449	139,931,581	280,307,121
26	39,897,704	45,338,300	132,008,626	259,318,574
27	38,735,635	44,017,767	124,428,492	239,314,866
28	37,607,413	42,735,696	117,177,933	220,256,433
29	36,512,051	41,490,967	110,244,178	202,105,181
30	35,448,593	40,282,492	103,614,926	184,824,431
31	34,416,110	39,109,216	97,278,319	168,378,874
32	33,413,699	37,970,113	91,222,935	152,734,518
33	32,440,484	36,864,187	85,437,767	137,858,641
34	31,495,616	35,790,473	79,912,211	123,719,750

Table C–12	No-Action Alternative Estimated Cost Discounted at 3 Percent			
Project Year	**Phase 1 Scenario 1 (2019 dollars)**	**Phase 1 Scenario 2 (2019 dollars)**	**Full Build-out Scenario 1 (2019 dollars)**	**Full Build-out Scenario 2 (2019 dollars)**
35	30,578,268	34,748,032	74,636,052	110,287,533
36	29,687,639	33,735,953	69,599,450	97,532,820
37	28,822,950	32,753,353	64,792,926	85,427,538
38	27,983,447	31,799,371	60,207,349	73,944,678
39	27,168,395	30,873,176	55,833,928	63,058,251
40	109,111,734	112,708,609	51,664,193	52,743,255
TOTAL*	2,071,599,901	2,168,249,278	4,167,221,831	5,856,614,539

*These totals appear in EIS Table 8.4-1, and in that table these values are rounded off and expressed in millions of dollars
Sources: EIS Tables C–10 to C–11. Information from these two tables (i.e., the total undiscounted costs for each project year) serve as input for Equation 2, and EIS Table C–12 contains the results of Equation 2 (i.e., the estimated costs discounted at 3 percent).

Table C–13	No-Action Alternative Estimated Cost Discounted at 7 Percent			
Project Year	**Phase 1 Scenario 1 (2019 dollars)**	**Phase 1 Scenario 2 (2019 dollars)**	**Full Build-out Scenario 1 (2019 dollars)**	**Full Build-out Scenario 2 (2019 dollars)**
1	80,414,056	80,414,056	140,985,679	140,985,679
2	75,153,323	75,153,323	131,762,316	131,762,316
3	70,236,751	70,236,751	123,142,352	123,142,352
4	65,641,823	65,641,823	115,086,310	115,086,310
5	61,347,498	61,347,498	107,557,299	107,557,299
6	57,334,111	57,334,111	100,520,840	100,520,840
7	53,583,281	53,583,281	93,944,711	93,944,711
8	50,077,833	50,077,833	87,798,795	87,798,795
9	46,801,713	46,801,713	82,054,949	8,2054,949
10	43,739,918	43,739,918	76,686,868	76,686,868
11	40,878,428	40,878,428	71,669,970	71,669,970
12	38,204,139	38,204,139	66,981,280	66,981,280
13	35,704,803	35,704,803	62,599,327	62,599,327
14	33,368,974	33,368,974	58,504,044	58,504,044
15	31,185,957	31,185,957	54,676,677	54,676,677
16	29,145,755	29,145,755	51,099,698	51,099,698
17	27,239,023	27,239,023	47,756,727	47,756,727
18	25,457,031	25,457,031	44,632,455	44,632,455
19	23,791,618	23,791,618	41,712,575	41,712,575
20	22,235,157	22,235,157	38,983,715	38,983,715
21	20,780,520	23,614,228	36,433,378	121,444,599
22	19,421,047	22,069,372	34,049,886	113,499,625
23	18,150,511	20,625,581	65,304,867	135,473,094
24	16,963,095	19,276,244	59,396,859	121,157,945
25	15,853,359	18,015,181	53,982,366	108,136,001
26	14,816,224	16,836,618	49,022,102	96,299,326
27	13,846,938	15,735,157	44,479,808	85,548,569
28	12,941,064	14,705,754	40,322,026	75,792,306
29	12,094,452	13,743,695	36,517,886	66,946,428
30	11,303,226	12,844,575	33,038,911	58,933,575
31	10,563,763	12,004,276	29,858,839	51,682,613
32	9,872,675	11,218,949	26,953,449	45,128,147
33	9,226,799	10,484,999	24,300,412	39,210,081
34	8,623,177	9,799,065	21,879,145	33,873,200
35	8,059,044	9,158,005	19,670,677	29,066,790
36	7,531,817	8,558,883	17,657,528	24,744,283
37	7,039,081	7,998,956	15,823,594	20,862,936
38	6,578,581	7,475,660	14,154,042	17,383,528

Table C–13 No-Action Alternative Estimated Cost Discounted at 7 Percent

Project Year	Phase 1 Scenario 1 (2019 dollars)	Phase 1 Scenario 2 (2019 dollars)	Full Build-out Scenario 1 (2019 dollars)	Full Build-out Scenario 2 (2019 dollars)
39	6,148,206	6,986,598	12,635,214	14,270,078
40	23,768,914	24,552,458	11,254,534	11,489,597
TOTAL*	1,165,123,684	1,197,245,444	2,244,892,112	2,869,099,307

*These totals appear in EIS Table 8.4-1, and in that table these values are rounded off and or expressed in millions of dollars

Sources: EIS Tables C–11 to C–12. Information from these two tables (i.e., the total undiscounted costs for each project year) serve as input for Equation 2, and EIS Table C–12 contains the results of Equation 2 (i.e., the estimated costs discounted at 7 percent).

C.5 References

BLS. Consumer Price Index Data from 1913 to 2019. Washington, DC: U.S. Bureau of Labor Statistics. 2019. <http://www.bls.gov/data/inflation_calculator.htm. https://www.usinflationcalculator.com/inflation/consumer-price-index-and-annual-percent-changes-from-1913-to-2008/> (Accessed 17 September 2019).

Holtec. “Environmental Report-HI-STORE Consolidated Interim Storage Facility, Rev. 8.” ADAMS Accession No. ML20295A485. Marlton, New Jersey: Holtec International. 2020

Holtec. “Responses to Request for Additional Information.” ADAMS Accession No. ML18345A137. Marlton, New Jersey: Holtec International. 2018a.

Holtec. “Holtec International & Eddy Lea Energy Alliance (ELEA) Underground CISF – Financial Assurance & Project Life Cycle Cost Estimates.” ADAMS Accession No. ML18345A143. Marlton, New Jersey: Holtec International. 2018b.

OMB. “Circular A-4: Regulatory Analysis.” NRC000060. ADAMS Accession No. ML11231A834. Washington, DC: Office of Management and Budget. 2003

APPENDIX D
PUBLIC COMMENT SUMMARIES AND RESPONSES

D.1 The Holtec CISF Draft Environmental Impact Statement Public Comment Summaries And Responses

D.1.1 Introduction

The U.S. Nuclear Regulatory Commission (NRC) issued a *Federal Register* Notice (FRN) on March 20, 2020, notifying the public of the availability of the draft Environmental Impact Statement (EIS) and requesting public comment (85 FR 16150). The NRC notice provided for a 60-day public comment period, ending May 22, 2020. However, the NRC staff recognized that the pandemic health emergency created unique challenges for all stakeholders—including members of the public—to be able to participate in the public comment process. In response to requests for a comment period extension and in recognition of these challenges, the NRC extended the comment deadline on April 27, 2020, for an additional 60 days until July 22, 2020 (85 FR 23382) and again on June 24, 2020, for an additional 60 days until September 22, 2020 (85 FR 37964). This resulted in a 180-day comment period.

As a result of the pandemic and associated public health emergency, in-person meetings were determined to be unsafe by Federal, State, and local governments and agencies. Consistent with the practice of several other Federal agencies, the NRC modified its public interactions from in-person meetings to virtual meetings, such as webinars. This change allowed opportunities for oral comments while maintaining safety protocols for NRC staff and stakeholders. Comments received at webinar public meetings were handled and considered in the same way as if they had been received during in-person public comment meetings: a transcript was taken of the meeting and made available to the public, and the comments were grouped with comments received through other means (e.g., mail and email) for NRC staff response. Public meetings held through webinar also allowed for national participation. The NRC staff's meeting slides, handouts, and project fact sheets were available in both English and Spanish at the public meetings, and these slides, handouts, and fact sheets, as well as the transcripts for each meeting, are available at NRC's public web page at https://www.nrc.gov/waste/spent-fuel-storage/cis/holtec-international.html.

The NRC staff strives to conduct regulatory activities in an open and transparent manner and to make information as accessible as possible to optimize public participation. For this draft EIS public comment process, the NRC staff published FRNs, issued press releases, placed newspaper ads, and posted information to the NRC website. The NRC staff sent copies of materials to libraries closest to the proposed Consolidated Interim Storage Facility (CISF) site and mailed hard copies of the draft EIS to those that requested it. The NRC staff held six public webinars accessible from any location on June 23, July 9, August 20, 25, 26, and September 2, 2020. Approximately 400 people attended the June 23, 2020 meeting, with 38 providing verbal comments, and approximately 200 people attended the July 9, 2020 meeting, with 42 providing verbal comments. Approximately 90 people attended the August 20, 2020 meeting, with 15 providing verbal comments, approximately 115 people attended the August 25, 2020 meeting with 22 providing verbal comments, approximately 75 people attended the August 26, 2020 meeting with 15 providing verbal comments, and approximately 130 people attended the September 2, 2020 meeting, with 27 providing verbal comments. As previously noted, the NRC extended the public comment period to 180 days, during which comments were also received by email, mail, or through regulations.gov. The NRC accepted all comments on the draft EIS received on or before September 22, 2020.

The NRC received approximately 4,807 comment correspondence, including form letters. From these, the NRC identified 428 unique correspondence that were delineated into a total of 3,718 unique comments. This appendix contains summaries of these comments by subject matter, the NRC staff's responses to the comments, and a table of the correspondence numbers. Where applicable, the responses note which EIS sections the NRC staff edited in response to comments.

Comment Review Method

Draft EIS comment correspondence received by the NRC staff included e-mails, comment letters, comments submitted online at www.regulations.gov, and transcripts of comments provided orally at the four virtual public meeting webinars. The NRC staff assigned a number to each commenter based on the order in which the correspondence was received. For form comment correspondence (i.e., identical comment correspondence submitted or signed by multiple people), the NRC staff assigned a single number and noted that the correspondence was from multiple commenters. Individuals who submitted or signed a form e-mail or letter, and who modified the e-mail or letter with additional comments were given a unique commenter number to allow the separate identification of that individual's additional comments. Individuals who submitted more than one piece of comment correspondence and/or who spoke at more than one public webinar have multiple identification numbers (one for each correspondence that contains their comments). Additionally, for extensive correspondence, the NRC staff sub-divided the correspondence to better identify and number comments.

The NRC staff reviewed each comment correspondence and identified and consecutively numbered distinct comments in each document. Comment numbers follow a two-part or three-part numbering system separated by a hyphen(s). The first part of the numbering system corresponds to either (1) the unique identification number for each commenter or (2) the number assigned to each public meeting transcript. Transcripts for the June 23, July 9, August 20, 25, 26, and September 2, public webinars are identified respectively as 98-, 99-, 167-, 168-, 169-and 170-. In the two-part number system, the second number is a consecutive number for each comment identified in the comment correspondence.

For the three-part number system, the second number refers to either (1) a sub-divided part of an extensive correspondence or (2) the individual commenting, in consecutive order, at the identified public meeting webinar (e.g., 98-12 corresponds to the 12th speaker at the June 23, 2020 webinar). The final number is a consecutive number for each comment identified in the comment correspondence or made by the commenter in a transcript.

Table D–1 provides, in alphabetical order by last name, a list of all commenters, their affiliations if stated, the manner in which their comment correspondence was submitted, the Accession Number to be used to find the correspondence in the NRC's Agencywide Documents Access and Management System (ADAMS), and the identification number assigned to the commenter and their comment correspondence.

D.2 Public Comment Summaries and Responses

D.2.1 Comments Concerning NEPA Process

D.2.1.1 National Environmental Policy Act (NEPA) General—Adjudicatory Hearings

The NRC received a comment expressing concern about the separation of environmental concerns and public participation in the EIS, further stating that this bifurcation of topics would lead to future lawsuits.

Response: *The NRC staff is reviewing the Holtec application in accordance with the applicable NRC regulations for a CISF. This process is a well-established regulatory framework, which includes a safety review, an environmental review, and an opportunity for adjudicatory hearings. Because the adjudicatory process is separate from this EIS, comments about the Atomic Safety Licensing Board (ASLB) decisions and process are beyond the scope of this EIS.*

The NRC directly engages with stakeholders regarding its regulatory review process during the environmental review process. All stakeholders, including government representatives, Tribal members, and members of the public, are encouraged to attend and participate in the environmental public comment process. As discussed more extensively in Section 2.2 of this appendix, the NRC staff offered ample opportunity for public participation. The NRC staff held six public webinars accessible from any location and had a 180-day public comment period, during which comments could be sent by email, mail, or through regulations.gov.

No change has been made to the EIS as a result of this comment.

Comment: (170-14-6)

D.2.1.2 NEPA General—Role of State and Local Governments in Decommissioning

One commenter questioned the role of State and local governments in the decommissioning process and aging management of the proposed CISF.

Response: *The NRC has oversight of the proposed facility under a specific Title 10 of the Code of Federal Regulations (10 CFR) Part 72 license, which establishes the requirements, procedures, and criteria for the receipt, handling, storage, and transfer of spent nuclear fuel (SNF). These NRC requirements for storage include aging management processes and practices, such as inspections. The NRC enforces licensee compliance with NRC regulations. Similarly, the NRC expects that all licensees will abide by all other applicable Federal, State, and local regulations, but adherence to those regulations is outside of NRC's jurisdiction.*

Because decommissioning and reclamation are likely to take place well into the future, the NRC requires that licensees applying to decommission an Independent Spent Fuel Storage Installation (ISFSI) (such as the proposed CISF) submit a Final Decommissioning Plan. The requirements for the Final Decommissioning Plan are delineated in 10 CFR 72.54(d), 72.54(g), and 72.54(i). The NRC staff would conduct a separate environmental review and prepare an environmental assessment (EA) or EIS, as appropriate, at the time the Final Decommissioning Plan is submitted to the NRC. Because the Final Decommissioning Plan would undergo a separate NEPA review, the NRC staff would decide at that point which potential cooperating and consulting agencies should be included in that Federal action. The potential environmental impacts would be evaluated and mitigated, if needed, as part of that process, and therefore, are not included in this EIS. A detailed evaluation of aging management of the proposed CISF is part of the NRC's safety review and thus beyond the scope of this EIS.

No change has been made to the EIS as a result of this comment.

Comment: (240-3-10)

D.2.1.3 NEPA Process: General—Adequacy of Information and/or Analyses

The NRC staff received comments concerning the adequacy of information and analyses in the EIS or objecting to the EIS. Commenters made general statements of their concerns, including that the information and analyses in the EIS are inadequate, insufficient, not comprehensive, segmented, not reassuring, pseudoscience, a waste of taxpayer funds, or lacked research. One commenter stated that the EIS was less detailed than the extensive one for Yucca Mountain. Two commenters stated that the EIS relied on outdated sources of information. One commenter requested additional information to justify the NRC determination of small impacts to resource areas, while another commenter requested the use of "extra large" as an impact determination. Some commenters objected to the content and depth of the transportation and accident analyses. Many commenters stated that the EIS violates the "hard look" requirement under NEPA. One commenter was concerned about the credentials of the NRC staff and contractors who prepared the EIS. Specifically, the commenter stated that the preparers of the EIS did not include physicians, biologists, environmental justice experts, water experts, and climate scientists. Other commenters made statements that they did not agree with the findings of the EIS.

Response: *The NRC approach to licensing proposed facilities is rooted in sound scientific principles, analyses, and information and follows a well-established regulatory process to ensure public health and safety. The NRC staff applies a multidisciplinary approach to conduct both safety and environmental reviews of license applications. The NRC staff disagrees that the evaluation in the EIS was incomplete, not factual, inadequate, or lacked research. Applicants submit their documents under oath and affirmation attesting to the accuracy of the contents. In developing this EIS for the proposed CISF, the NRC staff independently reviewed and evaluated the information and analyses provided in the applicant's license application, Environmental Report (ER), and supplemental information. In addition, the NRC staff independently collected and reviewed additional information related to the proposed CISF project and its environs. The NRC staff prepared and submitted requests for additional information (RAIs) to the applicant requesting additional information needed to make environmental impact determinations and safety conclusions for the proposed CISF. The applicant updated and revised the ER and Safety Analysis Report (SAR) to include new information and analyses submitted in response to the NRC staff RAIs. The NRC analyses in the EIS use both applicant and independently sourced information to reach evaluation conclusions. Documents relied upon for the NRC's analysis are publicly available and cited in the EIS. Following the NRC's NEPA-implementing guidance, the NRC staff thoroughly analyzed the resource areas within the scope of the EIS and presented these results in the draft EIS for comment and has now finalized the EIS based on the feedback, as appropriate.*

Regarding the concerns about use of outdated information, the NRC staff considers the type of information that is available and determines whether it is still appropriate for use as is, in lieu of, or in combination with current available information that is more indicative of the effect a proposed facility will have on the environment. For example, if a site's geologic characterization has not changed in many years, older studies may still be applicable and useful for the evaluation process. Commenters did not provide additional sources of information for the NRC staff to consider or evaluate; therefore, no changes were made to the EIS as a result of these comments.

The NRC staff recognizes that NEPA calls for a hard look at the significant environmental impacts associated with a major Federal action. The NRC staff disagrees with the comments that it has failed to take a hard look at environmental impacts of the proposed Holtec CISF. As *described above, the NRC staff has performed its review consistent with its regulations and guidance implementing NEPA and other applicable laws.*

Finally, for this proposed project, the NRC's environmental review team includes highly qualified professionals with extensive experience working in their respective areas of expertise. As listed in EIS Chapter 10, this group of scientists and engineers includes hydrologists, geologists, ecologists, health physicists, social scientists, nuclear engineers, environmental scientists, and chemical engineers, among other disciplines.

Comments expressing objection to the proposed project are addressed in Section 2.35 of this appendix.

No changes were made to the EIS in response to these comments.

Comments: (38-1) (45-1) (47-4) (68-5) (77-2) (98-1-2) (98-3-1) (98-4-3) (98-14-4) (98-15-1) (98-21-1) (98-23-9) (98-24-9) (98-27-3) (98-27-4) (98-27-5) (98-31-7) (98-34-8) (98-37-2) (98-44-2) (99-2-5) (99-2-12) (99-7-1) (99-14-3) (99-17-8) (99-17-10) (99-21-3) (99-32-1) (101-3) (110-3) (136-7) (138-5) (151-12) (154-2) (157-3-19) (168-6-2) (168-19-4) (169-2-4) (169-5-4) (169-13-3) (170-18-4) (170-19-11) (170-20-1) (175-3) (196-1) (196-9) (224-4) (231-19) (237-4-18) (240-3-17) (240-3-20) (247-12) (265-3) (266-1) (289-10) (322-1) (323-1-3) (324-2-4) (328-1-1) (341-13) (343-7) (359-8) (370-1) (375-1-4) (375-1-10) (376-1-10) (376-3-17) (376-3-20) (385-1) (401-3) (401-4) (402-3)

D.2.1.4 NEPA Process: General—Contentions

The NRC received comments on contentions that were submitted as part of the adjudicatory process. One commenter stated that the ASLB proceedings were terminated prematurely because the final Holtec SAR has not been placed in the public record and that the NRC will not issue its final Safety Evaluation Report (SER) until March 2021. Another commenter stated that the 20 different subject matter areas that were raised as contentions and rejected by the ASLB should be taken seriously and given a hard look by the NRC staff in the EIS. One commenter stated that it is a very difficult process for a contention to be admitted.

Response: *The NRC staff is reviewing the Holtec application in accordance with the applicable NRC regulations for a CISF. This process is a well-established regulatory framework that includes a safety review, an environmental review, and an opportunity for adjudicatory hearings. Information in the applicant's documents, including its SAR, ER, responses to RAIs, and other supporting documentation can be found using the NRC publicly available website for the proposed project at https://www.nrc.gov/waste/spent-fuel-storage/cis/hi/hi-app-docs.html. The NRC's hearing process is governed by the regulations in 10 CFR Part 2. This adjudicatory process is separate and distinct from the NRC's environmental review, which is conducted in accordance with NEPA and the NRC's regulations for implementing NEPA. An ASLB, which is an adjudicatory body independent of the NRC staff, has been constituted to rule upon hearing requests and proposed contentions concerning the proposed action, and to preside over any hearings that may be held in the proceeding. Because the adjudicatory process, including contention admissibility, is separate from this EIS, comments about the ASLB decisions and process are beyond the scope of this EIS.*

No changes have been made to the EIS as a result of these comments.

Comments: (99-37-3) (167-12-3) (168-10-1) (169-10-4)

D.2.1.5 NEPA Process: General—Lack of Transparency (Copyright Restrictions and Redacted Information)

The NRC staff received comments about the lack of transparency in the documentation of the NEPA process for the proposed CISF. Commenters expressed concerns about copyright restrictions and redacted information in the ER. One commenter noted that one quarter of the ER has been withheld from the public.

Response: *The NRC strives to conduct an open and transparent environmental review process. Thus, all references cited within the EIS that the NRC used to formulate impact determinations, except for cultural resources reports subject to specific protections, are publicly available. Information regarding the location and character of potentially eligible historic properties that may be withheld to protect those resources is provided in Section 304 of the National Historic Preservation Act (NHPA).*

An important purpose of the applicant's submission of an ER is to provide information to assist the NRC staff with carrying out its independent environmental review, and it is the NRC's production of the EIS that is the legal requirement under NEPA for this CISF proceeding. The NRC's regulations include criteria for applicants seeking to withhold sensitive information from public disclosure under 10 CFR 2.390; however, as noted above, the references in the EIS are, generally, publicly available.

Regarding the copyright statement that is on the cover of the ER, the NRC does not require that applicants remove copyright statements prior to transmitting documents to the NRC. However, in accordance with 10 CFR 2.390(e), the NRC may copy and distribute documents submitted to the NRC for consideration in a licensing proceeding, including Holtec's ER, as necessary, to carry out the NRC's licensing responsibilities. In turn, members of the public may, in a manner consistent with "fair use," use and quote these documents as necessary to participate in the NRC's licensing proceeding.

No changes were made to the EIS in response to these comments.

Comments: (90-4) (116-3) (167-12-2)

D.2.1.6 NEPA Process: General—Permitting Status and Consultations

The NRC received comments about that status of relevant permits and consultations conducted during the environmental review process. One commenter stated that the resolutions of consultations between the NRC and several other agencies are not included in the EIS. One commenter stated that the EIS does not comply with 10 CFR 51.71 because the EIS does not follow NRC protocols for including major points of view of other agencies and fails to disclose the status of necessary licenses, approvals, and other entitlements. A commenter stated that the NRC should include the U.S. Department of Transportation (DOT) as a cooperating agency because the DOT would approve SNF transportation routes across the country. Commenters stated that the NRC should have consulted with the New Mexico State Land Office and oil and gas lessees. Another commenter suggested that the SNF licensees or shippers should coordinate with State, Tribal, and local officials. Several commenters were concerned that no description of the Environmental Protection Agency's (EPA's) review of the EIS was included and asked how likely is it that EPA Region 6 would give a National Pollutant Discharge Elimination System (NPDES) permit without a review.

Response: *The NRC staff engage with consulting agencies as part of the environmental review under NEPA, and the EIS analysis takes into account the views and requirements of other permitting agencies, as explained in EIS Sections 1.5, 1.6, and 1.7. In addition, EIS Table 1.6-1 lists the status of the required permits and approvals. The table also identifies permits that may apply if they are required. The NRC does not have the statutory authority to enforce the permits listed in Table 1.6-1 if they are under the jurisdiction of another agency. The NRC staff relies upon other Federal, State, and local regulatory agencies in applying and enforcing these requirements. The NRC staff also assumes that the applicant would comply with regulatory requirements and license and permit conditions issued by other agencies when evaluating the potential environmental impacts from issuing an NRC license. However, the NRC staff does not have the authority to prescribe how licensees, shippers, or other agencies or parties interact. This EIS discloses relevant regulations that must be met, should NRC issue a license for the proposed project.*

EIS Section 1.7 explains that the consultation and coordination process for this EIS has included discussions with the New Mexico Environment Department (NMED), U.S. Fish and Wildlife Service (FWS), New Mexico Department of Game and Fish (NMDGF), local organizations (e.g., county commissioners), as well as Tribal governments. The NRC identified the Bureau of Land Management (BLM) as a cooperating agency and the NMED as a cooperating agency for the Holtec CISF environmental review. In addition, to input provided from these agencies, the NRC staff relied on information from many other agencies, including studies from the DOT, to assess potential impacts from the proposed project. As is the standard process with all EIS reviews, the final EIS for this proposed project contains updated information about consultations described in the draft EIS. The EPA has provided comments on the EIS, and those comments have been addressed, as appropriate, and responses provided within this appendix. Additionally, the EPA will make its own determination regarding NPDES permit requirements. The NRC staff anticipate that the applicant will be required to receive both a construction and an industrial stormwater permit (EIS Table 1.6-1).

No changes were made to the EIS as a result of these comments.

Comments: (98-14-7) (203-5) (224-24) (247-9) (250-9) (277-5) (375-2-1) (375-2-2) (375-2-5) (375-2-6) (375-3-12) (379-9) (428-7)

D.2.1.7 NEPA Process: General—Process and Requirements

The NRC staff received comments concerning the NRC's process for complying with NEPA, NEPA requirements for the evaluation of the proposed CISF, and related questions about the NRC's overall license review process. Some commenters made general statements that the EIS and/or the project fail to meet the requirements of NEPA. Several commenters supported a thorough regulatory and licensing proceeding, including an EIS published for comment as well as a thorough review of all safety measures that will be in place at the facility. Another commenter stated that the evaluation of the proposed project should be based on the best available science, and that a thorough and objective evaluation with respect to storage, transportation, and public safety should be in effect before a license is approved. Similarly, another commenter stated that the EIS should include publicly available information, a comprehensive analysis, and may need to be rewritten and re-released for public comment. One commenter expressed concern that the project is being fast-tracked so that it can be approved before administrations change. One commenter requested clarification on whether the NRC or Holtec should conduct the safety evaluation for the proposed project. A commenter stated that the Holtec license approval should be delayed until the Interim Storage Partners

(ISP) CISF EIS is completed and questioned whether there needs to be two CISFs (Holtec and ISP). Several commenters also expressed objections to the reliance of the June 4, 2020, Executive Order (EO) and the Council on Environmental Quality's new NEPA regulations issued July 16, 2020, citing that they are unconstitutional and violate NEPA and other acts. Similarly, the NRC staff received comments from NMED concerning NEPA requirements and technical deficiencies in the EIS. NMED stated that the EIS fails to address the fundamental requirements of NEPA. One commenter stated that the use of an "Out of Scope" category is used to bypass meaningful analysis. Another commenter stated the proposed project does not consider the irretrievable commitment of resources.

Response: *The EIS was prepared in accordance with the NRC's applicable NEPA-implementing regulations in 10 CFR Part 51 and associated guidance in NUREG–1748. NEPA mandates that Federal agencies carefully consider the environmental impacts of major Federal actions prior to making decisions that could significantly affect the environment. NEPA requires that the NRC consider the information available at the time of its environmental analysis, which the NRC has done in preparing this EIS. NEPA does not require that the NRC wait for other licensing reviews to be completed (e.g., a second CISF). The EIS presents a detailed and thorough description of each affected resource for the evaluation of potential impacts to the environment from the proposed action (Phase 1). Using publicly available information, environmental resources that are evaluated for potential impacts include land use, transportation, geology and soils, surface and groundwater, threatened and endangered species, air quality, socioeconomics, historic and cultural resources, and public and occupational health. In addition, environmental justice issues and economic, technical, and other benefits and costs of the proposed action are considered in the EIS. The EIS also presents a detailed and thorough description of the No-Action alternative and mitigation measures that would be implemented to avoid or minimize adverse impacts. Additionally, EIS Chapter 9 summarizes the potential environmental impacts of the proposed action (Phase 1, including the rail spur), Phases 2-20, and the No-Action alternative for all resource areas regarding (i) unavoidable adverse environmental impacts, (ii) irreversible and irretrievable commitments of resources, (iii) short-term impacts and uses of the environment, and (iv) long-term impacts and the maintenance and enhancement of productivity. Thus, the NRC staff disagrees with the comments that the EIS does not comply with NEPA.*

The NRC is conducting a concurrent safety review of the CISF application in parallel with this environmental review, and issues concerning the safety of the facility, the facility design, and the impact of external events on the proposed facility are addressed in that review. Holtec submitted its own safety analysis as part of its license application, and the NRC staff are in the process of developing a SER. Specific safety issues are beyond the scope of the EIS, but additional information about the scope of the NRC staff's safety review is provided in Section 2.26 of this appendix.

Regarding the concern about the NRC's concurrent evaluation of two proposed CISFs, the NRC has conducted separate evaluations for the two proposed CISFs (Holtec and ISP). The NRC's regulations governing CISF reviews do not prevent multiple applicants submitting applications or the NRC from reviewing them; each proposal will be evaluated on its own merits and whether the proposed facility meets regulatory requirements. Each EIS discusses potential cumulative impacts associated with the other proposed facility.

This EIS process was initiated before the Council on Environmental Quality (CEQ)'s final rule to update the regulations implementing the procedural provisions of the NEPA; and therefore, this EIS was drafted under the previous regulations and not required to abide by the final rule. The

NRC staff has prepared the EIS in accordance with NRC's NEPA-implementing regulations and staff guidance. The Notice of Intent to conduct scoping for this EIS was published in Spring 2018, and this project is not subject to the June 2020 Executive Order on Accelerating the Nation's Economic Recovery from the COVID-19 Emergency by Expediting Infrastructure Investments and Other Activities. Furthermore, the NRC has not expedited the review of the proposed project; rather, considering the national public health emergency the NRC had extended the public comment period to a full 180 days to allow stakeholders additional time to review the EIS and provide comments.

The designation of "out of scope" is not intended to avoid analysis of certain subject areas. Rather, in accordance with NRC's NEPA-implementing regulations, the NRC conducts a scoping period with the objectives of (i) defining the scope of the proposed action that is to be the subject of the EIS; (ii) determining the scope of the EIS and identifying alternatives and significant issues to be analyzed in depth; and (iii) identifying, and eliminating from detailed study, issues that are peripheral or are not significant. In accordance with the determinations and conclusions reached as a result of the scoping process, the NRC developed the EIS. Issues and topics that fall outside of the defined proposed action and purpose and need are outside the scope of the EIS, even though they may otherwise be issues of significance and concern to people in a different context. For example, legacy issues of nuclear contamination outside of the geographic scope of analysis are considered "out of scope," because they are not relevant to the proposed project.

No change was made to the EIS in response to these comments.

Comments: (19-1) (62-2) (93-15) (98-13-1) (98-14-6) (98-14-9) (98-24-7) (98-49-9) (98-53-4) (237-4-20) (40-2-7) (252-8) (289-12) (318-2) (372-4) (372-5) (372-17) (372-18) (380-28)

D.2.1.8 NEPA Process: General—Scoping Process

The NRC staff received comments concerning the scope and scoping process for the proposed CISF project. One commenter was pleased with the scoping process and stated that, in general, the EIS addressed the scoping comments they submitted. Other commenters were disappointed in the scoping process. One commenter stated that the EIS did not address any of their comments in a satisfactory manner. Another commenter stated that the scope of the EIS is insufficient and inadequate.

Response: *The NRC staff strives to conduct its regulatory responsibilities, including the scoping process, in an open and transparent manner, consistent with the NRC Approach to Open Government (https://www.nrc.gov/public-involve/open.html). The NRC requirements for scoping are found at 10 CFR 51.26-51.29 and are further explained in NUREG–1748, Section 4.2.3. The objectives of the scoping process include (i) defining the scope of the proposed action that is to be the subject of the EIS; (ii) determining the scope of the EIS and identifying alternatives and significant issues to be analyzed in depth; and (iii) identifying, and eliminating from detailed study, issues that are peripheral or are not significant. In accordance with these outcomes of scoping, the NRC developed and published a scoping summary report to define issues that are within and outside the scope of the EIS. In accordance with the determinations and conclusions reached as a result of the scoping process, the NRC developed the EIS for public comment, which evaluates the potential environmental impacts of the CISF. Regarding the comments stating that the scope was insufficient or that scoping comments were not dispositioned satisfactorily, specific additional concerns provided by the commenter are addressed in resource-specific sections of this appendix.*

No changes were made to the EIS in response to these comments.

Comments: (16-1) (110-6) (135-4)

D.2.2 Comments Concerning Public Participation

D.2.2.1 NEPA Process: Public Participation—Availability of Transcript

One commenter stated that they were unable to find the transcript from the NRC's July 9, 2020, public meeting on the NRC website.

Response: *The NRC staff has posted materials, including transcripts, from all the NRC's Holtec CISF draft EIS public meetings at the following website: https://www.nrc.gov/waste/spent-fuel-storage/cis/holtec-international.html The July 9, 2020, public meeting transcript is linked on that website or can be found directly at https://www.nrc.gov/docs/ML2019/ML20197A225.pdf.*

No changes were made to the EIS as a result of this comment.

Comment: (168-1-5)

D.2.2.2 NEPA Process: Public Participation—Comments in Support of Webinars

Several commenters provided supportive comments about the effectiveness of the webinar-based public meetings. Some commenters stated that they were appropriate and effective at gathering input during the time that in-person public meetings are not feasible because of the COVID public health emergency. Some commenters noted that the webinars provided fulsome opportunities for participation. One commenter provided a variety of reasons supporting their view that electronic comment submittals and webinars are better than in-person public meetings.

Response: *The NRC strives to conduct its public outreach activities in an open, transparent, and effective way. The NRC typically holds in-person public meetings during draft EIS public comment periods, but such meetings were precluded by the public health emergency, as noted by the commenters and discussed extensively in this appendix in Section 2.2.7. The NRC staff agrees that the webinar-based public meetings, together with other means of submitting comments, provided an effective opportunity for gathering public input on the draft EIS, as required by NEPA.*

As part of their statements, one commenter was critical of the scope and nature of the comments from other members of the public; this aspect of the comments is addressed in Section 2.2.4 of this appendix.

No changes were made to the EIS as a result of these comments.

Comments: (29-3) (29-4) (98-47-8) (98-55-1) (98-57-3) (99-31-1) (168-8-1) (168-19-5) (170-17-4) (170-17-6)

D.2.2.3 NEPA Process: Public Participation—Concerns About Facilitation

Several comments were received expressing dissatisfaction or concerns with the facilitation of the webinar public meetings. The comments included concerns about (i) the order in which callers were allowed to speak (including some statements of specific preferences), (ii) restrictions on the length of time allowed for individual commenters, (iii) certain participants or topics being discouraged or disallowed, (iv) perceived bias in treatment of various commenters, and (v) lack of moderation to keep commenters on topic.

Response: *The NRC staff strives to conduct public meetings in a manner that is fair, transparent, and inclusive. For the CISF public meetings, the NRC staff determined that despite efforts to create a pre-registration system for commenters, the most fair and logistically feasible method for the order of callers was on a first come, first served basis. Because the order of callers was not pre-determined, any perception of bias toward one view or another based on several callers with similar views making statements in sequence is unintentional. At NRC's discretion, and as a courtesy, government and publicly elected officials are sometimes invited to speak first or early in the comment portion of the meetings.*

Regarding allowing or disallowing discussion of topics at draft EIS public meetings, the purpose of the meetings is to provide an opportunity for members of the public to provide their feedback on the draft EIS so that the staff can make changes, corrections, or updates in development of the final EIS. Thus, while the NRC staff and facilitators encourage members of the public to provide comments related to the EIS (i.e., comments with the scope of the EIS,) to optimize the usefulness of the meetings, commenters are not censored or prohibited from making comments later deemed to be out of scope. Furthermore, because of the high interest in the public meetings, and to maximize the number of participants that can speak in any given meeting, the NRC places reasonable time limits on the length of time for individual callers to comment based on the number of participants in each meeting.

The NRC staff acknowledges the difficulty some callers may have had in waiting a long time to speak or in not having enough time to verbally state their full comments. However, commenting in a public meeting is not the only avenue through which the NRC accepted public comments. All comments are considered equally and are available for public review, whether received by email, mail, regulations.gov, or at a public meeting.

No changes were made to the EIS as a result of these comments.

Comments: (98-23-5) (99-3-3) (128-7) (167-5-2) (168-9-3) (168-23-3) (169-20-1) (170-5-4) (170-11-1) (170-11-2) (170-12-2) (170-22-1) (217-2)

D.2.2.4 NEPA Process: Public Participation—Concerns About Other Commenters

Several commenters criticized the statements that were made at public meetings by other meeting participants. Some commenters were critical of statements in opposition to the proposed project, the motivation or demeanor of commenters, and the concerns raised by those in opposition to the proposed project. Other commenters expressed their views regarding who should and should not be allowed to comment.

Response: *As part of its commitment to an open, transparent, and participatory public process, the NRC holds public meetings where oral comments can be made on the record. The NRC does not restrict the content of comments during public meetings or who can provide comments.*

Instead, the NRC listens to and records the comments, evaluates the comments, and provides responses, either in the form of a scoping summary report (for scoping comments) or draft EIS comment response report (in the final EIS, after the draft EIS has been published for comment). This allows the NRC staff time to fully consider all input received. These comments did not provide any information regarding the scope or content of the EIS and therefore will not be considered further.

No changes were made to the EIS as a result of these comments.

Comments: (29-1) (29-6) (71-1) (71-3) (98-8-1) (99-21-1) (123-2) (128-6) (168-11-1) (168-24-2) (168-24-4)

D.2.2.5 NEPA Process: Public Participation—Concerns About Webinar Logistics and Submitting Comments

The NRC staff received comments expressing concern or dissatisfaction with the logistics of the public meetings held by webinar and difficulty submitting comments. Issues raised by commenters included difficulty in connecting to the meeting (including difficulty with links to the online portion of the meeting), the wait time for callers to speak, the need for both internet and phone to fully participate in the meetings, the registration process for the webinar, the volume of the speakers on the call, and general concerns about the technology used. Some commenters stated that they had trouble providing comments through email to the designated address.

As part of these comments, related issues were raised such as facilitation (e.g., the order of callers), accessibility for non-English speakers, and the need for in-person public meetings.

Response: *The NRC acknowledges the technical difficulties that were experienced during some of the webinar public meetings with the conference call line and that some participants had trouble accessing the internet portion of the webinar meetings. The NRC staff further recognizes the importance of public participation as well as the challenges that the COVID-19 public health emergency presents to ensuring such participation, including the challenge of shifting planned, in-person meetings to virtual (online-based) meetings. The NRC staff strives to provide reasonable means by which commenters can participate in public meetings and provide their input. The NRC regrets that some commenters were not able to access the internet portion of the meeting or the conference line because of technical difficulties or had trouble submitting comments via email. However, for this draft EIS public comment process, in addition to the webinar public meetings, other means were made available for commenters to provide comments, including through standard mail, email, and regulations.gov. Comments are considered equally regardless of the avenue through which they are submitted, so it is not necessary for commenters to be able to speak at public meetings for the NRC staff to receive their input. Although some participants were not able to log into the webinar, meeting materials were made available on the NRC website.*

Regarding the concerns about whether comments were received successfully by email, the Holtec project email box included an autoreply confirming receipt of each email, and NRC staff responded to specific requests to confirm receipt as practicable. All comments received were placed in NRC ADAMS and assigned a tracking number that can be referenced in Table D–1 of this appendix so that commenters can verify that their comments were received.

Related issues of facilitation (such as the order of callers), accessibility for non-English speakers, the NRC staff responsiveness to comments, and calls for in-person public meetings are addressed in detail in other comment responses in this appendix section (Section 2.2).

No changes were made to the EIS as a result of these comments.

Comments: (98-23-1) (98-27-1) (98-29-1) (98-42-2) (98-50-1) (98-56-1) (98-57-2) (99-2-1) (99-9-1) (99-17-3) (99-30-1) (167-2-1) (167-2-5) (167-8-7) (167-11-6) (167-13-1) (167-14-4) (168-1-2) (168-4-3) (168-4-4) (168-5-1) (168-9-1) (168-10-2) (168-18-6) (168-20-1) (169-2-7) (169-9-1) (169-11-5) (169-17-1) (170-5-3) (170-12-1) (170-20-4) (170-22-3) (170-22-5) (183-1) (220-5) (222-2) (299-5) (301-4) (307-1-4) (333-1) (341-1) (341-2) (341-3) (345-1)

D.2.2.6 NEPA Process: Public Participation—Consent Based Siting

The NRC staff received many comments about consent-based siting and whether the Holtec licensing decision should or will be decided based on consent of the community or of the State. Several of the commenters stated lack of local community consent, objected to assertions that the local community does consent, or pointed to statements of non-consent by States and localities along transportation routes. Some comments requested that the decision be democratic or brought to a vote. Several comments requested that NRC take into consideration that most of the voices heard in public meetings were opposed to the proposed project. Some comments referenced the Blue Ribbon Commission report that recommended consent-based siting. Other comments noted that other high-level nuclear waste projects have failed because of lack of community consent. NMED provided a comment about New Mexico's leadership's opposition to the project and noted that Holtec was asking the NRC, not the State of New Mexico, for permission to build the proposed CISF.

Response: *The NRC's regulatory framework for licensing a CISF is based on ensuring that a proposed project meets the applicable safety regulations and that the requirements of NEPA are met. This regulatory framework includes numerous public participation and consultation interactions with relevant government officials and agencies, but the NRC's regulatory authority is not based on consent-based licensing. Therefore, consent-based siting and requests for such are beyond the scope of the EIS. The Atomic Energy Act of 1954 requires that the NRC establish criteria for the licensing of nuclear facilities, including spent nuclear material storage facilities. Absent Congressional direction to do so, the NRC may not deny a license application for failure to conduct consent-based siting. Although the NRC licensing process offers multiple opportunities for public involvement, including an opportunity for public comment during the EIS scoping process and on the draft EIS, for the reasons stated above, this process does not include provisions for local consent prior to the NRC granting a license.*

The Blue Ribbon Commission report, published in 2012 through the Secretary of Energy, recommended a consent-based siting approach for new facilities for the management and disposal of nuclear waste. The U.S. Department of Energy (DOE) was tasked to implement the recommendations in the report. However, because the NRC would license the proposed CISF, and the NRC process for licensing is not consent-based, neither the assertions of consent by Holtec in its license application nor the statements of consent or non-consent in the comments are evaluated further in the EIS.

The NRC staff reviewed and carefully considered the comments received during scoping and on the draft EIS from all stakeholders, including government agencies and representatives and members of the public. Comments were evaluated based on their technical, legal, or regulatory *merit and, where applicable, insights or information from the comments were included in the development of the draft EIS and final EIS. While comments stating support or opposition to the project are useful for the NRC staff to understand stakeholders' views, the NRC licensing decision is based on whether or not the facility meets applicable regulatory criteria, together with the associated adjudicatory process.*

Comments related to consent-based siting at other sites are beyond the scope of this EIS.

No changes were made to the EIS as a result of these comments.

Comments: (22-7) (31-3) (38-18) (64-8) (98-3-4) (98-14-2) (98-48-2) (98-51-8) (99-9-6) (99-27-9) (99-27-10) (99-27-13) (99-29-5) (99-40-10) (99-41-10) (117-3) (151-3) (167-3-9) (167-14-6) (168-16-2) (168-17-4) (169-5-7) (170-20-7) (170-22-12) (170-24-1) (224-28) (240-1-16) (240-2-16) (287-3) (290-4) (292-2) (296-4) (301-3) (309-4) (335-8) (335-10) (337-3) (353-2) (364-1-5) (369-3)

D.2.2.7 NEPA Process: Public Participation—In-Person Meetings Needed

The NRC staff received comments stating that the virtual (internet and telephone based) public meetings held as part of the draft EIS public participation process were inadequate or that meetings must or should be held in person rather than virtually. Some people expressed their concerns about not being able to see the faces of those they are making comments to (including NRC staff and project proponents) or emphasized the importance of having in-person interactions. A few commenters wondered whether the NRC staff was listening to the comments, or indicated their disbelief that NRC has interest in understanding the public's concerns because of the lack of in-person meetings. Some of the commenters indicated that not holding meetings in person violated laws, including NEPA, and is unethical. The reasons that commenters stated for their concerns included (i) the dangerous nature of SNF, (ii) concerns about environmental justice communities being able to connect to virtual meetings because of cost or lack of internet and telephone service, (iii) the logistics difficulties some callers experienced during the meetings, and (iv) earlier indications by the NRC and expressed wishes of local government officials that meetings would be held in person.

As part of their remarks, some commenters stated that the process should be stopped or extended until in-person meetings could be safely held.

Response: *The NRC's typical practice for draft EIS public comment periods is to hold one or more public meetings at or near the location of a proposed project. This allows an opportunity for stakeholders to provide oral comments in person to the NRC staff. During the scoping phase of this project, and while NRC staff were developing the draft EIS, the NRC staff planned to hold in-person meetings in the vicinity of the proposed CISF as was done for scoping meetings. However, as a result of the pandemic and associated public health emergency, and consistent with the practice of several other Federal agencies, the NRC modified its public interactions from in-person meetings to virtual meetings, such as webinars. This change allowed opportunities for oral comments while maintaining safety protocols for NRC staff and stakeholders. While the NRC staff regrets that meetings were not able to be held in person, the staff disagrees that the public participation process requires in-person meetings by law and that not holding meetings in person denies the public ample opportunity to participate. Importantly, comments received at webinar public meetings are handled and considered in the same way as those received during public comment meetings: a transcript is taken of the meeting and made available to the public, and the comments are grouped with comments received through other* *means (e.g., mail and email) for NRC staff response. Public meetings held through webinar also allow for national participation.*

CEQ regulations at 40 CFR 1503.1(c) require that agencies make provisions for electronic submittals of public comments. CEQ regulations at 40 CFR 1506.6(c) require that agencies "hold or sponsor public hearings, public meetings, or other opportunities for public involvement whenever appropriate or in accordance with statutory requirements applicable to the agency. Agencies may conduct public hearings and public meetings by means of electronic communication except where another format is required by law." The CEQ guidance for citizen participation in NEPA processes (CEQ, 2007) notes that public meetings may be held in a variety of formats, including virtually. The NRC staff has allowed for public participation in a manner consistent with the CEQ guidance.

The NRC staff strives to conduct regulatory activities in an open and transparent manner and to make information as accessible as possible to optimize public participation. For this draft EIS public comment process, the NRC staff released FRNs and press releases, placed newspaper ads, posted information to the NRC website, and sent copies of materials to libraries closest to the proposed CISF site and mailed hard copies of the draft EIS to those that requested it. As discussed more extensively in other comment responses in this section (see responses regarding requests for extensions to the comment period and requests for additional public meetings), the NRC staff held six public webinars accessible from any location and extended the public comment period to 180 days, during which comments could be sent by email, mail, or through regulations.gov. Based on all these factors, the NRC staff believe that the change in public meetings from in-person to virtual format was appropriate and protective of public health and safety, and that this EIS public comment process was adequately inclusive and in compliance with NRC's NEPA-implementing policies.

No changes were made to the EIS as a result of these comments.

Comments: (98-31-12) (98-42-1) (98-43-10) (99-3-1) (99-3-2) (99-12-11) (99-17-11) (99-26-3) (99-27-2) (99-33-2) (99-36-1) (99-40-5) (157-1-3) (167-1-9) (167-2-4) (167-2-7) (167-3-2) (167-3-8) (167-4-2) (167-6-1) (167-8-8) (167-8-9) (167-9-6) (167-13-4) (167-14-2) (167-15-2) (168-1-3) (168-1-8) (168-3-1) (168-4-6) (168-5-6) (168-6-4) (168-6-8) (168-12-2) (168-16-1) (168-16-3) (168-16-11) (168-20-3) (169-8-1) (169-15-1) (170-2-7) (170-12-3) (170-22-4) (216-3) (231-16) (240-1-17) (291-4) (296-1) (301-2) (301-5) (306-1) (319-17) (335-2) (336-6) (369-2)

D.2.2.8 NEPA Process: Public Participation—Inquiry About Concerns of Local Officials

One commenter referenced EIS Section 1.7.3.3, "Coordination with Localities," and asked what the concerns were, if any, from these local officials, and how NRC responded.

Response: *As stated in EIS Section 1.7.3.3, when possible, the NRC staff addressed questions or concerns by members of local agencies during the meetings. Summaries of meetings with local officials and agencies can be found in the NRC Site Trip Report (ADAMS Accession No. ML18164A217.) Some local agencies and officials also submitted formal written comments during scoping or participated in public scoping meetings; these comments are summarized and responded to in the NRC's scoping summary report (ADAMS Accession No. ML19121A296), and, as appropriate, these issues were addressed or incorporated into the analysis presented in the NRC's draft EIS. Some local agencies and officials also submitted comments on the draft EIS. All comments submitted on the draft EIS* *were considered by the NRC staff, summarized and responded to in this comment response appendix, and, if appropriate, changes were made to the final EIS accordingly. A discussion of the draft EIS comment response process is found in EIS Section 1.4.1; however, no changes were made to the EIS as a result of this comment.*

Comment: (378-6)

D.2.2.9 NEPA Process: Public Participation—Logistics/Suggestions for Public Meetings

Three commenters made recommendations about when the public meetings should be conducted (e.g., holding meetings on consecutive nights and weekends, holding meetings at different times of day, and avoiding conflicts with national events) and how they can be advertised (e.g., that newspaper ads are not effective).

Response: *The NRC staff attempts to select a variety of meeting times and dates to maximize opportunities for members of the public to be able to attend at least one meeting. For example, some meetings are held during the day, and some are held during evening hours to accommodate a variety of work schedules. While the NRC staff attempts to avoid conflicts with major events (both local and national), the NRC usually holds multiple meetings in part to alleviate any external scheduling conflicts that may arise. Comments received at one meeting or in writing are considered the same as those comments received at multiple meetings or through multiple avenues. The NRC staff acknowledges the comments regarding its meeting processes and will make considerations and adjustments for future meetings, as practicable.*

No changes were made to the EIS in response to these comments.

Comments: (16-4) (99-40-4) (167-9-9)

D.2.2.10 NEPA Process: Public Participation—NRC Responsiveness to Comments and Concerns About Predetermined Decisions

Several commenters questioned whether the NRC staff would consider comments provided during the draft EIS comment process or whether such input would be ignored. Some of the commenters stated that decisions had already been made, or that the NRC was working in favor of industry and thus would not consider opposing viewpoints. Some commenters expressed concern that comments of other agencies or government officials were not heard or adequately addressed. Other commenters said (in the absence of face-to-face meetings) that they could not verify that NRC staff were receiving or hearing the comments. A few commenters stated their view that the NRC should not give weight to comments in favor of the EIS if they did not discuss the EIS or that NRC should not give weight to comments of those promoting the project. One commenter stated that the ASLB had ignored concerns that were raised. Several people called on the NRC staff to listen to concerns with an open mind. One commenter expressed confidence that the NRC would properly consider comments. Another commenter stated that the EIS evaluation ignored information NMED and the New Mexico Governor provided that suggests the EIS contains false information.

Response: *The purpose of the public comment process is for the NRC staff to receive information and feedback on the draft EIS from various stakeholders, including members of the public and other government representatives and agencies. The NRC staff actively elicits this feedback so that updates, corrections, and clarifications can be made in the final EIS. Whether* *comments are received at the public meetings, through email, regulations.gov, or U.S. mail, each submittal is tracked through the NRC's ADAMS system. All comments are carefully considered by the NRC staff. Importantly, comments received at webinar public meetings are handled and considered in the same way as those received during public comment meetings: a transcript is taken of the meeting and made available to the public, and the comments are grouped with comments received through other means (e.g., mail and email) for NRC staff response. Commenters can view the tracking tables in Table D–1 of this appendix.*

Completion of the draft or final EIS does not represent completion of a licensing process, and the EIS is considered in combination with the results of the safety review (the SER) and the outcome of any adjudicatory hearings when a licensing decision is made. Based on the NRC staff's evaluation of the license application materials, supporting documentation, independent assessments, and input received during the scoping process, the NRC staff issued a draft EIS with its preliminary conclusions regarding the potential environmental impacts of the proposed project. Stakeholders (including members of the public) were afforded this public comment opportunity to provide feedback on the draft EIS prior to publication of a final EIS.

Concerns about decisions made by the ASLB relate to the conduct of the adjudicatory process, which is separate from the process for producing the EIS, and, therefore, those issues are not within the scope of the EIS.

No changes were made to the EIS as a result of these comments.

Comments: (20-4) (79-4) (91-14) (98-31-2) (98-33-1) (98-40-1) (98-48-9) (98-56-3) (99-34-1) (99-40-3) (167-2-8) (167-3-1) (167-7-4) (167-7-5) (167-13-2) (168-1-1) (168-2-1) (168-4-1) (168-6-1) (170-2-1) (170-13-1) (170-22-13) (196-10) (216-1) (216-7) (231-13) (240-3-16) (307-1-5) (321-7) (329-7) (378-5) (394-1)

D.2.2.11 NEPA Process: Public Participation—Participation Process and Notification is Inadequate

Several commenters stated that the EIS public participation process is inadequate. Commenters expressed concern that information about the proposed project, transportation of SNF, or the NRC's public comment period and associated meetings was not readily available or appropriately distributed. Some comments indicated that information was difficult to access or inadequate. Some commenters stated that the NRC or Holtec should make information more available, increase distribution of the information, and provide more time for review of the information, because not enough people participated in the process or knew about the public meetings. Some commenters noted the lack of attendance of public representatives at public meetings or specifically requested their involvement.

Response: *The NRC staff strives to conduct its regulatory activities in an open and transparent manner and to make information as accessible as possible. For this public comment process, the NRC staff released FRNs and press releases; posted information to the NRC website, Facebook, and Twitter; and sent copies of materials to libraries closest to the proposed CISF site. Ads were also placed with local radio stations and newspapers to notify the public of the meetings. Transcripts of public meetings are also posted to the NRC website. The information available on the NRC's website includes records of pre-licensing interactions between the NRC and the applicant; the license application; the draft EIS; and materials that the NRC used in its public meetings, including summaries of the project (a reader's guide and fact sheet) and presentation slides.*

The NRC directly engages with stakeholders regarding its environmental review process. All stakeholders, including government representatives, Tribal members, and members of the public, are encouraged to attend and participate in the environmental public comment process. As discussed more extensively in other comment responses in this appendix (see responses in Sections 2.2.14 and 2.2.16 regarding requests for extensions to the comment period and requests for additional public meetings), the NRC staff held six public webinars accessible from any location and had a 180-day public comment period, during which comments could be sent by email, mail, or through regulations.gov. Thousands of public comment letters were received from across the country, indicating broad participation in the process. Regarding the concern that stakeholders that live along transportation routes have not been notified of the shipments or are not aware of the project, specific transportation routes have not yet been established for the proposed CISF, so the NRC staff's outreach focused on those communities closest to the proposed project. Furthermore, SNF shipments are currently allowed and occur under the provisions of 10 CFR Part 71 and required notification to appropriate State and local authorities is given in advance of these shipments.

Based on all these factors, the NRC staff believes that this EIS public comment process was adequately inclusive and in compliance with NEPA requirements and NRC's NEPA-implementing policies.

No changes were made to the EIS as a result of these comments.

Comments: (1-11) (38-3) (98-29-9) (98-38-3) (98-58-4) (98-58-6) (99-2-6) (99-9-2) (137-7) (167-8-3) (167-13-3) (167-15-1) (168-3-3) (168-7-1) (168-17-1) (168-17-3) (169-2-6) (170-14-5) (170-15-1) (170-18-1) (170-27-1) (170-27-4) (170-27-7) (215-5) (224-17) (231-18) (239-1) (269-1) (289-3) (299-4) (307-2-4) (321-6) (351-3) (363-3) (367-1) (369-5)

D.2.2.12 NEPA Process: Public Participation—Purpose of the Public Participation Process

Several commenters provided statements about the purpose of the draft EIS public comment process. Some commenters requested inclusion of the public, ample opportunity for comment, or open dialogue and information exchange with the public, particularly on matters related to risk. One of these commenters stated that, as part of that process, errors should be corrected when found. Another commenter noted that eliciting public comments made the project fairer and safer. One commenter voiced their support for the public comment process.

Response: *The NRC agrees that public participation is an important part of the EIS development process. Under NRC's NEPA-implementing regulations and guidance, the public is afforded opportunity to comment during scoping and development of the draft EIS. Comments are considered for all subject matter areas within the scope of the EIS, including transportation, storage, and health risks and impacts from accidents, as appropriate. As noted by the commenters, this process provides an opportunity for information exchange between the NRC staff and stakeholders, including members of the public. Comments received during scoping inform draft EIS development, and comments received on the draft EIS are considered in the development of the final EIS. This process also assists the NRC staff in identifying and correcting any errors in the draft EIS.*

For the Holtec CISF draft EIS public comment period, the NRC staff elicited input from the public over a 180-day comment period, hosted six public meetings, and accepted comments *through a variety of means, including electronic and standard mail. Thus, ample opportunity was provided for members of the public to participate in the comment process.*

No changes were made to the EIS as a result of these comments.

Comments: (62-3) (98-53-3) (133-2) (169-2-1) (277-6) (292-3)

D.2.2.13 NEPA Process: Public Participation—Request for NRC to Hold Public Safety Meetings

One commenter requested that the NRC hold public meetings on the safety review.

Response: *During the safety review process, the NRC staff holds meetings with the applicant to discuss the review of the application. These meetings may include clarification discussions about topics in the license application or the content of responses to NRC's requests for additional information and are typically open for public participation unless they involve discussion of nonpublic information. The results of the staff's safety review will be made available to the public. Information about public meetings related to this project are posted on the NRC's website at https://www.nrc.gov/waste/spent-fuel-storage/cis/hi/public-meetings.html. The NRC staff publishes the results of its safety review in a publicly available SER. However, the NEPA requirement for public interactions (including the draft EIS public comment period) does not apply to safety reviews.*

No changes were made to the EIS as a result of this comment.

Comment: (169-9-9)

D.2.2.14 NEPA Process: Public Participation—Requests for Additional Public Meetings

The NRC staff received many comments requesting additional public meetings, particularly that meetings be held in person and after the COVID public health emergency is resolved. Many of the comments requested geographically dispersed public meetings, meetings near the project location (or where scoping meetings were held), or meetings along transportation routes. Some commenters compared the DOE Yucca Mountain meetings and comment period length as precedent for public involvement, noting extensive transportation in both the proposed CISF and Yucca Mountain repository projects. As part of these comments, many commenters requested the opportunity to see the NRC staff face-to-face or have meetings held in person rather than virtually. Stated reasons for these requests included the magnitude of the project, extent of the transportation of radiological materials (including short-haul transportation from origin sites), concerns about health impacts along transportation routes, difficulty with or frustration about participating in remote meetings, and concerns about fair access for environmental justice populations.

A few of the comments stated that the process should not be rushed or that the process was being rushed to benefit the nuclear industry. One commenter requested that meetings be held only near the proposed facility and that meetings along transportation routes would be inappropriate because the EIS only covers transportation on site.

Response: *The NRC is committed to ensuring an open and transparent process that allows for ample public participation. During the 180-day public comment period, the NRC staff held six* *webinar public meetings on June 23, July 9, August 20, August 25, August 26, and September 2, 2020. In preparation for these meetings, the NRC staff released FRNs and press releases; posted information to the NRC website, Facebook, and Twitter; and placed ads with local radio stations and newspapers to notify the public of the meetings. The NRC staff made information related to the license application review (including the draft EIS) available to communities local to the proposed project and to Tribes within the vicinity of the proposed project, as well as on the NRC's website, such that the information was accessible nationwide. The six virtual public meetings included the opportunity for members of the public–regardless of their location–to participate by calling in with their comments, thus allowing more fulsome geographic participation (including along transportation routes) at all meetings. Furthermore, in addition to the webinar public meetings, comments were accepted through a variety of means (e.g., email, letter, and regulations.gov) to provide several avenues through which members of the public in any location and at any time during the 180-day comment period could provide information to the NRC. Comments are considered equally regardless of the avenue through which they are submitted, so it is not necessary for commenters to be able to speak at public meetings for the NRC staff to receive their input.*

The NRC staff recognizes the importance of public participation as well as the challenges that the COVID-19 public health emergency presents to ensuring such participation. Although the NRC staff had planned to hold in-person public meetings in the vicinity of the project area, national and local safety concerns related to the pandemic precluded these gatherings. As a result, the NRC staff held six public webinars, provided a 180-day public comment period, and accepted comments through a variety of means to optimize public participation despite the restrictions on in-person interactions. The NRC staff believes all these activities have provided sufficient and appropriate opportunity for the public to provide input to the draft EIS comment process. Some of the comments requesting additional public meetings also requested extensions to the public comment period or expressed concern regarding the lack of in-person public meetings or adequacy of public participation. These topics are addressed elsewhere in Section 2.2 [Comments Concerning Public Participation]. Transportation concerns are addressed in Section 2.9 of this appendix.

No changes were made to the EIS as a result of these comments.

Comments: (1-2) (1-9) (1-15) (16-3) (29-5) (50-4) (50-6) (98-25-4) (98-28-9) (98-29-2) (98-29-3) (98-29-4) (99-2-8) (99-9-3) (135-12) (162-3) (167-3-6) (167-4-3) (167-4-6) (167-4-8) (167-6-6) (167-9-7) (167-9-12) (167-11-2) (168-2-3) (169-9-7) (169-9-8) (169-16-1) (170-16-4) (170-19-1) (170-27-8) (170-28-2) (170-28-3) (170-28-6) (177-1) (189-1) (224-5) (236-3) (289-6) (303-7) (332-2) (333-2) (359-9)

D.2.2.15 NEPA Process: Public Participation—Requests for Foreign Language Translations

The NRC staff received several comments requesting that project information be made available in Spanish, Navajo, and other Native languages. The comments requested translation of various meeting notices, summaries, and the full ER or EIS. Some commenters expressed concern that not providing translations was an environmental justice or racism issue.

Response: *Regarding the use of Spanish and other languages during the environmental review process, the NRC does not require applicants to provide license application documents in languages other than English but does implement the NRC's Limited English Proficiency Plan for activities associated with review of the Holtec application. For example, fluent Spanish-*

speaking NRC staff opened all of the NRC's EIS public meetings for the proposed Holtec project by stating, in Spanish, that although the meetings are conducted in English, requests to translate into Spanish were welcomed and would be honored. The NRC staff did not limit the public from providing comments in other languages. The NRC public meeting announcements were issued in English and in Spanish in local newspapers. On the NRC website, the NRC staff provided Spanish language translations of a reader's guide to the EIS and presentation slides from the webinars that include information about how to comment on the project. Translated presentation slides in Diné are also available on the NRC website. Those materials are available on the NRC website at this link: https://www.nrc.gov/waste/spent- fuel-storage/cis/hi/public-meetings.html. Related comments regarding environmental justice concerns, including environmental racism, are addressed in Section 2.18 [Comments Concerning Environmental Justice] of this appendix. More information about public participation is discussed throughout this appendix. (Section 2.2).

No changes were made to the EIS as a result of these comments.

Comments: (93-7) (99-2-2) (99-2-11) (99-14-6) (99-15-1) (169-5-6) (169-10-2) (307-1-6) (341-4) (341-5) (341-7) (341-8)

D.2.2.16 NEPA Process: Public Participation—Requests to Extend the Public Comment Period or Review Process

The NRC staff received many comments regarding the length of the public comment period or review process for the draft EIS. Most of these comments requested that the NRC delay the review of the proposed CISF license application, postpone the licensing process, or keep the public comment period open for longer than the allotted time. Many of the commenters cited the national COVID-19 public health emergency as the need for an extension to the comment period, and some comments requested that the licensing proceeding be extended or halted until after a vaccine becomes available. Other stated reasons for requesting additional time were the lack of in-person meetings, difficulty in participating in remote (web-based) meetings, the complexity and controversial nature of the subject, the lengthy time period over which SNF remains radioactive, the large number of Federal and State agencies involved, the extensive transportation routes and potentially affected nearby communities, and environmental justice concerns. A few comments indicated that an extension is required by law or that not extending the public comment period defies the wishes of local and State government agencies. Some commenters compared the length of time to the DOE Yucca Mountain EIS public comment period of 199 days. A few of the comments stated that the process should not be rushed or that the process was being rushed artificially to benefit the nuclear industry. One commenter cited an error with a link in the meeting notice as justification for the comment period to be extended.

A few commenters stated their appreciation for the comment period extensions that NRC provided or indicated that the comment period length was sufficient.

As part of these comments, some commenters also requested additional public meetings, in-person public meetings, or meetings along transportation routes.

Response: *In the March 20, 2020, FRN notifying the public of the availability of the draft EIS and requesting public comment (85 FR 16150), the NRC provided for a 60-day public comment period, ending May 22, 2020. However, the NRC staff recognized that the pandemic health emergency created unique challenges for all stakeholders–including members of the public–to be able to participate in the public comment process. In response to requests for a comment* *period extension and in recognition of these challenges, the NRC extended the public comment deadline on April 27, 2020, for an additional 60 days until July 22, 2020 (85 FR 23382) and again on June 22, 2020, for an additional 60 days until September 22, 2020 (85 FR 37964). This resulted in a 180-day comment period, which is 60 days longer than the 120-day public comment period provided during the project scoping phase. Given that the NRC's NEPA-implementing guidelines in NUREG–1748 recommend a minimum 45-day public comment period, the NRC determined that 180 days constituted sufficient time for comments to be prepared and submitted to the NRC. The NRC made information about the draft EIS and comment period available to communities local to the proposed project and to Tribes within the vicinity of the proposed project, as well as on the NRC's website, such that the information was accessible nationwide. Although the COVID-19 public health emergency precluded holding in-person public meetings that were originally planned, the NRC staff held six virtual public meetings via webinar in which members of the public were invited to participate regardless of location, thus allowing geographically extensive participation at all meetings. Furthermore, in addition to the webinar public meetings, comments were accepted through a variety of means (e.g., email, letter, and regulations.gov) to provide several avenues through which members of the public in any location and at any time during the 180-day comment period could provide information to the NRC. Comments are considered equally, regardless of the avenue through which they were submitted, so it is not necessary for commenters to be able to speak at public meetings for the NRC staff to receive input. The NRC has a statutory obligation to conduct licensing proceedings in a timely manner while also considering its response to the public health emergency. Therefore, the NRC provided the extended comment period, multiple public meetings, and various comment response mechanisms to optimize input opportunities for stakeholder comments.*

Some of the comments requesting an extension to the public comment period also requested additional public meetings be held near the site or along transportation routes or expressed concern regarding the lack of in-person public meetings. These topics are addressed elsewhere in this appendix Section 2.2 [Comments Concerning Public Participation].

No changes were made to the EIS as a result of these comments.

Comments: (1-1) (1-3) (1-7) (1-8) (1-12) (1-17) (1-18) (1-23) (1-24) (16-2) (29-2) (50-1) (50-5) (93-1) (98-23-12) (98-23-13) (98-28-8) (98-32-1) (98-46-4) (98-47-9) (98-50-10) (98-55-2) (99-2-7) (99-2-10) (99-13-5) (99-37-5) (110-1) (135-11) (135-13) (160-1) (162-2) (167-2-3) (167-2-6) (167-2-9) (167-2-10) (167-3-3) (167-3-4) (167-4-1) (167-7-6) (167-9-11) (167-11-7) (167-12-6) (167-13-8) (168-1-4) (168-1-6) (168-2-2) (168-3-2) (168-4-2) (168-6-5) (168-6-6) (168-7-2) (168-10-3) (168-23-1) (169-6-3) (169-6-8) (169-16-2) (170-10-7) (170-13-2) (170-18-6) (170-19-8) (170-20-5) (170-21-1) (170-22-6) (170-22-11) (170-25-1) (170-28-1) (178-1) (216-4) (216-5) (221-8) (228-2) (251-1) (251-2) (251-18) (296-2) (301-1) (301-6) (301-7) (303-9) (333-3) (340-3) (344-9) (363-1) (370-3) (399-4)

D.2.2.17 NEPA Process: Public Participation—Require Disclosure of Interests

One commenter requested that the NRC staff require commenters to disclose their interest in a project or potential personal gains from a project before commenting.

Response: *The NRC encourages commenters to disclose their name and affiliation as part of their comments, particularly in public meetings, and many commenters choose to state their interest in a project. However, disclosure of interest in a project is not required, and the NRC* *evaluates all comments received, regardless if received anonymously or without disclosure of interest. Comments are evaluated based on their technical, regulatory, or legal merit.*

No changes were made to the EIS as a result of this comment.

Comments: (98-56-2)

D.2.3 Comments Concerning NHPA Section 106

D.2.3.1 NEPA Process: Section 106

The NRC staff received comments regarding the consultation activities with Indian Tribes for the proposed project. One commenter was supportive of the inclusion of Indian Tribes as a result of the NHPA in the NEPA process for the proposed project. Multiple commenters, including EPA, requested additional details be added to the EIS to discuss the process and outcome of the Tribal consultation and New Mexico State Historic Preservation Officer (NM SHPO) response. Two commenters stated that the NRC outreach efforts were too limited in terms of the number of Tribes contacted with one of the commenters adding that the scope of the project-related impacts was also limited. One commenter questioned how the NRC encouraged interested Indian Tribes to participate.

Response: *Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments," reaffirmed the Federal Government's commitment to a government-to government relationships with Indian Tribes and directed Federal agencies to establish procedures to consult and collaborate with Tribal governments when new agency regulations would have Tribal implications. The Order excludes "independent regulatory agencies, as defined in 44 U.S.C § 3502 (5)" from the requirements of the Order. However, according to Section 8, "Independent regulatory agencies are encouraged to comply with the provisions of this order." Although the NRC, as an independent regulatory agency, is explicitly exempt from the Order, the Commission remains committed to its spirit. In 2017, the NRC issued a Tribal Policy Statement (82 FR 2402), which establishes principles to be followed by the NRC in its government-to-government interactions with American Indian and Alaska Native Tribes, and to encourage and facilitate Tribal involvement in the areas over which the Commission has jurisdiction.*

EIS Section 3.9.3 states that the NRC staff, in compliance with Section 106 of the NHPA, and in conjunction with a professional archaeologist, identified 11 Tribes that may attach religious and cultural significance to historic properties in the area of potential effects and invited them to be consulting parties in the environmental review process. The NRC staff sent letters to each of the 11 Tribal representatives on April 2, 2018, inviting each Tribe to participate as a consulting party under Section 106 of the NHPA and assist in the identification and evaluation of historic properties that may be affected (EIS Appendix A). Four Tribes, including the Navajo Nation, Pueblo of Tesuque, Hopi Tribe, and the Iowa Tribe of Oklahoma, indicated that they would like to participate as consulting parties.

In August 2019, the NRC staff sent information to the Navajo Nation, Pueblo of Tesuque, Hopi Tribe, and the Kiowa Tribe of Oklahoma for review as consulting parties including a cultural resources survey and a description of the proposed area of potential effect. On September 16, 2019, the Hopi Cultural Preservation Office responded that the proposed project may have adverse effects on two prehistoric sites if the sites could not be avoided. On December 12, 2019, the NRC staff sent letters to the Navajo Nation, Pueblo of Tesuque, Hopi

Tribe, and the Kiowa Tribe of Oklahoma inviting those Tribes to participate in upcoming activities associated with consultation on the project, including a site visit (ML19344B782). The Navajo Nation expressed interest in participating in the planned site visit. On February 4, 2020, the Navajo Nation attended a site visit with the NRC staff and a professional archaeologist. In March 2020, copies of the EIS were sent to all 11 Tribes originally identified as potentially interested in the proposed project (EIS Chapter 11). As noted in EIS Table 3.9-1, the sites referenced by the Hopi Tribe are either no longer within the footprint of the proposed project activities or are not recommended as potentially eligible sites.

On August 26, 2020, the NRC staff provided the Navajo Nation, Pueblo of Tesuque, Hopi Tribe, and the Kiowa Tribe of Oklahoma with a copy of NRC's draft report on the identification of historic properties and its proposed eligibility recommendations, and the NRC staff requested that the Tribes review and comment on the report. On November 30, 2020, the NRC staff sent the draft final report with its recommendations to the NM SHPO for concurrence. The NM SHPO and the Hopi Tribe Cultural Preservation Office concurred with the NRC staff's recommendations on site eligibility. The EIS has been updated to reflect that activities under the NHPA Section 106 have been completed.

EIS Sections 1.7, 3.9, and 4.9 were updated to reflect additional Section 106 activities and final consultations with Tribes and NM SHPO. Based on the conclusion of the Section 106 process, the NRC staff determine that there would be no effect from the proposed CISF on historic properties. Additional information on NRC's consultations with Tribes and the NM SHPO is provided in Section 2.19 of this appendix [Historic and Cultural Resources—Comments and Concerns Regarding Historic and Cultural Resources].

For the proposed project, as discussed in EIS Section 3.9.2, the APE for direct effects includes a total area of 201.51 ha [497.93 ac], and the area of potential effect (APE) for indirect effects includes a 1.6-km [1-mi] radius around the direct APE. The direct APE was established to capture the land area that had the potential to be directly impacted by the proposed project activities (e.g., by excavation) and therefore represented the greatest potential for an adverse impact. Construction activities represent a bounding condition for evaluating the potential for ground-disturbing activities to impact historical and cultural sites. Therefore, the NRC staff find it an appropriate methodology for establishing an APE. However, the NRC staff evaluated potential impacts from all stages of the proposed project and the consultation with Tribes included both the establishment of the direct and indirect APE and potential cumulative impacts.

As part of its comments during the scoping period for the proposed Holtec CISF project, the Tribal Radioactive Materials Transportation Committee (TRMTC) extended an invitation for the NRC staff to meet with TRMTC staff to discuss TRMTC's concerns. As a result of this invitation, the NRC staff attended TRMTC's January and June 2020 meetings to discuss the proposed project and continued to provide updates to TRMTC on request throughout the EIS process.

Additional information about impacts to historic and cultural resources are provided in Section 2.19.1 of this appendix [Historic and Cultural Resources—Comments and Concerns Regarding Historic and Cultural Resources].

Comments: (62-4) (232-1) (288-1) (341-9) (373-12) (378-4)

D.2.4 Comments Concerning the Proposed Action

D.2.4.1 Proposed Action—Characteristics of Fuel

The NRC staff received a comment requesting a quantity for the small amount of mixed-oxide fuel that could be stored at the proposed CISF.

Response: *Holtec has not specified the volume of mixed-oxide fuel that would be stored at the proposed CISF. However, the historic use of mixed oxide fuel (MOX) fuel in U.S. reactors has been very limited, and MOX fuel is not currently being produced in the U.S. Therefore, the vast majority of SNF in the U.S. that is potentially available for consolidated storage is the more commonly used uranium-based SNF. Additionally, all SNF characteristics and quantities to be stored at the CISF would be evaluated as part of the NRC's safety review that is conducted in parallel to this EIS. The safety review would also include verification that all SNF types transported to and stored at the proposed CISF would be contained within transportation and storage casks that NRC certified to meet the applicable safety standards in 10 CFR Part 71 and Part 72. These additional NRC safety reviews evaluate transportation package and storage cask performance regarding various aspects of design, including structural, thermal, containment, shielding, and criticality control. While MOX SNF has some characteristics that differ from typical low-enriched uranium based SNF, the characteristics of typical SNF also vary and the NRC safety reviews account for these differences in SNF when certifying transportation packages and storage casks (NRC, 2020a,b). The EIS impact analyses, as applicable, incorporate the use of certified transportation packages and storage casks and the associated performance characteristics that follow from these certifications. The safety afforded using NRC-certified packages and casks for various types of SNF (including MOX) combined with the relatively small amount of MOX SNF expected to be stored at the proposed CISF indicates that the existing EIS analyses adequately address the potential impacts of the proposed CISF.*

No changes to the EIS were made as a result of this comment.

Comment: (128-2)

D.2.4.2 Proposed Action—De Facto Disposal at the Proposed CISF

The NRC staff received many comments expressing concern that the proposed CISF would not be an interim storage facility but would instead become a de facto disposal site (i.e., that SNF may remain on the site for very long or indefinite periods of time). Commenters expressed concern about the maintenance of canisters and casks over the timeframe of the proposed project, stating that the timeframe would be indefinite. Other commenters stated that the facility would become a de facto storage site because there was no intention to move the SNF twice (i.e., once from the generation site and once to the final repository) with some commenters further indicating that the cost of transporting the SNF would ensure it only moves once. Some commenters stated concern that licensing the proposed CISF would reduce the need for and likelihood of construction of a permanent repository, or that because there is currently no final permanent repository available, that this interim facility would be a de facto disposal site. Some commenters were concerned that the interim proposed CISF would not be built to the same standards as a permanent repository, should the proposed CISF become a de facto storage site. In addition to these statements, commenters raised other topics such as safety of the transportation and storage of SNF and issues related to the potential Yucca Mountain repository.

Response: *The proposed action is to construct and operate a CISF for SNF, providing an option for storage of the SNF before a repository is available. The proposed CISF, if licensed, would be subject to the duration requirements for licenses and, if sought and granted, renewed licenses in Part 72. The availability of interim storage would not lessen the need for a permanent repository, because the policy for disposition of SNF remains disposal in a permanent geologic repository. The EIS evaluates the impacts of the proposed action for the license term of the proposed CISF, which is 40 years. The applicant did not design or propose the CISF to become a permanent repository (which would be subject to licensing requirements under 10 CFR Part 63 rather than Part 72), and should the NRC grant the license, it would not be approving the permanent storage of SNF at the proposed facility. If the initial license is approved, the licensee would have the option to apply for a 40-year license renewal under 10 CFR 72.42. However, the environmental analysis assumes that SNF would be transported away from the CISF and that decommissioning of the proposed CISF would occur prior to license termination at the end of the initial 40-year license period. In accordance with 10 CFR §§ 51.23(b), 51.80(b)(1), and 51.97(a), with respect to analysis of potential environmental impacts of storage beyond the license term of the facility, the impact determinations in the Continued Storage Generic Environmental Impact Statement (Continued Storage GEIS), NUREG–2157, shall be deemed incorporated into the EIS for the proposed CISF. As explained in the Continued Storage GEIS, consistent with current national policy, disposal in a permanent repository is feasible (see Appendix B of the GEIS). Therefore, evaluation of impacts of SNF disposal or of indefinite storage at the proposed CISF are outside the scope of this EIS. Additional information can be found in this appendix regarding the safety of canisters and casks in Section 2.26, transportation of SNF in Section 2.9, and Yucca Mountain in Sections 2.6.5 and 2.37.14.*

No changes were made to the EIS in response to these comments.

Comments: (1-6) (14-1) (20-3) (22-13) (50-3) (54-8) (55-6) (59-2) (68-1) (68-11) (74-4) (81-3) (90-5) (93-16) (96-4) (98-14-1) (98-15-3) (98-26-2) (98-26-3) (98-26-5) (98-26-6) (98-30-2) (98-30-17) (98-31-4) (98-31-5) (98-32-2) (98-42-3) (98-50-5) (98-51-1) (98-51-2) (99-17-6) (99-19-1) (99-19-3) (99-25-4) (99-41-1) (103-7) (104-3) (109-15) (110-7) (116-4) (124-2) (127-3) (128-1) (135-16) (137-4) (146-13) (150-3) (150-13) (151-17) (155-10) (157-3-15) (167-6-2) (168-3-5) (168-3-7) (168-18-4) (168-20-8) (169-4-5) (169-16-5) (170-10-8) (170-12-10) (170-15-2) (170-19-2) (172-10) (177-5) (190-3) (215-11) (215-12) (220-2) (220-3) (220-4) (220-6) (220-7) (221-2) (222-9) (223-5) (224-18) (230-2) (230-4) (231-11) (236-5) (237-1-21) (240-1-3) (240-1-20) (240-2-2) (240-3-5) (244-7) (247-3) (251-10) (256-2) (256-3) (256-4) (266-2) (280-3) (280-5) (289-1) (294-4) (304-7) (311-4) (319-14) (320-2) (321-8) (323-1-1) (323-1-2) (328-1-23) (330-2) (334-4) (336-3) (343-8) (344-3) (360-2) (364-1-10) (364-1-29) (375-2-9) (396-2)

D.2.4.3 Proposed Action—Decommissioning

The NRC received comments on the decommissioning plan for the proposed project. Some commenters, including NMED, noted that a decommissioning plan had not been submitted as part of the license application, had not been fully evaluated with regard to environmental impacts, and questioned the potential improvements in technology and the financial assurance of the project. One commenter also stated that a decommissioning plan could not be submitted until a repository was available. One commenter stated that because the NRC had not required Holtec to submit a decommissioning plan until a future date, this indicated that NRC intended to grant multiple license renewals and that decontamination may not be possible after the termination of the license term. One commenter noted that an alternative evaluation of impacts was not included if decommissioning and reclamation activities are unable to restore the site to preconstruction conditions. Another commenter noted the phrase, "if decommissioning and reclamation of the proposed CISF were to also occur" in the EIS and questioned if that implied that decommissioning and reclamation could not occur. One commenter expressed concern about the number of shipments that would be required to decommission the proposed facility. Two commenters questioned the timeframe of the proposed project regarding decommissioning and license renewals.

Response: *At the end of the license term of the proposed CISF project, once the SNF inventory is removed, the facility would be decommissioned such that the proposed project area and remaining facilities could be released, and the license terminated. Decommissioning activities, in accordance with 10 CFR Part 72 requirements, would include conducting radiological surveys and decontaminating, if necessary. Holtec has committed to reclamation of nonradiological-related aspects of the proposed project area. Reclamation would include dismantling and removing equipment, materials, buildings, roads, the rail spur, and other onsite structures; cleaning up areas; waste disposal; controlling erosion; and restoring and reclaiming disturbed areas. Because decommissioning and reclamation are likely to take place well into the future, the NRC staff acknowledges that technological changes that could improve the decommissioning and reclamation processes cannot be predicted. As a result, the NRC requires that licensees ceasing operations and moving to decommissioning an ISFSI (such as the proposed CISF) submit a Final Decommissioning Plan. The requirements for the Final Decommissioning Plan are delineated in 10 CFR 72.54(d), 72.54(g), and 72.54(i). The NRC staff would conduct a separate safety evaluation and NEPA review (i.e., prepare an EA or EIS, as appropriate) at the time the Final Decommissioning Plan is submitted to the NRC. Because the Final Decommissioning Plan would undergo a separate NEPA review, during which the NRC staff would consider the environmental impacts and potential mitigation for decommissioning, the detailed analysis of environmental impacts to occur under the Final Decommissioning Plan is not included in this EIS.*

The national policy for disposition of SNF remains disposal in a permanent geologic repository. This concept, and NRC's determinations regarding feasibility of a geologic repository, are discussed in Appendix B of the NRC's Generic Environmental Impact Statement for Continued Storage GEIS (NUREG–2157). Therefore, the requirement to submit a Final Decommissioning Plan is independent of the availability of a repository.

The proposed project under review would be licensed by the NRC to operate for a period of 40 years. Holtec has indicated that it may seek to renew the license for two additional renewal periods of up to 40 years each for a total of up to 120 years. Renewal of the 40-year license would require Holtec to submit a license renewal application, which would be subject to a new safety and environmental review. As stated previously, before the end of the license term of the proposed CISF, the NRC expects that the SNF would have been shipped to a permanent repository. Defueling of the proposed CISF would occur under the operation stage, not the decommissioning stage. And, when a repository becomes available, the daily number of SNF shipments to the repository would be determined by several factors but would be limited by the same loading and transfer capabilities at the CISF that factored into the average rate of SNF receipt (1.4 shipments per day).

Regarding the statement "if decommissioning and reclamation of the proposed CISF were to also occur," this statement was made in the waste management section in reference to the large amount of nonhazardous decommissioning and reclamation waste that would be generated.

Holtec has committed to both decommissioning and reclamation, and the text in EIS Section 4.14.1.3 has been edited for clarification.

No additional edits outside of those made in EIS Section 4.14.1.3 were made in response to these comments.

Financial qualifications and decommissioning financial assurance for the proposed CISF is addressed in the safety review, which is conducted in parallel with the environmental review, per 10 CFR 72.22(e) and 10 CFR 72.30, respectively. Information on cost estimates associated with the proposed project can be found in EIS Chapter 8, and Section 2.37.6 [Out of Scope—Financial Assurance] of this appendix. Additional information on the availability of a repository can be found in Section 2.6.5 of this appendix.

Comments: (169-4-4) (240-3-2) (252-16) (328-3-15) (373-6) (375-2-7) (375-2-17) (380-11)

D.2.4.4 Proposed Action—Description and Details

The NRC received clarification requests for the terminology used in the EIS to describe the proposed project activities and timeframes. One commenter requested clarification between the terms "stages" and "phases." Another commenter stated uncertainty about length of the license term for each of the phases. One commenter stated that the EIS should only have analyzed Phase 1 of the proposed project.

Response: *In the EIS, the term "stages" describes progression of the proposed project through (i) construction, (ii) operation, and (iii) decommissioning and reclamation. The activities specific to the construction and operation of the proposed facility are described in EIS Section 2.2.1.3 and decommissioning and reclamation in EIS Section 2.2.1.4. The "phases" of the proposed project refer to specific quantities of storage units to be constructed, each (phase) of which, beyond the initial phase (Phase 1), would require additional license amendments to transport and store SNF at the proposed CISF. Each phase would increase the storage capacity of the CISF. For the current license under review, Holtec is requesting authorization for the initial phase (Phase 1) of the proposed project to store 8680 metric tons of uranium (MTUs) [5,512 short tons] in 500 canisters for a license period of 40 years. This proposed action (Phase 1) includes the construction, operation, and decommissioning and reclamation stages of that phase. However, as part of its application, Holtec indicated its intention to apply for license amendments to expand the facility to include 19 additional phases. Each of the 19 license amendments (i.e., 19 additional phases) to the original license would include the construction, operation, and decommissioning and reclamation stages for the addition of 500 canisters of SNF per phase. If the NRC approves all 19 license amendments, the 40-year CISF license would then include all 20 phases.*

Holtec's expansion of the proposed project (i.e., Phases 2-20) is not part of the proposed action currently pending before the agency, which is licensing of Phase 1. However, the NRC staff considered these expansion phases in its description of the affected environment and impact determination, where appropriate. The NRC staff conducted this analysis as a matter of discretion because Holtec provided the analysis of the environmental impacts of the future anticipated expansion of the proposed facility as part of its license application. For the bounding analysis, the NRC staff assumes the storage of up to 10,000 canisters of SNF. Therefore, the EIS addresses the impacts from the construction and operations stages of proposed action (Phase 1) as well as subsequent phases of the proposed CISF project (i.e., Phases 2-20).

Under the proposed action, the applicant is applying for a license with a 40-year term. The license could be renewed twice, each renewal potentially being for 40 additional years. Therefore, if the NRC granted the renewals, the proposed project could operate for a total of 120 years. The distinction between a license renewal and a license amendment is that a license renewal extends the license term, whereas a license amendment alters the approved operating conditions of the facility (e.g., increasing the storage capacity).

At the end of the license term of the proposed CISF project and once the SNF inventory is removed, the facility would be decommissioned in accordance with 10 CFR Part 72 requirements, which would include conducting radiological surveys and decontaminating, if necessary. Additional information on decommissioning activities can be found in Section 2.4.3 of this appendix, [Proposed Action—Decommissioning].

No changes were made to the EIS as a result of these comments.

Comments: (46-5) (68-9) (74-6) (96-2) (99-12-2) (99-20-11) (157-1-9) (157-1-14) (169-3-2) (169-4-3) (237-1-4) (237-1-8) (237-1-9) (237-1-10) (237-1-11) (237-2-12) (237-3-13) (240-3-15) (300-3) (339-2) (364-1-19) (372-19) (373-1) (401-5)

D.2.4.5 Proposed Action—Licensing Conditions and Oversight

The NRC received comments, including from NMED, regarding the disclosure of license conditions associated with the proposed project and the need for comprehensive environmental oversight during the license term. One commenter stated that the financial and operational responsibilities and commitments of Holtec are unclear in the EIS, particularly with respect to the end of the 40-year license. One commenter asked if the SER is complete.

Response: *Although Holtec has proposed certain license conditions in its application documents, the NRC would establish final license conditions once both the environmental and safety reviews have been completed and the NRC staff is prepared to make a make a final licensing decision. At the time of publication of this EIS, the SER has not been completed. Both the EIS and SER will be made publicly available.*

The NRC oversight of the proposed facility occurs under a specific 10 CFR Part 72 license, which establishes the requirements, procedures, and criteria for the receipt, handling, storage, and transfer of SNF. The NRC staff regularly inspects its licensed facilities and enforces licensee compliance with NRC regulations and license conditions. Similarly, the NRC expects that all licensees will abide by all other applicable Federal, State, and local regulations; however, the NRC may only take enforcement action within the scope of its regulatory jurisdiction.

No changes were made to the EIS as a result of these comments.

Comments: (310-26) (322-13) (328-3-10) (380-15)

D.2.5 <u>Comments Concerning the Purpose and Need</u>

D.2.5.1 Purpose and Need—Defining the Purpose and Need

The NRC staff received comments on the adequacy of the EIS purpose and need statement. While one commenter was supportive of the purpose and need language, several others criticized the statement as being defined so narrowly as to limit the reasonable alternatives, not considering the proposed CISF as a permanent repository, and they questioned the need to move SNF from generation sites.

Response: *The proposed Federal action and the purpose and need for the proposed Federal action define the range of reasonable alternatives. The proposed action is the issuance, under the provisions of 10 CFR Part 72, of an NRC license authorizing the construction and operation of the proposed Holtec CISF in southeast New Mexico. For the proposed action, the purpose of the proposed Holtec CISF is to provide an option for storing SNF from nuclear power reactors before a permanent repository is available. The need is to provide away-from-reactor SNF storage capacity that would allow SNF to be transferred from existing reactor sites and stored for the 40-year license term before a permanent repository is available. Additional away-from-reactor storage capacity provides the option for away-from-reactor storage so that stored SNF at decommissioned reactor sites may be removed so the land at these sites is available for other uses. Therefore, considering the proposed action and purpose and need, the NRC staff determined a reasonable alternative to analyze would be a No-Action alternative in which the NRC would not approve the Holtec license application. The No-Action alternative would result in Holtec not constructing or operating the proposed CISF. In the absence of a CISF, the NRC staff assumes that SNF would remain on site in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available. As further detailed in EIS Section 2.3, other alternatives considered at the proposed CISF project but eliminated from detailed analysis include storage at a government-owned CISF, alternative design and storage technologies, an alternative location, and an alternative facility layout. These alternatives were eliminated from detailed study because they either would not meet the purpose and need of the proposed project or would cause greater environmental impacts than the proposed action.*

As previously stated, the proposed action is to construct and operate a CISF for SNF, providing an option for storage of the SNF before a repository is available. Therefore, the purpose and need statement should not assume the proposed CISF would be a permanent repository. The proposed CISF would be licensed by the NRC to operate for a period of 40 years. Holtec has indicated that it may seek to renew the license for two additional renewal periods of up to 40 years each for a total of up to 120 years. By the end of the license term (i.e., either 40 years or a maximum of 120 years) of the proposed CISF, the NRC expects that the SNF would have been shipped to a permanent repository. This expectation of repository availability is consistent with Appendix B of NUREG–2157, the Continued Storage GEIS (NRC, 2014a).

Regarding whether reactor sites are advocating for or against the construction and operation of a CISF, the NRC staff concluded that absent findings in its safety review or NEPA analysis that the proposed facility does not meet regulatory requirements, the NRC has no role in the planning decisions of private entities.

No changes were made to the EIS as a result of these comments.

For additional information on alternatives eliminated from detailed analysis see EIS Section 2.3. Information on the availability of a repository can be found in Section 2.6.5 of this appendix, and information on de facto storage is in Section 2.4.2 of this appendix.

Comments: (98-33-4) (109-14) (223-1) (223-9) (237-1-3) (237-3-10) (240-1-13) (330-1) (373-2)

D.2.6 Comments Concerning Assumptions

D.2.6.1 Assumptions—NRC's Continued Storage GEIS

The NRC staff received comments regarding the applicability of the assumptions in the Continued Storage GEIS to the NRC's EIS for the proposed CISF. The commenters' specific concerns include (i) the GEIS inclusion of the possibility of storage for an indefinite timeframe, (ii) improper reliance on the Continued Storage GEIS assumptions because of characteristics that differ between the proposed CISF and the generic facility evaluated in the GEIS (such as the quantity of SNF to be stored), (iii) applicability of the Continued Storage Rule and GEIS after the license period within the context of relicensing, (iv) addressing the arrival of damaged casks or accidents without a dry transfer system (DTS), (v) the lack of a DTS with regard to the requirement of the Continued Storage GEIS, (vi) the lack of inclusion of or requirement of a DTS in the NRC's EIS as a violation of NEPA, and (vii) inapplicability of the GEIS to severe accident mitigation in transportation and SNF and Greater-Than Class C (GTCC) storage and handling operations.

Response: *The NRC's Continued Storage GEIS (NUREG–2157) and Rule at 10 CFR 51.23 are applicable only for the period of time after the licensed life of a facility. The Continued Storage GEIS analyzed the environmental effects of the continued storage of SNF at both at-reactor and away-from-reactor ISFSIs. The NRC staff disagrees with the comments indicating that the EIS should include an analysis of the indefinite timeframe because the GEIS included such an analysis. The GEIS evaluated short-term, long-term, and indefinite storage timeframes after the expiration of a license term to broadly encompass possible scenarios. The NRC's licensing framework for site-specific reviews such as the proposed Holtec CISF are timeframe specific (in this case, for a 40-year license, or additional renewals as approved). After the license term, the analyses in the GEIS apply, whether over a short, long, or indefinite timeframe, per 10 CFR 51.23. However, because licensees are required to maintain an NRC license for their commercial nuclear facilities, a licensee may submit a license renewal application or begin decommissioning activities near the end of the license term. Related comments about the potential for the proposed CISF to become a de facto disposal facility are found in Section 2.4.2 of this appendix.*

Second, EIS Section 5.1.3 discusses that the assumptions about a hypothetical away-from-reactor facility as described in GEIS Section 5.0 differ in scale from the attributes of the proposed CISF and notes that "the Continued Storage GEIS acknowledges that not all storage facilities will necessarily match the "assumed generic facility…" However, the impact determinations in the GEIS are based on analysis of continuing to store SNF at a facility that has already been built and analyzed in a site-specific licensing process, and, by regulation, the impact determinations in the GEIS shall be deemed incorporated into the CISF EIS. In short, the NRC has already made site-specific conclusions in the EIS regarding impact determinations over the license term (in this case, 40 years) for the proposed CISF, and the differences in assumptions do not change how those determinations would persist into the Continued Storage timeframes. For example, the GEIS impact determination for public and occupational health in GEIS Section 5.17 is that continuing to store SNF in an away-from-reactor ISFSI would result in a SMALL impact because the facility would continue to be required to meet regulatory safety criteria that are protective of public health and safety. Similarly, as evaluated in EIS Section 4.13, the proposed CISF public and occupational health impact would be SMALL for the same reasons, and this would be expected to continue during the timeframes over which the Continued Storage timeframe applies, regardless of the size of the facility.

Third, regarding the comments about applicability of the Continued Storage GEIS and Rule within the context of relicensing (i.e., that because of relicensing, the GEIS would never apply), the NRC incorporates the generic determinations in 10 CFR 51.23 to satisfy its obligations under NEPA with respect to continued storage of SNF for commercial reactor licenses, license renewals, and ISFSI licenses and license renewals. Specifically, GEIS Section 6.1 notes that the GEIS is applicable both for licensing and relicensing actions: while a site-specific NEPA review is being conducted for the present proposed action (i.e., the proposed CISF) and would be conducted again in the future for a license renewal application (if requested), the impact determinations of the GEIS are incorporated by regulation for continued storage impacts beyond the licensed life of the facility for both reviews. As previously noted, the Continued Storage GEIS is applicable after the licensed life of a facility, but the GEIS and Rule do not obviate the requirement of licensees to have an approved and current NRC license to operate a commercial nuclear facility, which would then either be decommissioned or undergo license renewal near the end of its license term.

In response to comments stating that the EIS needed to consider a DTS either for SNF or packaging that is damaged on arrival, the applicant has not proposed a DTS for this purpose and has included a "return to sender" policy in its license application, as described further in Section 2.26 of this appendix [Comments Concerning Safety], which will be evaluated as part of the NRC's safety review. The NRC staff's safety review addresses the potential for credible accidents and associated mitigations. If the NRC staff's safety review determines that these scenarios are credible, the NRC staff would consider their environmental impacts, as appropriate. However, NEPA does not require the consideration of speculative impacts. Neither transportation nor storage and management operations are treated as generic issues in the EIS; both are analyzed for the site-specific license term. The NRC would not grant a license for the proposed CISF if safety issues exist that would preclude reasonable assurance of adequate protection of public health and safety and the environment. The EIS also contains an analysis of transportation impacts in EIS Section 4.3 and of accidents in EIS Section 4.15.

The NRC staff disagrees with comments that a DTS is required because the GEIS assumes that one would be built for away-from-reactor facilities. GEIS Section 5.0 notes that "the ISFSI would require a DTS only for the long-term storage and indefinite storage timeframe" to facilitate SNF transfer and handling between canisters (i.e., bare fuel handling), and that "(t)he DTS is assumed to be built sometime after the ISFSI is built because it would not be needed immediately" (see also GEIS Section 1.8.3). The license term for the proposed CISF is 40 years, and the long-term timeframe begins at 100 years beyond the licensed life of the facility (including license renewal). The applicant has proposed transfer of canisters among storage and transportation casks, which can be safely accomplished without a DTS. The applicant has not proposed construction or operation of a DTS in its license application, and a DTS is not anticipated to be needed during the 40-year license term. If the licensee intends to build a DTS during the license term under evaluation, the licensee would be required to submit a license amendment request for NRC approval. Therefore, discussion of a DTS is outside the scope of this EIS and exclusion of such a discussion does not violate NEPA.

Regarding treatment of severe accident mitigation in transportation being treated as a generic issue, the NRC staff evaluated potential accident scenarios in the safety review. Findings of the safety evaluation are documented in the NRC SER. The NRC would not grant a license for the proposed CISF if safety issues exist that would preclude reasonable assurance of adequate protection of public health and safety and the environment. The EIS also contains an analysis of transportation impacts in EIS Section 4.3 and of accidents in EIS Section 4.15. The NRC staff disagrees that SNF and GTCC storage and operations cannot be treated generically after *the licensed life of the facility. As discussed earlier in this response, GEIS Section 6.1 notes that the GEIS is applicable both for licensing and relicensing actions: a site-specific NEPA review is being conducted for the present proposed action (i.e., the proposed CISF) and would be conducted again in the future for a license renewal application (if requested), and the impact determinations of the GEIS for SNF storage and handling are incorporated by regulation at 10 CFR 51.23 for continued storage impacts beyond the licensed life of the facility. GTCC impacts would be bounded by SNF impacts in both the licensed and continued storage timeframes because GTCC is a low-level radioactive waste that is considered less hazardous material than SNF, and GTCC would also be required to be stored in NRC-approved containers.*

No changes were made to the EIS as a result of these comments.

Comments: (57-4) (93-13) (98-11-2) (98-43-5) (99-11-6) (99-17-5) (99-22-7) (99-25-6) (99-31-13) (100-4) (100-7) (100-10) (102-1) (109-5) (114-3) (119-1) (138-2) (138-4) (155-6) (155-13) (169-4-8) (170-25-2) (188-8) (190-2) (215-8) (237-1-5) (237-1-7) (240-2-20) (244-8) (294-3) (307-1-10) (307-2-7) (319-6) (323-1-10) (324-1-1) (324-1-2) (324-2-9) (357-6) (372-3) (372-6) (372-13) (373-14)

D.2.6.2 Assumptions—Legal Framework of the Proposed CISF

The NRC staff received numerous comments regarding the legal framework of the proposed action. Commenters questioned (i) the legality of licensing an interim storage facility without a final repository, (ii) the ownership (i.e., title) of the SNF, (iii) the legality of a private entity transporting fuel, and (iv) the financial and legal liability of a CISF. Several commenters stated that the Nuclear Waste Policy Act (NWPA) prohibits the licensing of a CISF and prohibits DOE transporting SNF to a CISF rather than a repository. Some commenters questioned whether delay in Federal ownership of SNF would result in the proposed CISF becoming a de facto disposal site. One commenter requested additional detail on the site selection process for the proposed Holtec CISF. Some commenters criticized the NRC for refraining from evaluating GTCC disposal. Some commenters stated that the NRC also did not comply with the Administrative Procedure Act (APA).

Response: *The NRC has previously licensed a consolidated spent fuel storage installation, and NRC regulations continue to allow for licensing private away-from-reactor interim spent fuel storage installations under 10 CFR Part 72. The proposed CISF, if licensed, would be subject to the duration requirements for licenses and, if sought and granted, renewed licenses in Part 72. The availability of interim storage would not lessen the need for a permanent repository because the national policy for disposition of SNF remains disposal in a permanent geologic repository. The NRC's determinations regarding feasibility of a geologic repository are discussed in Appendix B of the Continued Storage GEIS (NUREG–2157). The NRC has recognized and acknowledges the political uncertainties in siting and licensing a permanent geologic repository and has also addressed this in Appendix B of the GEIS. Issues relating to ownership (i.e., title) of spent fuel are, generally, outside the scope of this EIS because the environmental impacts of the proposed action would remain at the same level of significance regardless of ownership. The license, if granted, would not authorize or effect any unlawful transfer of title from DOE; the NWPA does not prohibit a power plant licensee from transferring spent fuel to a private entity, like Holtec. Regarding comments on the legality of privatized transport of SNF, the NRC allows licensed private transportation of spent fuel. For more information on the NRC's regulation of spent fuel transportation, see https://www.nrc.gov/waste/spent-fuel-transp.html. Issues related to GTCC waste regulation (e.g., policy decisions for GTCC storage and disposal) are outside the scope of this EIS. The* *storage of GTCC at the proposed CISF is part of the proposed action and is included as part of the general term "SNF" (EIS Section 1.1) as analyzed in the EIS. Therefore, each resource area's impact determinations for the storage of SNF includes the portion of stored waste that is GTCC. Separate from this EIS process, the NRC has developed a draft regulatory basis for GTCC and transuranic waste disposal (ADAMS Accession No. ML19059A403). That regulatory process is ongoing and therefore detailed review of GTCC disposal is not feasible at this time. Regarding the statement that the NRC violated the APA, the commenters do not specifically address what they believe constitutes a violation. However, the NRC staff is working to develop a sound record to support an eventual licensing decision on the proposed project. Moreover, the NRC staff has complied with the noticing requirements and public participation process of the APA, and these are described in Section 2.2, [Comments Concerning Public Participation], of this appendix. For information on the site-selection process, see EIS Section 2.3.3, and for details on the cost-benefit analysis see EIS Chapter 8, and Section 2.20 of this appendix.*

No changes were made to the EIS as a result of these comments.

Comments: (1-5) (16-5) (46-1) (46-2) (46-4) (47-6) (53-1) (54-1) (68-6) (68-8) (77-4) (90-3) (93-9) (98-11-3) (98-25-2) (98-28-4) (98-31-13) (98-32-5) (99-2-3) (99-4-3) (99-17-2) (99-26-2) (99-29-3) (103-1) (103-4) (103-5) (103-6) (103-8) (116-2) (117-12) (135-5) (150-2) (155-7) (157-1-10) (157-1-20) (160-2) (167-7-2) (167-8-2) (167-9-4) (167-12-5) (167-15-5) (168-3-8) (168-9-5) (168-10-4) (169-9-4) (169-16-6) (170-5-2) (170-14-1) (170-18-5) (170-26-2) (188-5) (196-11) (221-3) (222-5) (223-3) (223-4) (223-8) (223-10) (223-12) (224-9) (224-30) (231-2) (236-2) (237-1-12) (237-1-14) (237-1-15) (237-1-16) (237-1-17) (240-1-1) (240-1-4) (240-1-10) (240-2-3) (251-3) (251-13) (272-1) (272-3) (287-1) (287-4) (294-9) (303-6) (308-7) (309-5) (321-5) (335-3) (336-4) (337-7) (345-3) (349-2) (357-3) (361-2) (364-1-9) (369-4) (373-3) (390-4) (428-6)

D.2.6.3 Assumptions—Loss of Institutional Controls at the Proposed CISF

The NRC staff received comments that questioned the reasonableness of effective institutional controls that would continue in the long-term timeframe. Commenters were concerned specifically with the maintenance, repair, and replacement of casks, as well as the degradation of the storage system should institutional controls fail. One commenter noted that future governmental entities would need to adhere to current waste disposal policies to validate the assumptions on which the NRC is basing its licensing decision. One commenter was concerned about who would be responsible for maintaining and funding the disposal of SNF if the government structure changed. Another commenter suggested that the proposed CISF would become a de facto permanent storage site because future entities would not return to remove the waste. One commenter questioned how entities would communicate to relay information regarding stored SNF tens to hundreds of thousands of years in the future.

Response: *The timeframe of analysis for this proposed action is 40 years, over which timeframe institutional controls can be reasonably assumed to remain in place. At the end of the 40-year license timeframe, the licensee would have the option to renew the license, at which time another full environmental and safety review would be conducted. For periods of time beyond the license term of the proposed facility, the Continued Storage GEIS (NUREG–2157) addresses the environmental impacts. The Continued Storage GEIS addressed the stability of institutional controls over the long-term and indefinite timeframes and discussed the potential impacts of a loss of institutional controls. Thus, the NRC has concluded that it is reasonable to assume that licensees will remain responsible for the SNF stored on their sites and that institutional controls and, specifically, continued NRC oversight, will remain in place for the* *duration of the licensing timeframe and any subsequent licensing timeframes. Furthermore, given that the NRC regularly conducts license renewal reviews for facilities that have been in operation for decades longer than 40 years, the NRC staff do not foresee difficulty in communicating technical issues about the facilities over each license term.*

The applicant did not design or propose the CISF to become a permanent repository, and should the NRC grant the initial 40-year license requested, it would not be approving the CISF for permanent storage of SNF. The environmental analysis assumes that the national policy for disposition of SNF remains disposal in a permanent geologic repository. This concept, and NRC's determinations regarding feasibility of a geologic repository, are discussed in Appendix B of NUREG–2157.

In parallel with this environmental review of the proposed CISF, the NRC is conducting a separate safety review that will be documented in an SER. The safety review of the Holtec application evaluates whether the application complies with applicable requirements, including 10 CFR Part 72, which addresses facility design and operations, receipt inspections, canister and cask safety, quality assurance, records, and reports. The NRC staff would require compliance with all aspects of the license, should the Holtec CISF be licensed, for the duration of the license term. Therefore, because the NRC staff finds it reasonable to assume institutional controls will be in place in the future, the NRC staff also anticipates that the proposed facility would operate as designed to maintain the health and safety of people and the environment. Also, as part of the safety review, the NRC staff would evaluate Holtec's decommissioning funding assurance plan and put in place a license condition that Holtec proposed addressing liability and financial assurance arrangements. Through these actions, the NRC verifies that financial assurance for radiological decommissioning would be provided.

Additional comments on the scope of the timeframe for the proposed action can be found in this appendix in Section 2.6.4 [Assumptions—Timeframe of the Proposed Action], Section 2.4.2 [Proposed Action—De Facto Disposal at the proposed CISF], Section 2.20.10 [Cost Considerations—Financial Responsibilities for Facilities and Activities], and Section 2.26 [Comments Concerning Safety].

No changes were made to the EIS as a result of these comments.

Comments: (46-12) (57-1) (77-5) (99-41-2) (99-41-7) (100-1) (155-2) (196-3) (215-13) (220-1) (244-1) (286-16) (304-8) (308-2) (311-6) (344-5) (372-2) (388-2)

D.2.6.4 Assumptions—Timeframe of the Proposed Action

The NRC staff received several comments regarding the timeframe of the analysis for the proposed action in the EIS. Several commenters stated that an analysis of only 40 years was too short to meaningfully evaluate environmental impacts. Some commenters were also concerned about the design safety of the proposed facility for timeframes after the initial 40-year license period, with one commenter specifying that the proposed facility would not be designed for longer timeframes (or permanent storage). Other commenters requested that the NRC evaluate the safety and environmental impacts of the proposed CISF over the potential total license timeframe (i.e., potentially 120 years if renewals were granted), while others stated that the proposed CISF should be evaluated for a longer period of time than just the initial licensed life. A few commenters questioned if a permanent repository would be built at all or could be built during the proposed CISF license period.

Response: *The proposed action being evaluated in the EIS is the issuance, under the provisions of 10 CFR Part 72, of an NRC license authorizing the construction and operation of the proposed Holtec CISF in southeast New Mexico. The proposed CISF, if approved, would be licensed by the NRC in accordance with regulations authorizing operation under a license for up to 40 years. Holtec has indicated that it may seek to renew the license for two additional renewal periods of 40 years each, for a total of 120 years. Renewal of the license beyond the initial 40-year term would require Holtec to submit a license renewal request, which would be subject to an additional safety and environmental review [EA or EIS] separate from this licensing action. Therefore, the EIS evaluated the initial licensing period of 40 years. By the end of the license term of the proposed CISF (40 years plus subsequent renewals, if approved), the NRC expects that the SNF would be shipped to a permanent geologic repository. This expectation of repository availability is consistent with NUREG–2157, the Continued Storage GEIS (NRC, 2014a), which concluded that a reasonable period of time for the development of a repository is approximately 25 to 35 years, based on experience in licensing similarly complex facilities in the U.S. and national and international experience with repositories already in progress. Furthermore, the Continued Storage GEIS (NUREG–2157) and associated rule at 10 CFR 51.23 state that EISs such as the EIS for the proposed Holtec CISF are not required to discuss the environmental impacts of spent nuclear fuel storage in an ISFSI for the period following the term of the ISFSI license. The impact determinations in NUREG–2157 regarding continued storage are deemed incorporated into the EISs according to 10 CFR 51.23.*

A separate safety review, conducted in parallel with the environmental review, addresses the safety of facility design, SNF receipt, transfer, and storage operations and related activities at the proposed CISF in New Mexico.

No changes were made to the EIS as a result of these comments.

Comments: (45-4) (55-2) (57-3) (77-1) (82-3) (93-17) (98-20-3) (98-28-6) (98-28-7) (98-30-1) (98-32-4) (98-49-10) (99-20-1) (99-20-2) (99-27-3) (100-8) (100-9) (109-11) (114-2) (135-6) (155-12) (167-1-4) (167-6-3) (168-3-9) (169-4-7) (170-19-7) (170-20-10) (188-2) (208-2) (236-4) (237-1-13) (240-1-8) (240-2-4) (247-7) (259-5) (280-7) (303-4) (328-1-24) (336-2) (344-4) (357-1) (372-1)

D.2.6.5 Assumptions—Availability of a Repository

The NRC received several comments about the reasonableness of the assumption in the EIS that the SNF stored in the proposed CISF would be moved to a permanent repository. Several comments included statements about the need for a repository or permanent solution (i.e., instead of interim storage), and some comments simply pointed out the current lack of an available repository. Several commenters stated skepticism as to whether a permanent repository (e.g., Yucca Mountain) would be completed or is feasible under current legislation, with some of these commenters citing the lengthy timeframe over which the DOE has worked to develop a repository. Other commenters objected that the EIS assumes that Yucca Mountain will be the designated repository, citing issues and delays in the licensing process. One commenter stated their support for a parallel repository licensing process.

Response: *The national policy for disposition of SNF remains disposal in a permanent geologic repository. This concept, and NRC's determinations regarding feasibility of a geologic repository, are discussed in Appendix B of the Continued Storage GEIS (NUREG–2153). Furthermore, the Nuclear Waste Policy Act, as amended, designates Yucca Mountain as the location for the DOE to develop a geologic repository. The NRC*

recognizes and acknowledges the political uncertainty and difficulties in siting and licensing a geologic repository and has also addressed this in Appendix B of the Continued Storage GEIS. The purpose and need for the proposed action are to provide a temporary storage solution before a repository becomes available. Additional information on the timeframe of the analysis (including de facto disposal) and the proposed action can be found in Sections 2.6.4, and 2.4 of this appendix. Detailed comments about the proposed Yucca Mountain geologic repository are beyond the scope of this EIS and are addressed in Section 2.37.14 of this appendix.
No changes were made to the EIS as a result of these comments.

Comments: (45-3) (46-6) (46-9) (46-13) (49-1) (74-3) (91-2) (96-1) (98-53-5) (99-20-4) (156-6) (157-1-12) (169-4-6) (169-4-13) (169-11-1) (169-11-2) (169-15-2) (170-20-8) (170-21-4) (217-1) (219-1) (219-4) (222-1) (222-8) (240-3-4) (242-1) (242-2) (250-4) (266-6) (280-2) (302-1) (307-1-21) (320-3) (323-1-8) (347-2) (347-3) (359-2) (364-1-28) (364-1-30) (378-10) (396-1)

D.2.7 Comments Concerning Alternatives

D.2.7.1 Alternatives—Comments on and Support for the No-Action Alternative

The NRC received a number of comments, including from NMED, in support of the No-Action alternative. Commenters stated their preference not to move the SNF, or to leave the SNF at or near its current storage location, whether that be a reactor site or ISFSI. The bases for supporting the No-Action alternative included the reduced environmental impact, cost, and transportation risk, as well as general opposition to the proposed project. Multiple commenters stated that if the SNF is currently safely stored, then there is no reason to move it. Some commenters noted that communities that have benefitted from nuclear power should bear the cost and risk of storing the SNF, and some residents currently living near SNF storage locations said they are not pushing to move the waste out of their area because they do not wish to burden other populations. Some commenters also indicated that the SNF should stay at its current location until a repository is available. A commenter also noted that keeping the SNF at the generation site did not preclude modifications or expansions to accommodate SNF if additional storage is needed. Two commenters stated that storage at the generation site should be funded by the U.S. government, with one comment indicating that storage should be overseen by an organization in charge of monitoring the SNF. One commenter noted that the SNF can be stored safer at existing storage locations because of the increased earthquakes due to the oil and gas industry in the proposed CISF project area. Some commenters also requested additional details on why the No-Action alternative is not the preferred alternative, further stating that to comply with NEPA, additional analysis is required to effectively compare the alternatives presented in the EIS.

Response: *In accordance with NEPA, the NRC staff evaluated the No-Action alternative (i.e., not building the proposed CISF and SNF remaining in its current location) in the EIS. The No-Action alternative is discussed in EIS Chapters 2, 4, 8, 9, and Appendix B and C. In the absence of a CISF, the NRC staff assumes that SNF would remain on site in existing wet and dry storage facilities and be stored in accordance with NRC regulations and be subject to NRC oversight and inspection. Site-specific impacts at each of these storage sites would be expected to continue as detailed in generic (NRC, 2013a, 1989) or site-specific environmental analyses. In accordance with current U.S. policy, the NRC staff also assumes that the SNF would be transported to a permanent geologic repository, when such a facility becomes available. Inclusion of the No-Action alternative in the EIS is a NEPA requirement and serves as a baseline for comparison of environmental impacts of the proposed action. EIS Chapter 8 includes a cost-benefit analysis that compares the cost of keeping SNF at the generation site* *versus moving SNF to the proposed CISF. However, issues commenters raised such as pursuing a permanent repository instead of a CISF, altering who pays for storage, or changing the current requirements for on-site storage are beyond the scope of this EIS.*

Regarding the comments that requested a detailed comparison of reasons for rejecting the No-Action alternative, EIS Section 2.4 provides a comparison of the impacts from the proposed action and No-Action alternative; EIS Chapter 9 also summarizes the potential environmental impacts of the proposed action (Phase 1, including the rail spur), Phases 2-20, and the No-Action alternative; and EIS Section 2.5 contains the NRC's recommendation of issuance of a license. The NRC's recommendation accounts for the fact that the proposed action is the option that meets the purpose and need for the proposed project, that the difference in environmental impacts between the proposed action and No-Action alternative is primarily with respect to the location that those impacts would occur, and that the comparison of economic costs and other costs and benefits (as described in EIS Section 8.5.2) favor the proposed action.

With respect to statements that the NRC did not include the facts and data used to determine that the impacts of storage at a government-owned CISF, alternative design and storage technologies, an alternative location, and an alternative facility layout would either not meet the purpose and need of the proposed project or cause greater environmental impact than licensing the Holtec facility, the entirety of this analysis and the basis for the conclusions are contained in EIS Section 2.3. Several of the proposed alternatives were eliminated because they did not meet the purpose and need for the proposed action. The DOE integrated waste management system was ruled out from detailed consideration as an alternative because it is in the planning stage, and sufficient information is not available at this time to evaluate it as a reasonable alternative.

The NRC staff agrees with the comments stating that SNF can be safely stored at facilities on or near the generation site. However, NRC regulations (10 CFR Part 72) allow for the storage of SNF in away-from-reactor facilities, as well. Holtec has requested a license for an away-from-reactor ISFSI and therefore, the NRC staff is reviewing the application. Although it may be true that reactor licensees could choose to develop or expand onsite storage for the SNF, they also have the right, in accordance with NRC regulations, to pursue other options, such as moving the SNF from the reactor site to the proposed Holtec CISF.

Additional information on geologic conditions at the proposed project area, as well as the impact of the proposed facility on the geology and soils of the area can be found in EIS Sections 3.4, 4.4, and 5.4. Related comments objecting to the proposed project can be found in Section 2.35 of this appendix [Comments of General Opposition].

No changes were made to the EIS as a result of these comments.

Comments: (1-21) (11-1) (14-3) (22-4) (38-5) (38-17) (38-19) (58-2) (69-3) (92-1) (93-8) (98-20-4) (98-24-8) (98-26-1) (98-28-5) (98-33-7) (99-4-2) (99-7-5) (99-12-10) (99-16-1) (99-16-4) (99-29-8) (99-30-3) (99-30-8) (99-30-9) (99-35-11) (99-40-2) (117-13) (126-5) (133-1) (135-3) (135-14) (135-15) (136-8) (137-5) (137-8) (146-2) (147-2) (149-6) (150-11) (151-14) (157-1-5) (158-1) (160-3) (161-1) (167-8-4) (167-13-9) (169-4-2) (169-6-5) (169-9-6) (169-16-4) (170-12-8) (170-19-5) (172-2) (172-12) (184-2) (191-2) (196-13) (199-2) (201-1) (204-4) (206-1) (211-1) (214-4) (215-17) (222-4) (229-2) (230-3) (231-12) (235-1) (237-1-6) (240-1-5) (240-1-12) (240-1-15) (240-2-19) (247-23) (249-1) (250-2) (250-5) (251-11) (256-1) (259-1) (266-16) (266-18) (269-8) (289-9) (289-11) (299-9) (303-3) (304-2) (304-3) (304-5) (307-2-3) (307-2-6) (308-9) (309-2) (311-1) (315-2) (319-12) (322-2) (322-4) (323-1-5) (323-1-7) (328-1-2)

(328-1-4) (328-1-8) (334-2) (338-1) (339-4) (349-5) (353-1) (353-3) (364-1-6) (373-15) (374-1) (376-1-12) (376-2-6) (394-2) (394-6) (395-2) (401-2) (405-2) (406-2) (411-2) (412-4) (416-1) (424-1)

D.2.7.2 Alternatives—Hardened Onsite Storage System (HOSS) and Hardened Extended-Life Local Monitored Surface Storage (HELMS)

Several comments were received stating that the NRC should have considered HOSS and/or HELMS as alternatives to the proposed action or should have conducted studies comparing the relative safety of HOSS and HELMS to the proposed action. Some commenters also requested that the EIS evaluate costs, safety, and transportation risks associated with moving the SNF compared to leaving the SNF in onsite storage. One commenter was supportive of exclusion of HOSS from detailed analysis. One commenter noted that HOSS had been presented as an alternative in a 2018 petition to intervene in the NRC proceedings. Two commenters stated that the purpose and need was defined too narrowly, which resulted in either exclusion of HOSS as an alternative or conversely did not preclude it from being an alternative. In both cases, the commenters requested a more detailed analysis of HOSS as a full alternative to the proposed project. Commenters also indicated that by not including a detailed analysis of HOSS, which they deem as a viable option, the EIS violates NEPA. Some commenters also requested that additional information be included in the EIS as justification for why HOSS or the No-Action alternative was not considered a viable alternative. One commenter also said that by not evaluating HOSS, the proposed CISF could become a permanent repository.

Response: *The NRC's safety and environmental review is limited to evaluating the proposed CISF as described in Holtec's license application, as well as viable alternatives. The staff's assessment of the No-Action alternative evaluates the potential impacts of leaving the SNF at current storage locations as a baseline for comparison against the potential environmental impacts of constructing and operating a proposed CISF. HOSS and HELMS were not analyzed in detail in the EIS because these concepts do not meet the purpose and need of the proposed action. Regarding defining the purpose and need for the proposed action, the purpose is to provide an option for storing SNF from nuclear power reactors for the timeframe prior to a permanent repository becoming available. The need for the proposed action is to provide away-from-reactor SNF storage capacity that would allow SNF to be transferred from existing reactor sites and stored for the 40-year license term before a permanent repository is available. Additional away-from-reactor storage capacity is needed to provide the option for away-from-reactor storage so that stored SNF at decommissioned reactor sites may be removed such that the land at these sites is available for other uses. Thus, new or modified facilities at existing sites do not meet the purpose and need for the proposed action. Furthermore, the scope of this licensing action for the proposed CISF does not include new storage system designs for the storage of spent fuel at existing sites; therefore, assessing the impacts of HOSS and HELMS at other sites is not included in this site-specific licensing process.*

Regarding requests for the NRC to consider the safety benefits of HOSS and HELMS fully and compare the safety of these systems to the proposed action (Phase 1), evaluation of new systems or designs is beyond the scope of this EIS. Furthermore, the NRC recently reviewed a request for rulemaking submitted by Raymond Lutz and Citizens Oversight, Inc. (the petitioners), dated January 2, 2018, regarding HELMS (a similar concept to HOSS that also acknowledges the potential need for local off-site storage). The petitioners requested that the NRC amend its regulations regarding SNF storage systems to embrace the Hardened Extended-life Local Monitored Surface Storage (HELMS) approach and identified multiple revisions to accommodate such an approach. The NRC denied the petition because the *petitioners did not present information that supports the requested changes to the regulations or that provides substantial increase in the overall protection of occupational or public health and safety (85 FR 3860). The NRC's current regulations and oversight activities continue to provide for the adequate protection of public health and safety and to promote the common defense and security. However, in accordance with its statutory authority to do so, the NRC would evaluate the environmental and safety of implementation of HOSS or HELMS systems at a SNF storage facility, should an application for such be submitted.*

With respect to the comments about the decision regarding exclusion of HOSS as part of a previous petition to intervene in the proceedings, that decision is part of the adjudicatory process that is a separate component of the NRC licensing decision process, and therefore is beyond the scope of this EIS.

No changes were made to the EIS as a result of these comments. Both HOSS and HELMS remain eliminated from detailed analysis as described in EIS Section 2.3.2.2 and 2.3.2.3, respectively.

Comments: (51-3) (90-6) (98-40-2) (98-41-1) (98-52-4) (99-31-4) (99-36-8) (116-5) (165-1) (168-4-5) (168-12-1) (169-5-3) (191-6) (237-2-10) (237-3-7) (237-3-8) (237-3-9) (240-1-14) (240-2-6) (266-17) (280-12) (294-10) (305-2) (305-6) (314-2) (321-2) (324-2-18) (332-7) (360-1) (361-4) (361-6) (364-1-17) (376-2-4) (405-6) (406-6) (423-1)

D.2.7.3 Alternatives—Alternative Sites and Methodologies

The NRC staff received comments suggesting the use of alternative sites for storage and disposal, alternative plans for disposition of the SNF, or alternative locations for the site-selection process for the proposed project. One commenter questioned the NRC evaluation of the site selection process. Some commenters suggested alternate locations for the proposed project, including the previously licensed Private Fuel Storage CISF; the ISP CISF; the State of Texas; the State of Oklahoma; Washington DC; generic locations away from humans and animals; the Texas salt flats; multiple smaller locations rather than a consolidated site; former uranium, cadmium, or lead mines; a site closer to the Yucca Mountain; and the Nevada Test Site. Some commenters suggested using alternative system designs for the proposed CISF similar to the one currently implemented in Switzerland. Some commenters stated that SNF should be stored or disposed in a geologic formation or that a repository should be considered instead of a CISF. Some commenters, including NMED, stated that the alternatives eliminated from detailed analysis (EIS Section 2.3) should be fully evaluated and seriously considered. One commenter further stated that an evaluation of reasonable alternatives is mandated by NEPA, and a supplemental EIS would be required to inform the public of the additional analyses.

Response: *The NRC staff's discussion of alternatives in the EIS and a description of alternatives considered but eliminated from detailed analysis can be found in EIS Sections 2.2 and 2.3, respectively. The alternatives analysis did not include a review of alternate plans for disposition of the SNF, such as developing a repository because such alternatives do not meet the purpose and need for the proposed action (providing an option to store SNF until a repository is available).*

As described in EIS Section 2.3.3, the NRC staff reviewed Holtec's site-selection process and evaluated the sites proposed in its application. To evaluate whether any of the environmental impacts could be avoided or significantly reduced through site selection, the NRC staff *independently evaluated the site-selection process to determine if the site Holtec proposed was the environmentally preferable location when compared to other evaluated sites. The NRC staff conducted a sensitivity analysis of the siting process to ensure that the site selection was not sensitive to small changes in the relative weights of objectives or criteria. The NRC staff evaluated the information by equally ranking each of the criteria, segregating certain criteria for specific evaluation, and applying higher weighting to environmental- and safety-related criteria. Based on the results of the NRC staff's site-selection process evaluation and sensitivity analysis, the NRC staff independently verified that Holtec's elimination of other alternative sites from detailed evaluation was reasonable. In addition, the NRC staff did not identify any additional alternative sites that Holtec did not consider in its site-selection process. Inclusion of the No-Action alternative in the EIS addresses a requirement under NEPA, and it serves as a baseline for comparison of environmental impacts of the proposed action. Because the NRC staff determined that the site-selection process was reasonable and did not unreasonably exclude alternative sites, the NRC staff did not identify additional site locations for a detailed analysis, and no supplemental analysis is needed.*

The NRC staff performs independent environmental and safety reviews of the project proposed by an applicant. Holtec did not propose a cask storage system similar to systems the commenter suggested that are used in Switzerland. Holtec proposed to use the Holtec International Storage Module Underground MAXimum Capacity (HI-STORM UMAX) technology (certified in NRC Docket Number 7201051), which is a dry, in-ground storage system that stores a hermetically sealed canister containing SNF in several vertical ventilated modules. Therefore, an evaluation of an alternative storage design is not included in this EIS. EIS Section 2.3.2 includes additional information about alternative system designs and technologies that Holtec considered, but which it decided against after evaluation.

No changes were made to the EIS as a result of these comments.

Comments: (4-3) (14-5) (22-1) (23-10) (26-3) (33-1) (38-7) (38-13) (59-4) (78-1) (78-3) (79-7) (80-1) (80-3) (83-1) (95-1) (98-30-7) (98-54-2) (99-16-2) (99-40-9) (142-2) (144-2) (148-1) (157-1-21) (157-3-16) (167-9-8) (168-6-7) (169-5-5) (172-3) (224-2) (226-2) (237-1-1) (237-3-6) (240-1-11) (240-2-15) (240-2-18) (264-3) (267-3) (269-7) (302-2) (313-2) (323-1-12) (327-2) (328-1-5) (359-11) (364-1-11) (368-7) (372-10) (376-1-14) (376-2-3) (376-2-5) (383-6) (398-1) (398-2) (405-1)

D.2.8 Comments Concerning Land Use

D.2.8.1 Land Use—Concerns About Natural Gas Pipelines

The NRC staff received a comment raising concerns about natural gas pipelines in the vicinity of the proposed CISF. The commenter was concerned about the risks posed by natural gas pipelines in proximity to the proposed CISF and questioned the NRC analysis of natural gas pipeline hazard risk on the proposed CISF.

Response: *EIS Section 3.2.5 describes the locations of natural gas pipelines that cross the proposed CISF project area. As described in EIS Section 4.2.1.1, natural gas pipelines that cross the proposed CISF project area are located east of the proposed 133.5-ha [330-ac] storage and operations area, and construction of the proposed CISF would not limit access to or maintenance of the natural gas pipeline rights-of-way. Therefore, the proposed CISF would not interfere with operation of the pipelines. As part of its safety review conducted in parallel with this EIS, the NRC staff evaluates the potential for natural gas pipelines to rupture and adversely* *impact safety structures and systems at the proposed CISF. Findings of the evaluation are documented in the NRC SER. The NRC would only grant a license for the proposed CISF if it finds that there is reasonable assurance of protection of public health and safety.*

No changes were made to the EIS as a result of this comment.

Comment: (170-6-4)

D.2.8.2 Land Use—Concerns About Oil and Gas Wells

The NRC staff received comments regarding active and inactive (e.g., abandoned) oil and gas wells. One commenter stated that abandoned oil and gas fracking wells in the Permian Basin makes nuclear storage in the area of the proposed CISF very dangerous. Another commenter noted that the EIS recognizes the potential hazards improperly abandoned oil and gas and water wells pose but offers no assurance that the 18 abandoned and active oil and gas wells and the one abandoned water well on the proposed CISF project area were properly constructed or properly abandoned. Another commenter noted that New Mexico Oil Conservation Department maps indicate there is an active gas well on the site. With regards to wells within and surrounding the proposed project area, this commenter was concerned with the integrity of plugs installed in shut in and abandoned wells, the integrity of boreholes, well depths, and monitoring of existing wells. Another commenter asked whether Holtec and/or the NRC have identified all the existing abandoned oil wells near the proposed site.

Response: *EIS Section 3.2.4 describes oil and gas exploration and development activities within and surrounding the proposed CISF project area. The location of active and plugged and abandoned oil and gas wells within and surrounding the proposed project area are shown in EIS Figure 3.2-7. As described in EIS Section 3.2.4, the eastern portion of the proposed CISF project area has 18 plugged and abandoned oil and gas wells. Information on the construction and plugging of these 18 wells can be accessed using the New Mexico Oil Conservation Division (NMOCD) Well Search application (https://wwwapps.emnrd.state.nm.us/ocd/ocdpermitting/Data/Wells.aspx) or the NMOCD Geographic Information System Oil and Gas Map application (http://www.emnrd.state.nm.us/OCD/ocdgis.html). The NRC staff evaluated the potential impacts of the proposed CISF on active and abandoned oil and gas wells in EIS Section 4.2. The NRC staff determined these impacts to be SMALL because active and plugged and abandoned oil and gas wells within the proposed CISF project area are situated in areas that would not be affected by construction, operation, and decommissioning of the proposed CISF. With regards to the depth of oil and gas wells within and surrounding the proposed project area, the NRC staff added text in EIS Sections 3.2.4 and 4.2.1.1 describing the total depth of all oil and gas wells within and surrounding the proposed project site. As part of its safety review conducted in parallel to this EIS, the NRC staff evaluates the potential for active and plugged and abandoned oil and gas wells to impact the integrity and stability of the proposed CISF. Findings of the safety evaluation are documented in the NRC SER. The NRC would only grant a license for the proposed CISF if it finds that there is reasonable assurance of adequate protection of public health and safety.*

No other changes were made to the EIS as a result of these comments.

Comments: (63-2) (157-2-2) (157-3-23) (379-6)

D.2.8.3 Land Use—Drill Islands

Commenters pointed out that (i) the proposed CISF site exists in the potash preservation area, which only allows drilling from specific drill islands located outside the proposed project area. Another commenter said that the statement in the EIS on page 4-5 that future oil and gas drilling will occur from drill islands outside the proposed CISF boundaries and would ensure that construction and operation of the proposed CISF would not have an impact on oil and gas exploration activities is flawed. This commenter noted that restrictions related to oil and gas drilling from drill islands are designed to provide for orderly development of oil and gas reserves and potash reserves, not for the protection of Holtec.

Response: *As described in EIS Section 4.2.1.1, Order 3324 "Oil, Gas, and Potash Leasing and Development Within Designated Potash Area of Eddy and Lea Counties, NM," issued by the U.S. Secretary of the Interior (77 FR 71814), provides procedures and guidelines for orderly co-development of oil and gas and potash resources within the Designated Potash Area (DPA) in southeastern New Mexico (which includes the proposed CISF project area). Under this order, the oil and gas industry use drilling islands that BLM established, from which all new drilling of vertical, directional, and horizontal wells that penetrate potash formations are allowed, to manage the impact on potash resources. Order 3324 only applies to oil and gas exploration and development activities on Federally owned mineral estate. As described in EIS Section 4.2.1.1, mineral estate owned by the State of New Mexico (which includes mineral estate within and adjacent to the proposed CISF project) is subject to rules and regulations promulgated in Order R-111 by the New Mexico Oil Conservation Commission, which governs oil and gas drilling and plugging activities within the DPA. Because oil and gas drilling on Federal lands are already limited to drill islands under Order 3324, construction and operation of the proposed CISF project would not impact oil and gas exploration and development activities on Federally owned land adjacent to and surrounding the proposed site. As described in EIS Section 4.2.1.1, the Belco Tetris Shallow and Belco Deep drill islands are located approximately 0.4 km [0.25 mi] and 0.8 km [0.5 mi] west of the proposed project area, respectively, and the Anise Tetris drill island is south of the proposed project area. The NRC staff revised text in EIS Section 4.2.1.1 to clarify that drill islands would be used for any future drilling on Federally owned land adjacent to and surrounding the proposed project area. Additional information responding to comments concerning oil and gas exploration and development on Federal and State owned and leased mineral estate can be found in Section 2.8.5 of this appendix [Land Use—Oil and Gas Leasing]. As part of its safety review conducted in parallel to this EIS, the NRC staff evaluates the risks of oil and gas exploration and production activities, including fracking, on the integrity and stability of the proposed CISF. Findings of the safety evaluation are documented in the NRC SER. The NRC would only grant a license for the proposed CISF if it finds that there is reasonable assurance of adequate protection of public health and safety.*

No other changes were made to the EIS as a result of these comments.

Comments: (98-34-6) (203-14)

D.2.8.4 Land Use—Mineral Extraction Activities

The NRC staff received comments regarding mineral extraction, specifically potash mining and oil and gas exploration and development, within and surrounding the proposed CISF area. Some commenters affirmed or noted that the EIS stated that oil and gas and other industries can operate and coexist with the proposed CISF project. One commenter stated that the proposed CISF would likely not have an impact on surface oil and gas operations. Other commenters were concerned that the proposed CISF project would interfere or conflict with ongoing and future oil and gas operations and development such as hydraulic fracturing beneath the proposed project area and in the surrounding region. Commenters stated that a safe exclusion zone should be established as a mitigation measure in which no potash mining and oil and gas exploration and development is permissible. One commenter was concerned that the EIS did not address drilling requirements, easement requirements, and safety precautions that might be required for oil and gas drilling and production in the area near the proposed CISF. Another commenter pointed out that additional oil and gas development wells, as well as injection wells, below and around the proposed CISF are part of the reasonably foreseeable development in the area and should have been analyzed in the EIS in determining the cumulative impacts of the proposed project. Another commenter noted that advancements in technology could result in shallower oil and gas development. Some commenters expressed concerns about the potential impact of future oil and gas drilling and potash mining in the immediate vicinity of the proposed project area on the integrity, stability, and safety of the proposed CISF. Several commenters pointed out that the International Atomic Energy Agency (IAEA), of which the U.S. is a member, published a report on away-from-reactor storage that advised organizations implementing away-from-reactor storage to avoid land with exploitable mineral and energy resources.

Response: *The NRC staff does not anticipate that construction, operation, and decommissioning of the proposed CISF project would significantly interfere with existing or future exploration or development of oil and gas or potash resources within or surrounding the proposed project area. As described in EIS Section 4.2.1.1, active and abandoned oil and gas wells within the proposed project area would not be disturbed during construction, operation, and decommissioning activities. In addition, existing oil and gas and potash leases within and adjacent to the proposed project area would remain in effect and oil and gas reserves will remain available for extraction either by horizontal or vertical drilling. Additional information on NRC responses to comments concerning oil and gas and potash leasing can be found in this appendix in Section 2.8.5 [Land Use—Oil and Gas Leasing] and Section 2.8.6 [Land Use—Potash Leasing].*

Regarding oil and gas drilling requirements and safety precautions, the NMOCD is the primary regulator of oil and gas development and production in New Mexico. The NMOCD would permit any new wells on State-owned mineral estate within or surrounding the proposed project area and would enforce the State of New Mexico's oil and gas laws, orders, and rules to ensure oil and gas drilling and development and eventual plugging and abandonment is conducted in a way that protects human health and the environment (New Mexico Administrative Code, Title 19, "Natural Resources and Wildlife," Chapter 15, "Oil and Gas"). The BLM would be the agency to review and approve any new wells on Federally owned mineral estate surrounding the proposed project area. Regulations that govern oil and gas drilling, development, and reclamation on Federally owned mineral estate can be found under Title 43, Part 3160 of the Code of Federal Regulations (43 CFR 3160, "Onshore Oil and Gas Operations"). The BLM would enforce these regulations to ensure oil and gas drilling and well plugging and abandonment are conducted in a way that protects human health and the environment. Regarding the cumulative impacts from reasonably foreseeable future oil and gas exploration and development, EIS Section 5.2 describes and evaluates the potential cumulative impacts from the proposed CISF project on oil and gas development when added to past, present, and reasonably foreseeable future oil and gas exploration and development activities. Regarding shallower oil and gas development using advancements in technology, there is no information or evidence to support the existence of shallow oil and gas deposits within or in the vicinity of the proposed project area. As described in EIS Section 3.2.4, all oil and gas production *horizons in Eddy and Lea Counties, New Mexico, are older (and therefore deeper) than the Salado Formation, which occurs at depths of 549 to 914 m [1,800 to 3,000 ft] below ground surface in the area of the proposed CISF. As further described in EIS Section 3.2.4, the shallowest identified oil and gas exploration target within and surrounding the proposed CISF project area occurs at a depth of approximately 727 m [2,385 ft]. Because of the extensive oil and gas exploration and development that has occurred in the area of the proposed CISF, it is highly unlikely that recoverable oil and gas deposits are yet to be discovered and developed in formations above the Salado Formation, such as in the Rustler Formation and Dockum Group.*

Regarding the establishment of a safe exclusion zone as a mitigation measure in which no potash mining and oil and gas exploration and development is permissible, neither the NRC nor Holtec have the authority to restrict potash mining or oil and gas exploration and development. As part of its safety review conducted in parallel to this EIS, the NRC staff evaluates the potential for future oil and gas drilling and potash mining within and surrounding the proposed project area to impact the integrity and stability of the proposed CISF. Findings of the safety evaluation are documented in the NRC SER. The NRC would only grant a license for the proposed CISF if it finds that there is reasonable assurance of adequate protection of public health and safety.

The NRC staff is aware that the IAEA published a guidebook on the selection of away-from-reactor facilities for SNF (IAEA, 2007). In this guidebook, the IAEA advises away-from-reactor storage implementing organizations to avoid land with exploitable mineral and energy resources, in addition to land adjacent to airports, toxic chemical facilities, facilities manufacturing or using explosives, and refineries. The NRC staff discusses the site-selection process and selection criteria for the proposed Holtec CISF in EIS Section 2.3.3. As part of the site-selection process, oil and gas development was considered along with other site-specific factors including site ownership, depth to groundwater, faults, seismicity, karst, and threatened and endangered species.

No changes were made to the EIS as a result of these comments.

Comments: (98-5-4) (98-7-2) (98-30-8) (98-34-7) (98-56-4) (109-6) (122-1) (122-2) (156-1) (156-2) (157-2-3) (157-2-5) (157-2-17) (157-2-18) (157-2-19) (247-1) (247-4) (247-18) (297-1) (297-3) (297-5) (297-6) (379-3) (383-1)

D.2.8.5 Land Use—Oil and Gas Leasing

The NRC staff received comments expressing concerns about oil and gas leasing within and surrounding the proposed CISF project area. Commenters were concerned that the EIS did not consider existing or future mineral rights and that the proposed CISF project would threaten already executed legal contracts for oil and gas operators who have invested in leasing the area for oil and gas exploration and development. A commenter noted that the New Mexico State Land Office (SLO) leases the site's mineral estate for oil and gas development and that Holtec does not own, lease, or control the development of the mineral estate. Commenters stated that the SLO has active oil and gas leases in the project area, which contain provisions that are intended to facilitate the extraction of oil and gas resources, including the necessary easements and rights-of-way across the surface to accomplish that objective. One commenter pointed out that the mineral lessee is entitled to use as much of the surface as is reasonably necessary to develop and produce its minerals and it is the surface user that must accommodate the exercise of the oil and gas lessee's surface use rights, and not the other way around. Commenters stated that Holtec has falsely claimed to have secured agreements from oil and gas operators at and around the proposed CISF site to restrict oil and gas exploration activities, but that no such agreements are in place with oil and gas lessees or the SLO. One commenter stated that, at a minimum, any license granted to Holtec must contain an express condition of non-interference with existing oil and gas leases within or adjacent to the proposed project area. Some commenters questioned statements in the EIS that the proposed CISF would have no impact on oil and gas exploration and development in the proposed project area because extraction will continue to occur at depths greater than 930 m [3,050 ft]. These commenters pointed out that SLO oil and gas leases, whose lease terms are set by statute, do not impose any depth restrictions on oil and gas development, and that neither the NRC nor Holtec has legal authority to unilaterally restrict production from existing oil and gas leases to certain depths where the lessee has not agreed to such a limitation. Another commenter pointed out that the EIS fails to report existing wells in the area producing at depths of 914 m [3,000 ft] and shallower.

Response: *The NRC staff agree that language in the EIS describing mineral rights and leasing of the site's mineral estate should be revised and supplemented to clearly identify the entities and agencies that own and lease the mineral rights for oil and gas development within and surrounding the proposed project area. The NRC staff have revised text in EIS Sections 3.2.1 and 3.2.4 to clarify ownership of subsurface mineral rights and the leasing of these mineral rights to oil and gas production companies. The NRC staff recognizes that leaseholders of subsurface mineral rights are entitled to certain surface rights. The NRC staff does not anticipate that construction, operation, and decommissioning of the proposed CISF project would significantly interfere with existing or future exploration or development of oil and gas resources within or surrounding the proposed project area. Existing oil and gas leases within and adjacent to the proposed project area would remain in effect. Oil and gas reserves will remain available for extraction either by horizontal or vertical drilling. As described in EIS Section 4.2.1.1, the storage and operations area for the proposed CISF, which would include project facilities and infrastructure, would encompass 134 ha [330 ac] of land at full build-out. This would include the 114.5 ha [283 ac] protected area at full build-out, where access is controlled and restricted by fencing. The protected area would contain the SNF storage pads and cask transfer building.*

The NRC staff evaluates the potential for oil and gas drilling within and surrounding the proposed project area to impact the proposed CISF as part of the concurrent safety review; the results of the NRC's safety review will be published in a Final Safety Evaluation Report. Text in EIS Section 4.2.1.1 was edited to clarify the status of land use restrictions on oil and gas exploration activities. Additional information about comments concerning surface and subsurface property rights can be found in this appendix in Section 2.8.8 [Land Use—Surface and Subsurface Property Rights], and additional information about comments concerning mineral extraction activities can be found in Section 2.8.4 [Land Use—Mineral Extraction Activities].

The NRC staff acknowledge that SLO oil and gas lease terms do not impose any depth restrictions on oil and gas development and that neither the NRC nor Holtec has legal authority to restrict production to certain depths. The NRC staff removed text in EIS Sections 4.2.1.1 and 4.2.1.2 that stated the proposed CISF would have no impact on oil and gas exploration and development in the proposed project area, because extraction will continue to occur at depths greater than 930 m [3,050 ft]. The NRC staff also acknowledge that existing oil and gas wells in the area of the proposed CISF project produce at depths shallower than 914 m [3,000 ft]. The NRC staff revised text in EIS Section 3.2.4 to clarify the depths of oil and gas exploration and production targets within and surrounding the proposed CISF project area.

Comments: (156-4) (169-10-6) (203-1) (203-2) (203-3) (203-4) (203-6) (203-7) (203-8) (203-9) (203-10) (203-11) (203-12) (203-13) (203-15) (247-2) (247-11) (247-13) (247-14) (297-2) (297-4)

D.2.8.6 Land Use—Potash Leasing

The NRC staff received comments expressing concerns about potash leasing at the proposed CISF project site. Commenters were concerned with the statement in the draft EIS on page 4-4 and 5-24 that Holtec is in discussions with the SLO regarding an agreement to retire potash leasing and mining within the proposed project area. A commenter noted that this statement is false and that Holtec is not in discussions with the SLO to limit mineral exploration and production at the site. This commenter stated that any agreement to relinquish a SLO lease for the benefit of a third party would require the approval of the New Mexico State Land Office Commissioner and that this has not occurred. Furthermore, this commenter noted that if the lease were relinquished by Intrepid (the current leaseholder of potash mineral rights at the site) back to the SLO, the potash resource would again be subject to leasing by other companies. One commenter wanted to know the result of discussions between Holtec and the SLO concerning potash mineral rights and whether Intrepid can mine potash under the proposed CISF. Another commenter wanted to know what would prevent Intrepid from exercising its lease agreement with the State of New Mexico to extract potash. Another commenter asked in what way potash mining would impact the proposed CISF project.

Response: *The NRC staff reviewed the information the commenters provided and acknowledges the concerns with statements in the EIS about an agreement between Holtec and Intrepid to relinquish potash mineral rights within the proposed project area to the State of New Mexico and about discussions between Holtec and the SLO regarding an agreement to retire potash mining and leasing within the proposed project area. The NRC staff received updated information that Holtec is not in discussions with the SLO to restrict or limit potash exploration and development at the site, and any agreement to relinquish a SLO potash lease for the benefit of Holtec would require the approval of the SLO Commissioner, which has not occurred. The NRC staff has removed statements in EIS Sections 4.2.1.1 and 5.4 about agreements between Holtec and Intrepid to relinquish potash mineral rights to the State of New Mexico and about discussions between Holtec and the SLO regarding retirement of potash mining and leasing within the proposed project area. With regards to potential potash mining beneath the proposed CISF, no restrictions are currently in place that would prevent Intrepid (the potash leaseholder) from mining potash beneath the site. As described in EIS Section 3.2.4, potash in mines in the vicinity of the proposed project area is extracted from the Permian Salado Formation at depths of approximately 549 to 914 m [1,800 to 3,000 ft]. The NRC staff added text in EIS Section 4.2.1.1 to clarify that no restrictions are in place that would prohibit potash mining beneath and surrounding the proposed project and that if leaseholders exercised their lease agreements potash would be extracted from the Salado Formation at depths of approximately 549 to 914 m [1,800 to 3,000 ft]. EIS Section 4.2.1.1 was also revised to note that potash would remain available for extraction by leaseholders from the Permian Salado Formation beneath the proposed CISF project area. However, given the current market prices for potash, the international surplus, the requirements for obtaining additional permits for any new mines or to expand existing extraction activities, engineering challenges, and the constraints on the existing local potash mill for processing potash ores, it is highly unlikely that additional potash activities or extraction will occur beneath the proposed CISF site (Holtec, 2021; SEC, 2021; USGS, 2021). Even if potash price fluctuations were to become more prevalent, the changes in potash supply that would result would not likely make the proposed resources near the proposed project more desirable for extraction. There are significant potash* *reserves available in southeastern New Mexico outside of the proposed project area (Holtec, 2021). For these economic and geographic reasons, the construction and operation of the proposed CISF would not adversely affect potash activities or extraction. As part of its safety review conducted in parallel with the EIS, the NRC staff evaluates the potential for potash mining within and surrounding the proposed project area to impact the integrity and stability of the proposed CISF. Findings of the evaluation are documented in the NRC SER. The NRC would only grant a license for the proposed CISF if it finds that there is reasonable assurance of adequate protection of public health and safety.*

Comments: (157-3-6) (157-3-22) (247-10) (247-15) (247-16) (378-11) (379-2) (381-15)

D.2.8.7 Land Use—Potential Impacts on Agriculture

The NRC staff received comments expressing concerns about agriculture. One commenter wanted to know about potential impacts to agriculture from the proposed CISF project. Another commenter stated that, in addition to mining and oil and gas extraction, New Mexico is heavily dependent on agriculture and that agricultural lands would be at risk from the proposed CISF project.

Response: *As described in EIS Section 3.2, land use within a 10-km [6-mi] radius of the proposed CISF project area is predominantly rangeland used for cattle grazing. Land use was not assessed beyond 10 km [6 mi] from the proposed project area because at that distance, land use would not be anticipated to be influenced by the proposed CISF. As further described in EIS Section 4.2.1, the amount of land that would be fenced to restrict cattle grazing over the license term of the proposed CISF would be small {133.5 ha [330 ac]} in comparison to the available grazing land within the land use study area {i.e., approximately 52,250 ha [129,110 ac]}. Regarding other agricultural activities, as part of the NRC scoping process, the NRC staff received comments concerning dairy and pecan farms in southeastern New Mexico. In addition, as discussed in EIS Section 3.11.2, farms in the region produce cotton and sorghum. However, all these farms are outside the 10-km [6-mi] geographic scope of the analysis for land use and are therefore not anticipated to be influenced by the proposed CISF project. The potential for release of radiological contaminants that could impact soils and surface water, which in turn could impact agriculture, was analyzed in EIS Sections 4.4.1.2 and 4.5.1.1.2, respectively. As described in these sections, the SNF canisters do not contain any material in liquid form, and the SNF transportation and storage canisters are sealed to prevent any liquids from contacting the SNF assemblies. Therefore, during normal operations there is no potential for radiological contamination of soils and surface water from a leaking canister. Accidents are discussed in EIS Section 4.15. Additional discussion regarding the economic cost to the State of New Mexico and region from an accident that could impact resources such as agriculture can be found in this appendix in Section 2.20.3 [Cost Considerations—Accident Costs and Impacts to Other Resources].*

No changes were made to the EIS as a result of these comments.

Comments: (41-1) (172-9)

D.2.8.8 Land Use— Surface and Subsurface Property Rights

The NRC staff received comments expressing concerns about ownership and control of the proposed CISF project area. One commenter pointed out that the EIS incorrectly states that "the proposed project area is privately owned by the Eddy-Lea Energy Alliance LLC," and that while the surface estate is privately owned, the mineral estate is the property of the State of New Mexico and is held in trust and managed by the SLO. This commenter noted that the SLO's control of the site's mineral estate is not limited to oil, gas, and potash, but encompasses all mineral resources, including caliche, sand, gravel, and other substances and is entitled to access and utilize surface lands to facilitate mineral development. Another commenter also pointed out the SLO, on behalf of its trust beneficiaries, controls the mineral estate at the proposed Holtec site. Another commenter stated that Holtec should follow through on their disclosed desire to buy the land and mineral rights to the proposed storage site and to retain these rights without leasing them to outside mining companies or exercising the use of these mineral rights themselves.

Response: *The NRC staff acknowledges that language in the EIS describing ownership of the proposed project area should be clarified to clearly distinguish the entities and agencies that own the property rights to the surface and subsurface. The NRC staff have revised text in EIS Sections 2.2.1.1, 3.2.1, and 4.2.1 to clarify that surface property rights in the proposed CISF project area are currently owned by the Eddy-Lea Energy Alliance (ELEA), and the State of New Mexico owns the subsurface property rights. As described in EIS Section 2.2.1.1 and 3.2.1, Holtec has committed to purchase the proposed CISF project area from ELEA if the NRC approves a license for the proposed facility. However, because the State of New Mexico owns the subsurface property rights (or mineral rights) in the proposed project area, this purchase would only involve the transfer of surface property rights to Holtec. The NRC staff have revised text in EIS Sections 2.2.1.1 and 3.2.1 to clarify that Holtec has committed to purchasing the surface rights to the property from ELEA. The State of New Mexico would retain the mineral rights at the proposed project area. As described in EIS Section 3.2.4, mineral rights to oil and gas and potash beneath the site are currently leased to production companies for development. The NRC staff recognize that the SLO's control of the proposed CISF site's mineral estate is not limited to oil and gas and potash but includes other mineral resources such as caliche and sand and gravel. However, other than oil and gas and potash, no other minerals resources are currently being leased for production within the proposed project area. Additional information concerning comments related to oil and gas and potash leasing can be found in this appendix in Section 2.8.5 [Land Use—Oil and Gas Leasing], and Section 2.8.6 [Land Use—Potash Leasing]. The results of the impact evaluation in the EIS for land use remains the same.*

Comments: (157-1-6) (247-6) (247-8) (247-17)

D.2.9 <u>Comments Concerning Transportation of SNF: Safety/Accidents</u>

D.2.9.1 Transportation—Traffic Impacts

The NRC staff received comments regarding the traffic impact analyses in the EIS. A commenter expressed concerns that the EIS analyses did not consider traffic capacity on the major roads evaluated after accounting for projected traffic from all other sources. They also suggested that the EIS analysis approach underestimated impacts by assuming traffic was dispersed throughout the day rather than being concentrated at specific times during the day (e.g., shift changes). The commenter suggested that the EIS should project traffic conditions for the operational period of the project, using State and regional strategic projections, internal industrial projections, and other available sources. Regarding the cumulative impact analysis, the commenter noted that the EIS does not consider projected growth in road and rail transportation during the project period. The commenter advocated that the EIS should consider planned project rail traffic along with projected overall railway use growth and compare to the capacity and accident rates for the rail mainline. The commenter proposed the staff obtain data from the Burlington Northern-Santa Fe (BNSF) Railroad that can be used for such an analysis. They also noted that the EIS did not consider projected growth in road and rail transportation from non-project operations in the area during the project period. They suggested that the EIS should consider expected growth in transportation for these external facilities along with strategic growth for the area. They further suggested planned project road and rail traffic should be added to projected overall railway use growth and compared to the capacity and accident rates for the highways and rail mainline.

Response: *The EIS traffic analyses in EIS Sections 4.3 and 5.3 were conducted in accordance with applicable NRC guidance (NRC, 2003) for environmental impact analyses using methods consistent with traffic impact evaluations in several prior NRC EISs. These impact analyses are intended to efficiently assess the potential for noticeable changes to traffic conditions, considering available traffic information and the proposed project traffic. The approach does not account for available capacity; however, the staff's review of available information did not indicate any capacity issues would be expected. The cumulative impact analysis in EIS Section 5.3 considered available information on current and proposed projects and potential future plans and did not identify any additional projects or trends, nor were any identified in comments received, that would be expected to change the impact determinations for traffic evaluated in EIS Section 4.3. While the comments convey expectations for a more detailed and thorough transportation assessment, based on the magnitude of proposed road and rail transportation documented in EIS Section 2.2.1.7 and the description of local and regional traffic and rail conditions in EIS Section 3.3.1, the NRC staff do not agree that a more detailed and thorough traffic analysis is necessary to adequately assess the proposed project impacts.*

No changes were made to the EIS as a result of these comments.

Comments: (382-17) (382-18) (382-20) (382-22) (382-25) (382-26)

D.2.9.2 Transportation of SNF—Accidents

The NRC staff received comments expressing a variety of general concerns about the potential likelihood of SNF transportation accidents, the types of accidents, the consequences of accidents, the level of preparedness, and the roles and responsibilities in responding to accidents; in particular, in small towns and cities along routes. Some commenters implied that SNF transportation accidents were certain to occur while other commenters stressed the long safety record of SNF transportation and thought it was safe. For those concerned about accidents, a variety of potential causes or concerns were highlighted including extreme weather, natural disasters, potential terrorist activity, heavy loads, deteriorating national infrastructure, cask leakage, criticality or canister failure. A variety of concerns were expressed about potential consequences of accidents, including health effects, environmental contamination, adverse economic effects, and disruption to transportation services to local communities. Other commenters were concerned about barge transportation and the potential consequences of a barge accident on Lake Michigan including recovery operations. Comments also focused on emergency response communications and preparedness at the local, State, and Federal levels including responsibilities, incident reporting and evaluation, recovery, and costs.

Response: *EIS Section 4.3.1.2.2.3 evaluated the radiological impacts to workers and the public from SNF transportation accidents. The EIS accident analysis considered the most recent NRC evaluation of SNF accident risks in NUREG–2125 (NRC, 2014b). In NUREG–2125, the NRC staff conducted detailed engineering analyses of transportation accident consequences including cask and SNF responses to severe accident conditions* *involving impact force and fire (thermal effects) within and beyond the hypothetical accident conditions found in 10 CFR 71.73 (NRC, 2014b). The results of the study concluded that no SNF releases would occur from a severe long-lasting fire. Additionally, for the evaluation of impact accidents, the steel-shielded cask with inner welded canister (i.e., rail-steel cask) had no release and no loss of gamma shielding effectiveness under the most severe impacts studied, which encompassed all historic or realistic accidents. Because the proposed design of the CISF would require SNF to be contained within inner welded canisters, the transportation of the SNF to the proposed CISF would also require SNF to be in canisters that would be shipped in transportation casks similar to the configuration evaluated in NUREG–2125. Therefore, the NRC staff considers the conclusion in NUREG–2125 regarding the resiliency of the rail-steel cask to severe accident conditions (resulting in no release under severe accident conditions) applicable to the evaluation of potential CISF SNF transportation impacts under accident conditions.*

As described in EIS Section 4.3.1.2.2.3, the NUREG–2125 risk analysis accounted for the probability of accidents occurring. It reported an average freight rail accident frequency of 1.32×10^{-7} per railcar-kilometer (approximately 1 in 10 million railcar kilometers) based on DOT historic accident frequencies from 1991 to 2007 (NRC, 2014b). This frequency broadly applies to all accidents ranging from minor to severe. The frequency further decreases by orders of magnitude when the focus narrows to specific less-frequent accident scenarios, such as severe accidents.

Considering a bounding representative route, the EIS estimated for 10,000 shipments (full build-out), eight accidents would be expected to occur over a 20-year period. This estimate is being revised to 13 accidents based on a units-related correction by the NRC staff. This means 13 accidents of any type are possible; however, because the most frequent accidents are not severe there is a higher likelihood that these accidents will not be severe. To estimate the probability of a severe accident, this result is multiplied by the conditional probability of the severe accident scenario (i.e., the probability of the sequence of events that result in the severe accident). For example, NUREG–2125 included an estimated conditional probability of a major derailment, with or without a pileup, that leads to a 3-hour pool fire that surrounds the cask as 8.7×10^{-15}. Therefore, for full build-out of the proposed CISF, the probability of a severe pool fire of the type described above would be $13 \times 8.7 \times 10^{-15} = 1.1 \times 10^{-13}$ (approximately one in 10 trillion).

The NRC staff note that the NUREG–2125 fire analysis evaluated transportation cask response to this unlikely pool fire scenario and concluded no release of SNF would occur. The NRC staff expect other accident scenarios that are more severe would be expected to have similarly low or lower conditional probabilities and therefore the probability of occurrence would also be similar or lower than the prior example. Overall, because rail accident rates are low and conditional probabilities of severe accidents require a series of unlikely events to occur (very low conditional probability), the probability of severe accidents is very low. Therefore, the resiliency of the canistered SNF cask-to-accident conditions and the very low probability of severe accidents provide confidence that transportation packages will contain SNF under accident conditions. Providing containment under accident conditions addresses several of the concerns associated with SNF releases commenters raised, including potential health effects, environmental contamination, adverse economic effects, and disruption to transportation services to local communities.

Regarding transportation of SNF by barge, this is an uncommon method of transportation that is applicable to a small number of reactor sites where SNF is being stored. Therefore, the EIS *referenced a previous analysis (DOE, 2008a; 2002) that showed a small contribution of barge and heavy haul truck transportation to national SNF transportation impacts. Additionally, the impacts of barge transportation, including accidents, were evaluated in NUREG–75/038 (NRC, 1975), the generic impact analysis supporting Table S-4 and cited in 10 CFR 51.52. NUREG–75/038 found barge transportation impacts to be less than the impacts calculated for both rail and truck transport. NUREG–75/038 is a supplement to and incorporates by reference an Atomic Energy Commission report (WASH–1238) (AEC, 1972). WASH–1238 provides additional analysis details regarding the incident-free and accident impacts of SNF transportation, including barge transportation.*

Several of the topics commenters raised are addressed in other more detailed comment responses provided on the following topics in this appendix: extreme weather events and natural disasters (Section 2.25.1); security and terrorism (Section 2.34); emergency response (Section 2.27); SNF transportation challenges (Section 2.9.23); rail transportation of heavy loads (Section 2.9.26); infrastructure (Section 2.9.25); cost of transportation accidents (Section 2.20); and cask leakage and external contamination (Section 2.26). The NRC staff note that criticality is addressed in this appendix in the response discussing certification of transportation packages (Section 2.9.29).

No changes were made to the EIS as a result of these comments.

Comments: (1-10) (1-13) (38-11) (73-5) (85-2) (98-9-2) (98-11-8) (98-36-6) (98-48-5) (98-51-4) (98-51-5) (99-9-10) (99-11-5) (99-12-3) (99-12-8) (99-23-2) (99-24-2) (99-25-2) (99-31-5) (99-32-2) (99-40-6) (117-11) (124-1) (127-1) (134-1) (136-2) (140-3) (141-2) (143-2) (146-9) (150-10) (152-2) (154-5) (167-1-8) (169-6-7) (169-9-2) (170-4-1) (170-12-5) (172-1) (178-2) (188-10) (196-6) (204-3) (213-8) (219-6) (227-1) (252-2) (264-2) (266-3) (269-5) (281-2) (284-1) (284-3) (284-5) (286-19) (299-3) (304-6) (308-6) (319-9) (320-1) (324-1-9) (324-1-13) (329-2) (332-3) (332-6) (343-4) (361-5) (368-6) (371-2) (373-4) (375-3-10) (380-22) (382-16) (392-1) (393-1)

D.2.9.3 Transportation of SNF—General Comments

The NRC staff received comments expressing general concerns about the proposed SNF transportation from sites to the CISF and from the CISF to a repository. Concerns focused on a variety of topics, including the adequacy of the EIS transportation impact analyses, SNF hazards and overall transportation safety, routing and the safety and other effects of proposed rail shipments traveling through towns; incident-free impacts from direct radiation; accidents and the potential for release of radioactive materials; railroad safety; the level of preparedness; the number of proposed shipments; the viability of casks and canisters; the logic of conducting national SNF transportation twice prior to final disposal; public and worker safety; the potential health effects, including cancer; and the viability of the rail infrastructure. Some commenters asserted that transportation of SNF was not safe, citing high hazard, concerns about hazards at rail yards, and concerns about the potential for releases of SNF and contamination of the environment. Other commenters asserted that SNF transportation was safe, citing railroad industry capabilities, the use of specialized equipment such as new railcars, the long safety record both nationally and internationally, required cask system testing and certification, and low estimated doses. Concerns with the EIS transportation analysis included the overall scope, level of detail, the adequacy of the representative route approach (which some interpreted as an attempt to exclude detailed information from the analysis), the adequacy of NRC and DOT regulations, the transparency or clarity of analysis descriptions, and disagreement with the conclusions.

Response: *The proposed CISF would require additional transportation and therefore would involve additional radiation doses and risks relative to continued at-reactor storage. However, as indicated by the transportation impact analysis results reported in EIS Section 4.3, the magnitude of the increase in doses and risks would be low, therefore the radiological impacts would continue to be SMALL. As described in EIS Sections 2.2.1.7 and 4.3.1.2.2, the transportation of radioactive waste and SNF must comply with NRC and DOT regulations. These regulations (10 CFR Parts 71 and 73, and 49 CFR 107, 171–180, 390–397, as appropriate to the mode of transport) protect public and worker safety by applying multiple layers of detailed requirements that directly address the credible safety-related concerns expressed in the comments including radiation exposures from normal transportation, accidents and their consequences, security and safeguards including terrorism, and emergency response. The requirements address safety through testing and approval of packaging to withstand normal and accident conditions during transport; proper placarding and labeling; limiting the dose rate from packages and conveyances; use of approved routing for shipments of spent fuel; safeguarding shipped materials, and incident reporting. Licensees are required to use only NRC-approved shipping casks.*

Responses to more detailed comments pertaining to these transportation topics are addressed under specific topics in the following sections of this appendix: routing (Section 2.9.28), infrastructure (Section 2.9.25), accidents (Section 2.25), transportation package testing and certification (Section 2.9.29), details of analysis methods including the representative route approach (Section 2.9.17), the number of shipments (Section 2.9.11), rail weight limits (Section 2.9.26), occupational doses (Section 2.9.12), cancer fatality estimates (Section 2.9.16), rail crossing fatalities (Section 2.9.14), traffic impacts (Section 2.9.1), accident rates (Section 2.9.18), and accidents involving fire (Section 2.9.19).

Comments on the adequacy of NRC and DOT regulations are beyond the scope of the EIS.

No changes were made to the EIS as a result of these comments.

Comments: (1-16) (1-19) (12-2) (22-2) (23-7) (34-3) (41-3) (47-2) (50-2) (55-3) (62-5) (65-3) (73-6) (75-1) (75-2) (75-3) (93-3) (93-5) (98-3-2) (98-3-7) (98-8-2) (98-11-4) (98-15-4) (98-23-6) (98-25-3) (98-27-2) (98-31-1) (98-34-1) (98-35-7) (98-38-1) (98-41-2) (98-43-9) (98-45-7) (98-45-9) (98-45-11) (98-48-4) (98-57-5) (98-58-5) (99-10-2) (99-10-3) (99-12-6) (99-12-9) (99-20-8) (99-23-1) (99-35-8) (103-10) (109-10) (118-2) (118-4) (127-4) (129-1) (134-2) (136-5) (137-6) (140-2) (144-1) (149-4) (150-4) (150-12) (151-13) (167-1-2) (168-19-1) (169-2-5) (169-6-2) (169-6-6) (169-9-5) (169-12-1) (170-1-1) (170-2-6) (170-7-1) (170-12-7) (170-18-2) (170-20-2) (177-4) (208-3) (213-1) (219-2) (219-3) (219-5) (234-1) (237-3-1) (243-2) (247-5) (250-8) (252-11) (252-14) (258-2) (258-5) (266-8) (270-3) (271-1) (277-1) (281-5) (286-21) (302-3) (303-2) (305-3) (322-8) (323-2-2) (324-1-7) (328-1-3) (328-2-4) (332-4) (334-5) (337-5) (351-6) (354-1) (364-1-18) (369-1) (372-8) (378-9) (382-2) (412-2) (412-3) (428-1) (428-2) (428-4)

D.2.9.4 Transportation of SNF—Impact Analysis Approach—Accidents Involving Fire

The NRC staff received comments regarding the potential for accidents involving fire and the potential for fire to damage SNF casks. One commenter suggested that the accident rates for freight rail (overall) and for rail fire accidents were greater than what was evaluated in the NRC EIS and the supporting NUREG–2125 accident analysis. The commenter suggested that the general accident rate was 36 times the value reported in NUREG–2125. They also suggested that accident fires have burned longer and hotter than the fires evaluated in NUREG–2125. The commenter evaluated accident rate data and suggested the probability of a rail accident involving fire has doubled during the more recent period relative to the data for the time period addressed in NUREG–2125. They noted the increase was the result of the notable increase in crude oil rail shipments during the period. The commenter suggested that the NRC analysis in the EIS should use the more recent fire accident rate data. Their analysis of the more current rates concluded that approximately 2% of rail accidents involve fire. They compared that value with the fire accident probability in the NUREG–2125 analysis, which they asserted was orders of magnitude lower than their 2% value and therefore unrealistic. They further suggested that the pool fire evaluated in NUREG–2125 was not the most severe fire that could have been modeled and referred to an analysis that concluded cask seals could degrade if a fire of similar duration to the NUREG–2125 fire were simulated but under more conservative regulatory test configuration conditions or a longer duration fire were simulated. The commenter referred to one of the most severe train fire accidents that occurred in Lac Megantic, Quebec as a basis for the existence of severe fires. The commenter also questioned the exposure duration of 10 hours used in the EIS accident analysis. They suggested it would take longer than 10 hours to move a cask at an accident scene.

Response: *EIS Section 4.3.1.2.2.3 evaluates the potential radiological impacts to workers and the public from the proposed transportation of SNF under accident conditions using packages that the NRC certified to meet safety requirements. The NRC package certification includes evaluating package performance when subjected to the tests in 10 CFR 71.73 that consider hypothetical accident conditions. As described in NUREG–2125, these tests were developed to envelope real-life accidents by simulating the damaging effects of a severe transportation accident but are not intended to represent any specific historical transportation accident, or a "worst-case" accident. NUREG–2125 conducted additional simulations of package response to accident conditions that went beyond regulatory test conditions such as extending the 30-minute fire duration to 3 hours. Although more severe and less probable accident scenarios can be hypothesized and may be plausible, EIS analyses and the NRC licensing decisions are not based on worst-case scenarios and the supporting analysis in NUREG–2125 provides confidence that packages the NRC certified are capable of providing containment of SNF under severe accident conditions.*

As noted by the commenter, during the past decade, the number and size of crude oil rail shipments increased significantly, and this contributed to an increase in the number of tank car fires (Fort et al., 2017). DOT classifies crude oil as a flammable liquid based on its ignitability in accordance with regulations at 49 CFR 173.120 (DOT, 2019). The increase in tank car fires occurred during a period when the overall rail accident rate was decreasing. In 2008, U.S. Class 1 railroads originated 9,500 carloads of crude oil, which increased to a high point of approximately 500,000 carloads in 2014, and then decreased to approximately 130,000 carloads by 2017 (NTSB, 2020). In 2015, Congress responded to the increase in tank car accidents with legislation, and in that same year, DOT finalized regulations addressing enhanced tank car standards and operational controls for high-hazard flammable trains (DOT, 2019). This included requirements to upgrade tank cars and phase out the DOT-111 tank cars built to lower safety standards and prohibit those cars from transporting any Class 3 flammable liquids by 2029. The upgraded tank cars include a thicker tank wall with insulation, puncture protection, a full head shield, and top and bottom valve fitting protections. According to DOT, by 2025, petroleum crude oil must only be carried in the new DOT-117 or 117R rail tank cars. DOT notes that while the DOT-111 railcars are still the largest component of the fleet of rail tank cars carrying Class 3 flammable liquids, DOT-117 rail tank cars are the fastest growing portion of the fleet, reaching 34 percent in 2018. The NRC staff expect that these developments will reduce the probability of severe flammable liquid transportation accident fires in the *future. As the most severe fires are still rare events, considering the very low conditional probabilities of the fire scenarios evaluated in NUREG–2125 (described further in the following paragraph) the NRC staff do not expect further analysis of the likelihood of severe oil train fires would change the conclusions of the EIS SNF transportation accident analysis. Additionally, information provided by commenters has not demonstrated that further analysis would lead to a different conclusion.*

Regarding the accident rates, the commenter's assertion that the general rail accident rate has increased by a factor of 36 from the rate documented in NUREG–2125 was evaluated by NRC staff, and the staff found the commenter was comparing two different types of rates. The details are provided in the response in Section 2.9.18 of this appendix. Additionally, the commenter compared the percentage of all accidents that include a fire (stated as 2%) with a conditional probability of a severe fire accident scenario documented in NUREG–2125. This is also an inaccurate comparison because the conditional probability of an accident scenario that includes several events occurring has a much lower probability than the more general probability of any accident involving a fire. As described in Appendix E of NUREG–2125, a conditional probability is the product of the probabilities of each event in a series that compose a specific accident scenario. As the number of unlikely events in a scenario increases, the conditional probability decreases. For example, the conditional probability of a fire scenario in NUREG–2125 that includes a derailment, fire, and at least 80 kilometers per hour (kph) [50 miles per hour (mph)] collision would be far less than the probability of any accident involving a fire. The appropriate comparison for the 2% probability of an accident involving a fire the commenter provided is the value used in NUREG–2125 for the probability of an accident involving a fire (provided on Page E-16 of that report as 0.0155). Substituting the commenters 2% probability of fire for the 0.0155 used in NUREG–2125 results in an increase in the calculated conditional probability of Fire Scenario 1 (a major derailment, with or without a pileup, that leads to a 3-hour pool fire that surrounds the cask) by a factor of 1.3 from 8.7×10^{-15} to 1.1×10^{-14} (i.e., a negligible change in a very low scenario conditional probability). Based on this comparison, the NRC staff conclude that the results of the EIS transportation impact analysis would not change substantively if the accident rates the commenter recommended were used.

The EIS evaluated doses to the public and first responders under accident conditions based on 10-hour exposure times for each population. The public dose calculation applied to the most likely accident conditions that would cause a delay in resuming transportation but no loss of shielding or release of radioactive material. The NRC staff expect under such accident conditions 10 hours would provide sufficient time for responders to assess the radiological safety conditions at the accident scene and take any necessary actions to limit public doses that may be warranted. Additionally, the accident public dose and health effects estimates in EIS Tables 4.3-1 and 4.3-2 are low, and the NRC staff expects further analysis to refine the exposure time would not change the associated impact determinations. Regarding the first responder analysis, the expected role of first responders is to secure an accident scene and provide EMT services if needed until State and potentially other responders as needed arrive on the scene and address the radiological incident response aspects of the accident. As stated in EIS Section 4.3.1.2.2.3, the exposure time of 10 hours is a conservative assumption based on a prior DOE study (DOE, 2002) that indicated first responders would take about an hour to secure the vehicle and the accident scene.

No changes were made to the EIS as a result of these comments.

Comments: (285-1) (285-3) (285-4) (307-1-9)

D.2.9.5 Transportation of SNF—Impact Analysis Approach—Applicable Regulations

The NRC staff received a comment that the EIS does not identify the Federal, State, and local regulations that Holtec must comply with to transport the SNF. Another commenter encouraged the NRC staff to ensure that all applicable DOT requirements and notifications were met.

Response: *EIS Section 4.3.1.2.2 states that during operation of any project phase (Phase 1 or Phases 2-20), SNF would be shipped from existing storage sites at nuclear power plants or ISFSIs to the proposed CISF. These shipments must comply with applicable NRC and DOT regulations for the transportation of radioactive materials in 10 CFR 71 and 73 and 49 CFR 107, 171–180, and 390–397, as appropriate to the mode of transport. These regulations comprehensively address several aspects of transportation safety, including testing and approval of packaging, proper placarding and labeling of packages and shipments, limiting the dose rate from packages and conveyances, approved routing for shipments of spent fuel, safeguards, and incident reporting. These regulations are the primary regulations governing the safety of SNF transportation. Any State or local regulations that may apply to transportation (e.g., for inspections) would also apply but are not listed in the EIS because specific routes have not been established. Additionally, notification requirements are established in 10 CFR 71.97, Advance Notification of Shipment of Irradiated Reactor Fuel and Nuclear Waste.*

No changes were made to the EIS as a result of these comments.

Comments: (98-49-5) (224-13)

D.2.9.6 Transportation of SNF—Impact Analysis Approach—Cancer Fatality Estimates

The NRC staff received comments regarding the calculations of latent cancer fatalities (LCF) in the EIS. NMED highlighted the EIS LCF results that were compared with baseline risks and found to be a fraction of estimated baseline values and suggested this was an inadequate characterization of risks to the public. NMED requested additional descriptions of whether the NRC staff consider the estimated risks as tolerable or acceptable risks. NMED requested clarification about the cancer risk coefficient that was used in EIS calculations and whether the coefficient represented a maximum tolerable risk. Similarly, they suggested that the NRC did not provide sufficient explanation or detail to demonstrate that consideration was given, regarding engineering design upgrades to the shipment conveyance, to ensure risk reduction to a level of 10^{-6} that would signify a level of “acceptable risk” at which level no further improvements in safety are needed. Another commenter reviewed the cumulative impact assessment for transportation and asked for clarification about the meaning of an impact conclusion of “minor.” Another commenter requested clarification of the comparison of EIS LCF results against the International Commission on Radiological Protection (ICRP) threshold for non-zero effects. One commenter requested that the EIS analyze the consequences to an accident-exposed individual. The commenter further noted that terms like “collective dose risk” and “person-rem” were used in the EIS to ignore the potential impacts to a single individual.

Response: *The LCF estimates in the transportation impact analyses in EIS Sections 4.3 and 5.3 are computed as the product of an estimated population radiation dose and a health effects coefficient. The health effects coefficient (also called a cancer risk coefficient) converts an estimated collective dose (i.e., population dose) due to radiation exposure to related health effects. Although uncertainties exist in the scientific understanding of the association between radiation exposure and health effects, particularly at low doses, the health effects coefficient used in the EIS was derived by the ICRP based on an analysis of epidemiologic data and is* *documented in the referenced ICRP report. As described in EIS Section 4.3.1.2.2.1, the calculation of health effects involved applying a current cancer risk coefficient assuming a linear, no-threshold dose response. A linear, no-threshold dose response assumes, for radiation protection purposes, that any increase in dose, however small, results in an incremental increase in health risk. The cancer risk coefficient is 5.7×10^{-2} health effects per person-sievert (Sv) [5.7×10^{-4} per person-rem] (ICRP, 2007), where the health effects include fatal cancers, nonfatal cancers, and severe hereditary effects. An estimate of the expected non-project baseline cancer that would occur in a population of comparable size to the exposed population (that does not include the estimated health effects from the proposed transportation) is also provided in the EIS for comparison. Both the National Council on Radiation Protection and Measurements (NCRP) and the ICRP suggest that when the collective (population) dose is less than the reciprocal of the risk coefficient (i.e., less than $1/5.7 \times 10^{-2}$ health effects per person-Sv or 17.54 person-Sv), the assessment should find that the most likely number of excess health effects is zero. This recommendation from the NCRP and ICRP aims to reasonably constrain conclusions about health effects consistent with underlying bases when health effects are estimated from collective doses that are derived from the summation of very small exposures to large populations.*

As explained previously, the health effects coefficient is a factor in the calculation of impacts and not the result or impact. Therefore, it is not meaningful to evaluate the coefficient itself within the context of acceptable risk or tolerable risk as suggested in the comment. Within the context of the EIS analysis, the estimation of health effects provides a standard means to report the magnitude of estimated radiological impacts to an exposed population that allows comparisons of impacts resulting from different aspects of the proposal (e.g., project phases, full build-out, expected baseline). The results of the EIS analysis (Section 4.3.1.2.2) showed that the health effects from the proposed SNF transportation were either most likely to be zero (below the NCRP and ICRP threshold) or they were a small fraction of the estimated non-project baseline health effects within the same population. Although the use of collective dose in the EIS may understandably be confusing to some readers, this particular metric is applied when radiological impacts to populations are evaluated. Despite comments to the contrary, the EIS also included analyses of maximally exposed individual doses from incident-free SNF transportation and first responder doses applicable to accident conditions in EIS Sections 4.3.1.2.2.2 and 4.3.1.2.2.3, respectively.

The transportation impact analyses in the EIS were prepared consistent with NRC's NEPA-implementing regulations contained in 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions" and the NRC staff guidance in NUREG–1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs" (NRC, 2003). This NRC guidance establishes the criteria (i.e., small, moderate, large) that NRC staff use to evaluate the significance of environmental impacts. The transportation impact analyses in EIS Sections 4.3 and 5.3 convey the relative magnitude of impacts (e.g., by use of the word "minor") to expected baseline conditions, which then allows impact significance determinations to be made in accordance with the NRC guidance. No changes were made to the EIS as a result of these comments.

Comments: (90-8) (99-12-4) (322-14) (322-19) (328-3-11) (328-3-17) (364-1-20) (379-8)

D.2.9.7 Transportation of SNF—Impact Analysis Approach—Environmental Justice

The NRC staff received a comment that the EIS transportation impact analysis should include nonradiological health impacts of diesel exhaust in addition to the radiological impact analyses.

The commenter suggested that diesel exhaust from the additional rail traffic could cause health impacts to people living or working near the proposed transportation routes. The commenter further suggested that the EIS should include an analysis of whether disparate impacts would be expected to environmental justice populations along the route.

Response: *EIS Section 4.3.1.2.2.4 evaluated the non-radiological impacts to workers and the public from SNF transportation. That analysis was focused on typical occupational injuries and fatalities and public fatalities from traffic fatalities (e.g., accidents at rail crossings) and fatalities involving individuals trespassing on railroad tracks. The impacts from exhaust emissions from SNF transportation were not quantified because prior analysis in the Yucca Mountain (YM) FEIS (DOE, 2002) concluded that SNF transportation would not be a significant contributor to air quality. The minor nonradiological impacts from the DOE analysis of the mostly rail scenario that are described in EIS Section 4.3.1.2.2 included estimated fatalities associated with rail exhaust emissions. The EIS contains an analysis of potential impacts to environmental justice populations in the vicinity of the proposed CISF in EIS Sections 4.12 and 5.12.*

No changes were made to the EIS as a result of this comment.

Comment: (307-2-1)

D.2.9.8 Transportation of SNF—Impact Analysis Approach—General Comments

The NRC staff received a variety of general comments related to the transportation impact analysis. One commenter raised concerns including that the transportation evaluation was limited, lacked operational details, relied on outdated and inapplicable information and analysis, as well as unrealistic transportation cost data and an implausible shipping schedule. An additional concern was expressed regarding the lack of an on-site repackaging and handling facility and no consideration of worst-case scenarios such as the possibility of natural disasters, or sabotage and terrorism in transit. Another comment suggested the EIS should model transportation risks based on real life waste accidents. The commenter suggested that the NRC should issue directives on scheduling transportation to avoid extreme weather events and fires and directives about mitigation measures. The commenter also requested assessments of the railroad infrastructure and plans for mitigating transportation accidents. Other commenters suggested there was too much reliance on modeling and that available data should be used to more accurately and deeply evaluate the safety hazards commensurate with the hazards.

Some commenters made comparisons with other proposed projects involving the transportation of SNF. They noted the proposed Holtec SNF transportation volume (in MTU) relative to other proposals including Yucca Mountain and Private Fuel Storage (PFS) Facility and proportionately scaled the expected impacts. Other comments suggested the EIS was inappropriately referencing the YM Final Environmental Impact Statement (FEIS) and Supplemental Environmental Statement (SEIS) for risks of transportation noting the information was dated. They noted potential changes in traffic patterns, population and population centers, rail infrastructure condition, climate, and science. Another comment questioned whether DOE had the statutory authority to transport SNF to a CISF and that the EIS did not address the issue.

Some commenters expressed concerns that all transportation modes were not evaluated in the EIS. One commenter noted that doses could vary according to mode noting the closer proximity of the public from roads compared to rail. They further noted that the mode of transport could affect shipment numbers, packaging, routing, and emergency preparedness and that the NRC staff must account for these factors in the final EIS.

Other commenters suggested the EIS did not include all transportation routes, the potential impacts of accidents, terrorism, on public health and safety along all the routes, and how rail shipments from reactors without rail access would be accomplished and the accompanying risks. Others suggested the EIS transportation impact analysis did not consider the Burlington Northern Santa Fe (BNSF) railroad between Clovis, New Mexico, and Carlsbad, New Mexico. Another was concerned that the 80-kilometer (km) [50-mile (mi)] radius of evaluation should be expanded to reflect the national transportation corridors.

Response: *The transportation impact analysis in EIS Section 4.3 evaluates the potential transportation impacts of the Holtec proposed CISF project. In reviewing license applications, the NRC staff review the project as proposed. The environmental review NEPA mandated is subject to a rule of reason and as such need not include all theoretically possible environmental effects arising out of an action but may be limited to effects that are shown to have some likelihood of occurring. For the proposed Holtec CISF, no SNF repackaging facility (also called a DTS) was proposed and no such facility is required for safety or is anticipated by NRC staff to be needed during a 40-year license term because the SNF would already have been placed in canisters prior to transferring to the proposed CISF. Furthermore, the storage cask systems (including canisters) would be included in the proposed aging management program, and licensed operations and cask systems for both storage and transportation would be subject to continued NRC oversight. With respect to modes of transport, Holtec proposed shipping SNF to and from the CISF by rail, although the EIS Section 4.3.1.2.2 describes other modes (barge or heavy haul truck) that might be used to move SNF from reactor sites without rail access and how that transportation could contribute to evaluated impacts. Overall, the level of detail of the transportation impact analysis was based on the information needed and available to evaluate the potential impacts. Because contracts and arrangements for storage of SNF at the proposed CISF have not been made, the specific characteristics of the SNF, the origins of shipments, the routes of travel, shippers and carriers, and specific plans and other details have not yet been clarified. Methods commensurate with industry practice and acceptable to the NRC staff for conservatively evaluating potential environmental impacts of SNF transportation were applied. This includes applying bounding representative routes, using the maximum package dose rate allowed by regulation, considering beyond design-basis accident conditions, and a conservative first responder exposure duration. Typically, the NRC staff does not evaluate worst-case scenarios in environmental impact analyses, and worst-case scenarios were not evaluated in the EIS transportation impact analysis for the Holtec CISF.*

The NRC staff, DOE, and DOT have evaluated the environmental impacts of SNF transportation using risk assessment modeling for several decades and have applied comparable methods in past analyses. General informed comparisons can be made with past analyses for other projects such as YM and PFS; however, because the package dose rates in the modeling analyses are set to regulatory maximums and are not directly related to package inventory, the incident-free radiological impacts are proportionate to the number of casks shipped rather than the amount shipped in MTU. For example, the PFS incident-free dose results can be scaled proportionately by a factor of 2.5 times to approximate the incident-free dose results for Holtec based on the relative number of casks shipped. The Holtec CISF is much closer to the number of rail casks proposed to be shipped to Yucca Mountain, although differences in other variables (such as shorter overall shipment distances for the Holtec CISF) muddle simple comparisons of results as done by the commenter. More important is that each of these three analyses concluded low radiological impacts from SNF transportation.

EIS Section 3.3.1 describes the BNSF railroad that travels from Carlsbad to Clovis. EIS Section 3.3.2 describes the affected environment for the transportation analysis. For *transportation of SNF from a nuclear power plant site (i.e., the generation sites of SNF) to the CISF or ISFSI, the affected environment includes transportation workers and all rural, suburban, and urban populations living along the transportation routes that are exposed to: (a) radiation emitted from the packaged material during normal transportation activities, (b) nonradiological accident hazards, or (c) a release of radioactive material in the unlikely event of a severe accident. The affected environment also includes people in rail cars using the same transportation route, people at stops, and workers who are involved with the transportation activities. Therefore, the SNF transportation impact analysis already addresses the commenters' concern that the affected population extends beyond an 80-km [50-mile] radius.*

Regarding whether the DOE would be the shipper, based on uncertainties regarding the DOE role in the proposed CISF project, the NRC staff considered in the EIS the possibility that the DOE or an NRC licensee could ship the SNF to and from the proposed CISF.

More detailed comment responses are provided on the following topics in the following sections of this appendix: Security and Terrorism in Section 2.34, Accidents in Section 2.25, Transportation Accidents in Section 2.9.2, Routing in Section 2.9.28, and the Representative Route approach in Section 2.9.17.

No changes were made to the EIS as a result of these comments.

Comments: (1-4) (73-3) (90-7) (116-7) (167-1-5) (224-6) (224-12) (237-2-15) (240-2-12) (286-1) (286-3) (286-4) (289-7)

D.2.9.9 Transportation of SNF—Impact Analysis Approach—NEPA Compliance

The NRC staff received a variety of comments related to the transportation impact analysis and NEPA compliance. Some commenters suggested the EIS did not take a "hard look" at the impacts of the Holtec CISF proposal regarding SNF transportation risks and routing. They claimed the transportation impact analysis did not analyze all potential routes, which amounted to segmentation (i.e., dividing an action into smaller parts with lower impacts). A commenter suggested revisions to the EIS were necessary because the NRC staff predetermined the outcome of the NEPA analysis by segmenting the transportation analysis. One commenter also stated that the safety and security concerns of the transportation cask and process were inadequate.

Response: *As described in EIS Section 4.3, the NRC staff's approach to analyzing the potential impacts from the proposed transportation of SNF involves detailed risk assessment calculations of the potential incident-free and accident impacts to workers and the public from the transportation of all proposed shipments during Phase 1 (500 shipments) and full build-out (Phases 1-20) (10,000 shipments). The application of a bounding representative route analysis may appear to some commenters as making the proposed action smaller; however, by assuming all proposed SNF shipments travel on the longest route, the approach used in the EIS overestimates the impacts of the proposed transportation relative to a more dispersed route-specific approach. The actual routes of the proposed SNF shipments are presently unknown and would be determined in the future and subject to appropriate approvals prior to executing the shipments. Related responses to comments on the representative route approach in the transportation impact analysis as well as transportation accident scenarios are provided in Section 9.17 of this appendix, and Security and Terrorism in Section 2.34 of this appendix.*

No changes were made to the EIS as a result of these comments.

Comments: (68-2) (68-3) (98-28-10) (155-4) (155-5) (169-9-10) (372-9) (373-10)

D.2.9.10 Transportation of SNF—Impact Analysis Approach—No Release Accident

The NRC staff received comments about its adoption of the conclusion in the NRC Spent Fuel Transportation Risk Assessment analysis in NUREG–2125 that accidents involving canistered SNF would not result in a release of radioactive material. Some commenters interpreted this conclusion as indicating the accident analysis did not consider any consequences or risks of accidents, that the EIS assumed that no accidents would happen, or that some important aspect was being ignored. One commenter was concerned about the effect of damaged canisters on the potential for releases and suggested the assumption of no release during an accident was baseless. The commenter noted that the DOE transportation and disposal (TAD) canister concept (included in the YM repository proposal) and any associated transfers of SNF into such canisters was not included in the EIS. In addition to these topics, some of the comments included concerns about holding meetings along transportation routes and doses to workers.

Response: *Many commenters disagreed with the conclusion in the EIS analysis that a transportation accident involving canistered SNF would not result in a release of radioactive material, however, none of the comments included any substantive technical bases for their statements that the NRC technical analysis in NUREG–2125 (NRC, 2014b) was flawed. The EIS transportation accident analysis included an evaluation of the impacts of accidents; however, the impacts did not include a release of radioactive material. This is consistent with the detailed technical analyses and conclusions documented in NUREG–2125 for canistered SNF. The NRC staff are familiar with analyses that have evaluated the risk of accidents involving a release of radioactive material, including NUREG–2125 (e.g., analysis of non canistered SNF) and the Yucca Mountain Final Supplemental Environmental Impact Statement (DOE, 2008a). Both analyses estimated low accident risks. All SNF proposed to be transported to and from the proposed CISF would be shipped in canisters that are placed in NRC-certified transportation casks.*

Regarding the comments about the effect of damaged canisters on accident consequences, the NRC staff expects that canisters would be unlikely to be shipped in a damaged state because as stated in the SAR (Holtec, 2020a) all canisters would be verified to conform to a no credible leakage specification prior to shipment and that would be confirmed upon arrival at the interim storage facility. In addition, a sample of canisters at each site would be inspected prior to loading in transportation casks, and the transportation casks would be inspected for damage upon receipt. Additionally, canisters would be inspected during storage. Required aging management programs including inspections of canisters would be implemented to verify that the safety functions of the storage systems continue to be maintained in the period of extended operation.

Regarding the concerns about worker dose and repeated worker exposure, doses to workers directly involved in SNF transportation would be maintained within DOE or NRC occupational dose limits while non-involved workers (e.g., those working at railyards but not directly involved) would be protected by required cask dose rate limits and their exposure time and distance from shipments. All transportation shipments are required to comply with the maximum required external dose rates (verified prior to shipment) and must satisfy all specifications in the cask's certificate of compliance. If any conditions were identified that violated the applicable requirements, then corrective actions would be taken to address compliance prior to executing a shipment. Elsewhere in this appendix, aspects of the comments that relate to meetings along *transportation routes are discussed in Section 2.2; comments about the NEPA Process are in Section 2.1; and additional comments relating to worker doses are in Section 2.9.12.*

No changes were made to the EIS as a result of these comments.

Comments: (99-31-6) (99-35-10) (100-5) (109-8) (157-2-20) (167-3-5) (170-10-5) (170-28-4) (307-1-7) (375-2-15) (375-2-19) (375-3-1) (382-1) (382-3) (382-4) (382-5)

D.2.9.11 Transportation of SNF—Impact Analysis Approach—Number of SNF Shipments

The NRC staff received a comment highlighting that communities where the proposed inbound and outbound SNF shipments would travel, for example in Texas and Oklahoma, would overlap and the estimated impacts would accumulate. The commenter further suggested that outbound SNF shipments to a repository would have to use DOE TAD canisters and assumed repackaging would multiply the number of shipments beyond what was evaluated in the EIS.

Response: *EIS Section 4.3.1.2.2 describes the SNF transportation impact calculations for incoming SNF shipments from reactors to the proposed CISF (EIS Sections 4.3.1.2.2.1 through 4.3.1.2.2.4) and for eventual outgoing shipments to a repository (EIS Section 4.3.1.2.2.5). The incoming and outgoing SNF shipments were described in separate sections because they would take different routes (with some overlap nearer to the proposed CISF) and they would not be expected to occur during the same time. This is because a primary justification for utilizing a CISF is the current unavailability of a national repository. The number of outgoing shipments to a repository would not be expected to increase by repackaging, as assumed by the commenter, because no repackaging is proposed for the CISF. Therefore, the number of outgoing shipments is expected to equal the number of incoming shipments as assumed in the EIS transportation impact calculations. If an individual were to live on the portion of the incoming and outgoing routes that overlapped for the 40-year license period, they could be expected to experience as much as double the estimated impacts from the passing shipments. This impact can be estimated by doubling maximally exposed individual dose of 0.06 mSv [6 mrem] from exposure to all 10,000 proposed shipments documented in EIS Section 4.3.1.2.2.5. Because the resulting dose 0.12 millisievert (mSv) [12 millirem (mrem)] is still a very low radiation exposure that would be a fraction of the natural background exposure, the impacts to such an individual would still be SMALL and consistent with existing conclusions in the EIS.*

No changes were made to the EIS as a result of this comment.

Comment: (397-4)

D.2.9.12 Transportation of SNF—Impact Analysis Approach—Occupational Dose

The NRC staff received comments about the SNF transportation occupational dose calculations in the EIS. One commenter noted that EIS Section 4.3.1.2.2.1 presents a DOE administrative dose limit of 5 mSv [500 mrem] and an NRC occupational dose limit of 0.05 Sv [5 rem]. The commenter mentioned the potential for rail delays, derailments, or accidents, and recommended that radiation exposure limits must account for exposure, and the lower exposure limit should be used. Another commenter questioned the technical basis for NRC staff use of the NUREG–2125 (NRC, 2014b) dose results for the rail-lead cask used in incident-free public and occupational dose calculations and requested clarification.

Response: *The EIS analysis of SNF transportation impacts to workers in EIS Section 4.3.1.2.2.1 described the applicable DOE administrative dose limit of 5 mSv [500 mrem] and the NRC occupational dose limit because the different limits would apply depending on who ships the SNF (DOE or an NRC licensee). These dose limits would take into account any extended exposure from delays in shipping even though the transport of spent fuel is highly supervised, and delays would be unlikely. In practice, the higher NRC occupational dose limit includes a requirement to maintain doses as low as reasonably achievable (ALARA), and actual occupational doses are typically less than the limit. Regarding the NRC staff's use of the NUREG–2125 (NRC, 2014b) dose rate from the rail-lead cask, the external dose rate for this cask was set at the regulatory maximum in that analysis and was therefore a bounding incident-free dose rate for any NRC-certified transportation cask that might be used for future shipments of SNF of various specifications (including, for example, high-burn-up fuel). Therefore, selecting the highest dose rate that is allowed by regulation bounds the effect of the transportation cask dose rate in the worker and public dose calculations included in the EIS.*

No changes were made to the EIS as a result of these comments.

Comments: (266-4) (379-7)

D.2.9.13 Transportation of SNF—Impact Analysis Approach—Operational Details

The NRC staff received a comment that the transportation evaluation in the EIS did not consider key operational factors. The commenter suggested the following factors should have been fully considered including: an analysis of the effects of different transportation operating protocols on shipment safety; the level of emergency preparedness along likely shipping routes; coordination and communication with affected states, Tribes, and other important stakeholders; and an analysis of the impact on shipment numbers and safety of using any of the variety of transportation casks that are licensed for use. The commenter requested that the EIS fully evaluate all reasonable modes and routes that could be used for SNF transportation to the proposed CISF. They suggested the transportation analysis ignored the operational details and alternatives that could have important effects on the NRC's conclusions about the proposed project's effects on the environment.

Response: *The transportation impact analysis in the EIS evaluates the impacts associated with the applicant's proposal to ship canistered SNF by rail from existing reactor sites to a CISF in accordance with NRC's NEPA-implementing regulations and guidance, using available analysis tools and information. As described in the EIS, many of the details associated with the proposed transportation of SNF have not been determined, and therefore the impact analysis uses bounding representative routes applicable to a national SNF shipping campaign and scales them to the number of anticipated shipments to and from the proposed CISF to evaluate the primary radiological impacts. Additionally, Holtec proposed shipping SNF to and from the CISF by rail, although the EIS (Section 4.3.1.2.2) describes other modes (barge or heavy haul truck) that might be used to move SNF from reactor sites without access to a rail line, and how that transportation could contribute to evaluated impacts. The proposed transportation would be conducted in compliance with applicable regulations and would follow currently acceptable practices and protocols.*

Key aspects of radioactive materials transportation are addressed by the RADTRAN 6.0 transportation risk assessment code. This is the same risk assessment code that the NRC staff used to produce the NUREG–2125 dose and risk results that were applied in the SNF transportation impact analyses of the EIS. The accident analyses in the EIS and NUREG–2125 *are based on historical accident rate data that accounts for and reflects the effects of all operational factors in effect at the time the data were collected. Any further enhancement to operational factors associated with the transportation of SNF would likely further mitigate the occurrence of incidents and accidents during transportation, consequently further lowering risks and associated impacts. In this context, while unspecified operational protocols, coordination efforts, and emergency response preparations are important and enhance SNF transportation safety, they are already an important foundation of established transportation practices, which are not a focus of the impact evaluation (i.e., the action under review does not include any proposals to change existing transportation practices regarding the topics the commenter highlighted).*

Additionally, because the proposal is limited to the transportation of canistered SNF, and loaded casks must comply with NRC and DOT maximum dose rate limits regardless of the type of canister, the NRC staff does not see any benefit to conducting additional analyses involving different transportation cask systems. Despite the noted differences in size and inventory, the dose rates on all transportation casks included in the NRC impact analysis are assumed to be at the maximum allowed by regulation. This is a bounding condition included in the EIS analyses of potential incident-free impacts. Additionally, because all SNF cask systems are designed and certified in accordance with the same NRC packaging regulations in 10 CFR Part 71, the NRC staff considers a NEPA analysis of accident impacts using a typical cask rather than several variants adequate to determine impacts. Additional information about the representative route approach and consideration of other modes of transport is provided, respectively, in Sections 2.9.17 and 2.9.3 of this appendix.

No changes were made to the EIS as a result of this comment.

Comment: (286-2)

D.2.9.14 Transportation of SNF—Impact Analysis Approach—Rail Crossing Fatalities

The NRC staff received a comment that the EIS should estimate rail crossing fatalities based on an accident rate applicable to a rural area with infrequent train traffic. The comment suggested using a national accident rate underestimates the impacts that would occur in a rural area with marginal railroad crossings.

Response: *EIS Section 4.3.1.2.2.4 describes the method the NRC staff used to estimate railroad crossing fatalities. This fatality estimate included traffic fatalities (e.g., accidents at rail crossings) and fatalities involving individuals trespassing on railroad tracks. The potential fatalities to members of the public from any rail accidents was estimated conservatively for the operations stage of the proposed action (Phase 1) by taking the product of the fatalities (worker and public) per distance traveled by rail (2.27 × 10^{-8} fatalities per railcar-km) (NRC, 2001), and a bounding estimate of the total rail distance associated with SNF transportation of 3.4 × 10^{6} km [2.1 × 10^{6} mi], which was revised to 1.0 × 10^{7} km [6.3 × 10^{6} mi] in the final EIS (to address consistency with the 3-car train assumption). Therefore, the shipment distance was conservatively estimated because the representative route distance is much longer than actual routes from each reactor site. The NRC staff considers that a broadly defined accident rate reflects a variety of accident conditions applicable to rail transportation in the U.S. Additionally, because most of the distance traveled by rail transportation occurs in rural areas, the NRC staff expect rural accident conditions would be represented in the selected accident rate.*

No changes were made to the EIS as a result of this comment.

Comment: (382-19)

D.2.9.15 Transportation of SNF—Impact Analysis Approach—Reactor Guidance

The NRC received a comment requesting that the EIS address information needs for transportation that the commenter identified in NRC reactor licensing guidance (NRC, 2018a). The requested information included reactor type; rated core thermal power; fuel assembly description; average irradiation level; capacity of onsite storage; storage time between removal and transportation; management of other wastes; transportation packaging system descriptions, including capacity, dimensions, and weight; dose rates; and shipping route information, including population densities in urban, suburban, and rural zones of travel. The commenter asserts that the EIS insufficiently addressed the information identified in the regulatory guidance.

Response: *The regulatory guidance cited in the comment is applicable to licensing an individual new nuclear power reactor when specific regulatory conditions require a license applicant to conduct a project-specific transportation risk assessment. Reactors that would provide SNF for storage at the proposed CISF would already have been evaluated for the environmental impacts of transportation of fresh and SNF to and from that individual reactor when the reactor was licensed. The purpose of the transportation impact analysis in the CISF EIS is to evaluate the potential transportation impacts of all SNF shipments to and from the proposed CISF from any licensed reactor SNF storage site. Therefore, the EIS analysis has a broader scope than the cited reactor licensing example and additionally is not subject to the same licensing requirements as a new nuclear reactor. The broader scope of the EIS analysis necessitated the broader analysis approach that is documented in the EIS.*

Despite the differences in scope, both the EIS analysis and reactor licensing calculations use comparable transportation risk assessment calculation methods and therefore several of the variables identified in the comment are applicable to CISF transportation and were incorporated into the EIS risk assessment calculations in the EIS. These variables are documented in the referenced risk assessment in NUREG–2125 (NRC, 2014b) and include packaging descriptions such as capacity, fuel type, dimensions, weight, package dose rate, and representative route details, including distances and populations in urban, suburban, and rural zones of travel. SNF characteristics the commenter raised, including fuel irradiation and SNF cooling time, are related to estimating radionuclide inventories. Because all proposed CISF SNF transportation would involve canistered SNF, the NRC staff considers the conclusion in NUREG–2125 regarding the resiliency of the rail-steel cask to severe accident conditions (resulting in no release under severe accident conditions) applicable and therefore parameters related to modeling of releases such as radionuclide inventory are not described in the EIS. Similarly, while the package dose rate is influenced by SNF inventory, the EIS calculations considered a bounding package dose rate at the regulatory maximum and therefore inventory details were not needed to support the incident-free impact analyses.

Because the applicable variables are documented in the cited NUREG–2125 report, no changes were made to the EIS as a result of this comment.

Comment: (237-2-7)

D.2.9.16 Transportation of SNF—Impact Analysis Approach—Reference Citations

The NRC staff received comments from NMED that in-text references were not provided for the health effects threshold obtained from the ICRP.

Response: *EIS Section 4.3.1.2.2.1 states that both the NCRP and the ICRP suggest that when the collective (population) dose is less than the reciprocal of the risk coefficient (i.e., less than 1/5.7 × 10^{-2} health effects per person-Sv or 17.54 person-Sv) the assessment should find that the most likely number of excess health effects is zero. This statement is preceded by a reference to ICRP (2007) for risk coefficient, which is the correct reference. All instances of similar statements did not include this reference. In response to these comments and for clarity, the NRC staff checked all instances of the statement and included, where appropriate, the in-text reference for the health effects threshold statement.*

Comments: (322-17) (328-3-14)

D.2.9.17 Transportation of SNF—Impact Analysis Approach—Representative Route

The NRC staff received a variety of comments related to the representative route approach that was used in the EIS to evaluate transportation impacts. A commenter stated that the representative route chosen by the NRC does not provide a realistic assessment of the impacts. They asserted transportation impacts are influenced by infrastructure, railroad transportation practices, and communities. Therefore, they concluded that scaling the impacts from a single route is inadequate to capture the unique route-specific impacts. Another suggested the use of a single route was segmentation intended to reduce impacts. A commenter requested the potential impacts (including accidents and terrorism) on communities along the routes including Tribal people, lands and resources should be evaluated in the EIS. A commenter requested the safety of rail transport in the State of New Mexico should be evaluated. Another commenter suggested that unique transportation conditions (e.g., railroad condition, railroad grades, road traffic make-up, road traffic patterns, driver behavior) in southeast New Mexico where proposed rail shipments would converge do not match the conditions considered in the EIS risk assessment. They noted the EIS did not consider region-specific information, data and analyses in its assessment and recommended the EIS should document the assumptions and analyses that are not representative of the conditions in the area of the proposed facility. Other commenters were concerned about the safety of trains passing through towns along the route, noting that trains pass by public places through the center of towns at slow speeds. Another commenter requested a programmatic EIS be initiated prior to the proposed action that addresses the transportation infrastructure. Commenters noted that the EIS does not identify all the shipment origin (reactor) sites, provides no maps showing all SNF shipment routes, and does not evaluate all modes of transport. A comment referred to the complexities of routing hazardous materials nationwide and recommended consultation with the Association of American Railroads (AAR) to understand the roles of DOT's Federal Railroad Administration (FRA), the Pipeline and Hazardous Materials Safety Administration (PHMSA), and the Department of Homeland Security (DHS). NMED noted that the EIS analysis did not include the work conducted by State of New Mexico and the NRC in the DOE Office of Nuclear Energy Rail Routing Ad Hoc Working Group that identified issues and uncertainties related to transportation of SNF for further investigation. One commenter suggested the EIS did not describe how shipments would be accomplished from reactor sites with no rail access and did not assess impacts while another expressed concerns about the safety of barge shipments. Other comments stated the EIS analysis did not address shipments to a repository and claimed that it doubles the risk.

Response: *EIS Section 3.3.2 states that because no arrangements regarding which nuclear power plants will ship SNF to the proposed CISF have been made yet, the exact locations of SNF shipment origins have not been determined; therefore, the details regarding the specific routes that would be used also are not known at this time. Additionally, that same EIS section states that the exact routes for SNF transportation to and from the proposed CISF would be determined in the future, prior to making the shipments. To capture the range of possible routes, the EIS evaluated the potential impacts of shipments by representative or bounding routes applicable to a national SNF shipping campaign. This approach provides sufficient information about potential transportation routes to support the analysis of impacts in EIS Chapter 4. The NRC staff considers the selected routes to be bounding examples. The routes were selected from the prior NRC transportation risk assessment in NUREG–2125 to evaluate SNF shipments to and from the proposed CISF project because they were derived based on typical transportation industry route selection practices. The selected representative route from reactors to the proposed CISF is based on the most distant existing power plant location from the proposed site, and the longest distance of travel across the U.S., which includes diverse transportation characteristics that add to the representativeness of the route. The analysis of transportation impacts from the proposed CISF to a repository in EIS Section 4.3.1.2.2.5 includes a similarly derived representative route that is longer than the actual route and is therefore also considered by the NRC staff to be bounding.*

EIS Section 4.3.1.2.2.1 describes the representative route approach from Maine Yankee nuclear power plant to the town of Deaf Smith, Texas, as an available (previously modeled) bounding route for the EIS because most of the potential origins (U.S. nuclear power plants) for shipments destined for the proposed CISF are located east of the proposed CISF, and the distance of the selected representative route is larger than the actual distances that would be traveled from most U.S. nuclear power plants to the proposed CISF. Because dose estimates increase with shipment distance, selecting a route with a larger distance than expected is a bounding condition. Furthermore, the transportation characteristics along the route from Maine to Texas are diverse and include several rural small towns as well as suburban and urban areas that have dose-related conditions that are representative of conditions on railways that could be potentially used for the proposed project. The calculation of doses based on a bounding representative route for all shipments is intended to provide a broad estimate of the collective dose from all proposed shipments while also serving to bound the doses expected from shipments that would occur on a variety of specific routes. The analysis of the impacts of all shipments in this way does not reduce or otherwise segment the scope of the proposal or the associated environmental impacts as some commenters have suggested. The actual doses to members of the public on specific (more dispersed) routes would be less than those calculated using the representative route because dose is proportionate to shipment distance and the number of shipments. Shipment distances would be shorter on the dispersed routes, and there would be fewer shipments per route.

A representative route approach allows a bounding analysis of national transportation impacts when routes are not known. Bounding analyses typically are biased toward the overestimation of doses and are less detailed than more resource-intensive realistic analyses that may be more accurate but typically produce lower doses. The NRC staff understands commenters desire for more detailed analysis; however, NEPA provides flexibility in determining the type of approach most appropriate to estimate the impacts of a specific project. A variety of impact analysis approaches of differing specificity have been utilized in past NEPA analyses. The single representative route approach is not unique to the Holtec CISF EIS. The NRC previously used a single representative route approach to calculate transportation radiological impacts in an EIS for a previously proposed private spent fuel storage facility (NRC, 2001). That analysis *calculated incident-free doses and accident risks from the proposed shipment of 4,000 spent fuel packages, transported over a representative route from Maine to Utah over a 20-year period, and concluded the impacts would be SMALL. DOE used a representative route approach in the 2008 YM Final Supplemental Environmental Impact Statement (FSEIS) but decided to select representative routes from each origin (reactor site) and therefore ended up with many more routes. A variant of such an approach could have been applied here, but the NRC staff analysis already bounds such variations. Additionally, all prior credible analyses of SNF transportation had indicated low doses and risks overall and therefore a bounding analysis was considered informative and appropriate for evaluating the potential impacts of the Holtec CISF project.*

Regarding the comments requesting additional local or regional analysis of transportation in New Mexico, the NRC staff understands the concerns about the convergence of national transportation routes as conveyances approach closer to the location of the proposed CISF, thereby increasing the number of shipments on some routes. In that regard, the representative route approach applied in the EIS is informative because all shipments have been evaluated on a single route. Therefore, for those segments of national routes where all shipments would travel, the representative route analysis accounts for all possible shipments for full build-out of the CISF along that portion of the route. Regarding the request to evaluate specific transportation conditions in New Mexico, or in any other specific location, the national average accident rates used in the EIS analysis are based on national accident data; therefore, the local and regional conditions that affect the occurrence of accidents are represented in the underlying data and the resulting average value. Applying an average national value in the EIS analysis is appropriate for estimating impacts of SNF shipments that would take place across the nation. If an analysis were done for a specific state that has an accident rate higher than the national average, the calculated risk results would not be expected to exceed the national risk results because the distance traveled would be much less and that would have an offsetting effect on localized results.

Regarding concerns about travel through towns and cities along the route, the transportation impact analysis in the EIS accounts for a minimum rail setback of 30 m [98 ft] and assumes the train speed in urban areas is 29 kph [15 mph]. Note that a slow train imparts a larger dose to the public along the route under incident-free conditions based on the increased exposure time to the passing train. The dose estimates assume the population along the route is exposed to all 10,000 proposed shipments and the package dose rate is at the maximum allowed by regulation. These conditions cause the resulting dose estimates to be overestimated and the resulting dose is a small fraction of what the public normally receives from natural background radiation. An additional maximum individual dose calculation was included in the EIS analysis to provide a more practical estimate of a potential dose an individual could receive if they lived near the track and were exposed to all proposed shipments. This estimate assumes an individual is passed by the slow-moving train and is exposed to all 10,000 shipments at the 30-m [98-ft] setback distance. The resulting dose was 0.06 mSv [6 mrem] (this compares with a 3.1 mSv [310 mrem] annual dose from natural background radiation). Accident impacts were evaluated and found to be minor. The slower speed of urban travel noted by a commenter further enhances safety under accident conditions because it limits the severity of the impact forces and effectively mitigates the potential for any associated release of radioactive material.

Regarding requests for additional route details and maps, the NRC staff notes that additional information about the representative route (which includes maps) is documented in the referenced NUREG–2125 report. EIS Section 3.3.2 also cites Section 2.1.7.2 of DOE’s FSEIS for a geologic repository at Yucca Mountain (DOE, 2008a), which has extensive information on *the DOE-selected representative routes from each reactor site in the U.S. to YM, including maps and route details. While these routes terminate at the proposed YM site in Nevada, many of the route segments originating from reactors to the southwestern portion of the US are expected to be similar. This information was considered broadly applicable to the current analysis as a way to visualize portions of the national rail network that could be used for the proposed shipments. Because that information had already been extensively documented in the cited DOE analysis and the specific representative route was documented in NUREG–2125, the NRC staff did not duplicate the information in the EIS.*

Concerning shipments from reactor sites lacking rail access, EIS Section 4.3.1.2.2 refers to the 2008 and 2002 YM EIS's that provide information and analysis on the reactor origin sites that lack rail access and options for shipping SNF from these sites and the impacts of those options. Referencing this information was appropriate because, as stated in that EIS section, the information showed that the national transportation impacts were the same or not notably different when these other modes were used to supplement rail transportation.

Overall, it is unlikely that evaluating additional representative routes or route details would significantly change the results or conclusions of the impact analysis. The analysis assumes that transportation would be conducted in accordance with the applicable NRC and DOT regulations, as stated in EIS Section 4.3.1.2.2. Prior to shipping SNF, the NRC reviews the proposed routes for security purposes and coordinates with applicable agencies as necessary. The NRC has a longstanding memorandum of understanding (MOU) with the DOT on roles and responsibilities within their respective authorities regarding radioactive materials transportation. Additionally, the NRC develops incident response plans that are coordinated with other agency response plans, including the Department of Homeland Security. DOT, through the Federal Railroad Administration, regulates the rail infrastructure and has plans for conducting rail inspections prior to SNF shipments to verify the condition of the infrastructure. The DOT is currently updating its Safety Compliance Oversight Plan for Rail Transportation of High-Level Radioactive Waste and Spent Nuclear Fuel (DOT, 1998) and the NRC staff expect when that plan is available additional detail on rail shipment planning, inspection, and oversight will be available. Because the NRC does not have any authority to regulate the rail infrastructure, there is no basis for the NRC to conduct a programmatic EIS related to routing infrastructure as recommended by a commenter. Shipments of SNF would be routed to rail lines that meet applicable specifications (for example, class of track) and that comply with all applicable regulations. Therefore, systems are in place to ensure the adequacy of route infrastructure. There are also a wide variety of efforts currently underway among various Federal and State agencies and associated committees regarding SNF transportation research and development, planning, coordination, and oversight. The EIS analysis is focused on the proposed action under NRC review and the potential impacts of that specific proposal considering existing available information, analysis tools, and requirements. Comments about the logic of conducting national SNF transportation twice prior to final disposal are addressed in Section 2.9.3 [Transportation of SNF—General Comments] of this appendix. Comments about transportation accidents including accidents involving barge transportation are addressed in Section 2.9.2 [Transportation of SNF—Accidents].

No changes were made to the EIS as a result of these comments.

Comments: (65-1) (99-12-7) (101-1) (101-2) (116-6) (135-7) (135-8) (135-9) (162-1) (168-20-2) (215-4) (224-11) (224-15) (224-16) (237-2-8) (276-1) (276-2) (284-2) (286-10) (286-11) (286-12) (288-2) (289-4) (298-1) (328-2-7) (341-12) (375-3-6) (382-10) (390-1)

D.2.9.18 Transportation of SNF—Impact Analysis Approach—Risk Assessment Applicability—Accident Rate

The NRC staff received comments that criticized the staff's use of the NRC spent fuel transportation risk assessment analysis in NUREG–2125 in the EIS transportation impact analyses. One commenter asserted that the NUREG–2125 analysis was not developed to support an impact analysis of specific routes. Some comments suggested the analysis in NUREG–2125 was out-of-date, no longer reflected current accident conditions, and that the EIS should update information, data, and analyses. One commenter suggested that because the risk analysis results from NUREG–2125 were out of date, the scaling of results in the EIS was not a valid approach. A few commenters highlighted a difference between the average freight rail accident frequency in NUREG–2125 (which they stated as 1.32×10^{-7} accidents per railcar mile) that was based on DOT data from 1991 to 2007 and an accident frequency obtained from more recent unspecified DOT accident data covering 2010 to 2018 of 4.83×10^{-6} (no reference provided), which they claimed was a factor of 36 times greater than the NRC value, implying that accident rates had significantly increased. A commenter also expressed concerns about EIS assumptions regarding SNF burn-up and exposure times to first responders.

Response: *The NRC has conducted several risk assessments and other analyses to evaluate the safety of SNF transportation during the past four decades. The transportation risk assessment in NUREG–2125 was published in 2014 and remains the most recent NRC analysis of its kind. The analyses in NUREG–2125 are reasonably current and applicable for the assessment of potential radiological impacts of the transportation of SNF. Because the analysis presents dose and risk results per shipment, the report documents methods for scaling results for use in EAs similar to the scaling used in this EIS. The NRC staff are not aware of any significant changes to regulations, transportation practices, cask designs, or underlying data that would invalidate the use of the information for the assessment of environmental impacts as applied in this EIS.*

The example provided in the comments suggesting a notable change in rail accident rates is not clearly documented. The comments compare the NRC value (in units of accidents per railcar-mi) with a value (in units of accidents per train-mi) that is 36 times larger than the NRC value. A train-mile refers to the movement of a train one mile, whereas a railcar-mile refers to the movement of a railcar one mile. Trains comprise several (or many) railcars, therefore a train-mile equates to several railcar-miles. This distance measure (train-mi) appears in the denominator of the accident rate; therefore, accident rates reported as accidents per train-mile will be larger than a comparable accident rate reported as accidents per railcar-mile. Recall that the larger accident rate the comments suggested is in units of train-mile, and this value would thus need to be reduced by a factor that represents the number of railcars per train (for example, the average number of railcars per train) to compare with the NRC value in the same units. The average number of railcars per freight train across all Class I railroads in 2017 was reported as 73.2 railcars per train (GAO, 2019). If the commenter's accident rate was reduced by a factor of 73.2 it would be lower than the NRC value. Therefore, the NRC staff concludes the comment was not making a valid comparison and did not provide a basis for asserting the value would underestimate accidents.

While evaluating the comment, the NRC staff identified that the EIS accident rate was erroneously listed on a per mi basis instead of per km (the correct value as reported in NUREG–2125 is 1.32×10^{-7} accidents per railcar-km or 2.12×10^{-7} accidents per railcar-mi). Therefore, the units in the EIS were corrected and the resulting number of expected accidents listed in EIS Section 4.3.1.2.2.3 was changed from 8 accidents in 10,000 shipments to 13. This *correction did not significantly affect the comparison the commenter raised or the preceding evaluation of it. Otherwise, no changes were made to the EIS as a result of these comments. Responses to comments about no-release accident conditions and accidents involving fire are provided, respectively, in this appendix in Sections 2.9.2 and 2.9.19. EIS assumptions regarding SNF burn-up and the first responder exposure time are provided in this appendix in Sections 2.9.24 and 2.9.19, respectively.*

Comments: (285-2) (286-5) (286-8) (375-3-5) (382-9)

D.2.9.19 Transportation of SNF—Impact Analysis Approach—Risk Assessment Applicability—Accident Scenarios

The NRC staff received comments that provided examples of accident scenarios that commenters suggested could create accident conditions that (based on the NUREG–2125 analysis) could result in sufficient damage to a transportation cask and canister to cause a release of radioactive material. These scenarios included a runaway train that exceeds 193 kph [120 mph] and a train caught in a wildfire of duration and temperature exceeding the fire conditions evaluated in NUREG–2125. A commenter also suggested a sabotage event involving an intentional high-speed crash could also lead to such conditions. Another commenter suggested NUREG–2125 deliberately omits realistic accident scenarios such as an impact with a surface that is not flat and noted concerns about the vulnerability of high-burn-up inventory.

Response: *The accident scenarios considered in the EIS transportation impact analysis incorporate results of the accident evaluation in NUREG–2125. That analysis is based on accident impact forces that encompassed all historic or realistic accidents and hypothetical fires that include regulatory test conditions and an engulfing hydrocarbon fuel pool fire of a 3-hour duration. The analysis also considered the results of prior analyses of cask impacts to non-flat surfaces (e.g., locomotive). Although more severe accident scenarios can be hypothesized and may be plausible, the EIS analyses and NRC licensing decisions are not based on worst-case scenarios. The scenarios mentioned in comments, including a runaway train exceeding 193 kph [120 mph] and severe wildfire, are less likely for SNF shipments due to the increased emphasis on safety including equipment inspections, limiting stops, security and safeguards protocols, and route selection. The DOT Safety Compliance Oversight Plan for Rail Transportation of High-Level Radioactive Waste and Spent Nuclear Fuel (DOT, 1998) addresses rail shipment planning, inspection, and oversight. DOT is currently in the process of updating this plan. Additionally, rail carriers use train control and monitoring systems to identify the location of their trains within the rail system and to make informed decisions to avoid or minimize potential weather-related or track condition risks. The carrier may impose local restrictions on transportation when local conditions make travel hazardous (DOE, 2008b). The potential for a terrorist attack is addressed by security and safeguards requirements and is typically not evaluated in NRC environmental impact assessments. For discussions related to high-burn-up SNF and no-release accidents, see other comments throughout this the transportation impact analysis approach section (appendix Section 2.9).*

No changes were made to the EIS as a result of these comments.

Comments: (323-2-1) (373-8) (375-1-9) (375-3-7) (375-3-8) (375-3-9) (382-11) (382-12) (382-13) (382-14) (382-15)

D.2.9.20 Transportation of SNF—Impact Analysis Approach—Risk Assessment Applicability—Affected Population

The NRC staff received a comment that the radiological region of influence analyzed in NUREG–2125 differed from what DOE has used in past analyses (an area extending 800 meters on either side of the centerline of the transportation route), and that based on 2010 Census data, there are more than 9 million people living within the ROI of the shortest path routes from U.S. nuclear power plants to the proposed Holtec CISF. The commenter compared this to the approximately one million residents within the region of influence (ROI) along the route between Maine Yankee and Deaf Smith that was used in the EIS to evaluate impacts. The commenter suggested this was an indication that affected people were being excluded from the analysis. They also recommended that the NRC include a more realistic and thorough examination of the likely SNF transportation routes in the EIS.

Response: *The NRC staff acknowledges that the cumulative population within a region of influence along dispersed (e.g., actual) transportation routes would be larger relative to a single representative route like that used in the EIS transportation impact analysis. The cumulative distance of all the routes combined under the dispersed approach would exceed the distance of the representative route; therefore, considering that typically the exposed population is a function of distance traveled, a larger exposed population would be expected. Within the context of the EIS impact analysis, the transportation assessment calculates radiological impacts to the public by summing the doses received by the population along the representative route and then scaling by the number of shipments. If similar calculations were done for each route under a dispersed routing scenario (i.e., several different routes, one from each reactor site) then the population along each of these routes would be a fraction of the total population (in other words, much smaller than the 9 million the commenter cited) and the number of shipments traveling on each route would be a fraction of the total number of shipments (10,000). These smaller (more precise) values would then be summed to calculate the total collective dose. Therefore, in comparing the two approaches, the representative route would be expected to calculate a higher total collective dose because the distance traveled per shipment would be much greater relative to each dispersed route and therefore more people are assumed to be exposed per shipment versus actual dispersed routes. Additionally, the representative route population is exposed to all shipments and the dispersed route population is not. These conservatisms would be reflected in the summed total dose. For these reasons, the representative route approach is bounding relative to the dispersed routing approach, and the comparison the commenter used of the two populations does not reveal any material exclusion of exposed population or undercounting of dose. The NRC staff notes that both the NRC risk assessment in NUREG–2125 used in the EIS analysis and the cited DOE analysis use the 800 m [2,625 ft] distance on either side of the rail track to calculate collective doses to the public along the route. Other comment responses in this appendix provide additional information about routing (Section 2.9.28) and the representative route approach (Section 2.9.17) used in the EIS transportation impact analysis.*

No changes were made to the EIS as a result of these comments.

Comments: (169-13-2) (286-9)

D.2.9.21 Transportation of SNF—Impact Analysis Approach—Risk Assessment Applicability—Canister Capacity

The NRC staff received a comment that pertained to the increases in SNF canister capacity since NUREG–2125 was published. The commenter called attention to the Holtec HI-STAR 190 XL that can be loaded with up to 37 pressurized water reactor (PWR) spent fuel assemblies rather than 24-26 assemblies in a cask evaluated in NUREG–2125. They suggested the increase in weight from these additional assemblies could affect the performance of new rail cars. They also noted the loaded weight would be greater than earlier casks and suggested that could affect infrastructure during shipment.

Response: *The NRC staff acknowledges the increased canister capacity the commenter noted and the capacities evaluated in the EIS transportation risk assessment that was based on NUREG–2125. The commenter asserted the additional weight would negatively affect the performance of rail cars and infrastructure but did not provide a basis for the concern. The NRC staff recognizes the importance of maintaining loads within weight specifications of rail equipment and expect the rail shippers and carriers under the oversight of the DOT would ensure specifications would be met regarding railcars and other infrastructure to maintain safe operations. Additionally, the NRC staff understands that a variety of canisters of various capacities are currently in use (already loaded) and the actual loading of the highest capacity canisters may be constrained by canister and cask specification (e.g., thermal limits, dose rate) and therefore actual canister loads shipped to the proposed CISF would be expected to vary. Other comment responses in this appendix provide additional information about rail weight limits (Section 2.9.26), infrastructure (Section 2.9.25), and related mitigations (Section 2.9.3).*

No changes were made to the EIS as a result of this comment.

Comment: (286-7)

D.2.9.22 Transportation of SNF—Impact Analysis Approach—Shipment Schedule

The NRC staff received a comment about various transportation-related operational details of the proposed project that were not described in the EIS impact analysis. This included a comment that the schedule for shipping SNF from origin sites to the proposed CISF was implausible and did not account for the availability of suitable transportation casks and railcars, thereby making the EIS transportation analysis inaccurate. The commenter assumed the railcars would have to be compliant with the Association of American Railroads (AAR) S-2043 standard and no compliant railcars have been manufactured. They further mentioned that the applicant would have to manufacture, purchase, and/or lease expensive transportation casks and railcars. The commenter added that the transporting entity or entities would have to coordinate the shipment schedule with the origin site, the destination site, the inspectors, the regulators, and the rail/truck/barge carriers, and transportation operations would have to be executed perfectly.

Response: *The EIS was prepared to evaluate the potential environmental impacts of the proposed action as proposed by Holtec. Shipments of SNF will be required to follow NRC and DOT regulations and specifications, including use of appropriate railcars for the proposed shipments. Regarding the transportation impact analysis, the impacts from the transportation of SNF would be proportionate to the number of shipments completed per project phase. In that regard, if the commenter is correct and the proposed schedule turns out to be unrealistic and* *fewer shipments would occur per phase than planned, then the EIS will have further bounded the impacts.*

No changes were made to the EIS as a result of this comment.

Comment: (286-14)

D.2.9.23 Transportation of SNF—Impact Analysis Approach—SNF Transportation Challenges

The NRC staff received comments about existing uncertainties and challenges for implementing national SNF transportation. Some referred to a 2019 Nuclear Waste Technical Review Board (NWTRB) report, "Preparing for Nuclear Waste Transportation" that identifies several technical issues that commenters suggested were not addressed or discussed in the EIS. These challenges include higher burn-up SNF that is thermally hotter and more radioactive than lower burn-up SNF and the use of larger capacity SNF canisters and casks requiring longer cooling times that could affect schedules and delay SNF transportation and loading. Another concern was the lack of data on the potential for damage to SNF during transportation after storage. An additional concern from the NWTRB report raised in a comment was the responsibility for transportation of SNF. NMED referred to a 2015 Government Accounting Office (GAO) report that highlighted complexities, including decades for planning and implementation of SNF transportation. NMED suggested transportation planning could take about 10 years, in part because routes would have to be agreed upon, first responders would have to be trained, and critical elements of infrastructure and equipment would need to be designed and deployed. They noted that the NRC did not consider the technical challenges in transporting SNF described in GAO reports, including transportation of high-burn-up fuels, the effects of hydrogen buildup and cladding embrittlement, and differences in storage and transportation requirements. They also described a long-term DOE and the Electric Power Research Institute investigation of high-burn-up fuel, cladding, and the cask during transport. NMED stated that DOE indicated transportation of large amounts of high-burn-up fuels would not occur until at least 2025. Overall, NMED asserted that the NRC did not consider the technical challenges in transporting SNF described in any of the GAO reports, the work the NRC engaged in with States and Tribes in the Ad Hoc Working Group, or the work conducted by the Western Interstate Energy Board (WIEB) High Level Radioactive Waste Committee (HLRW). Another commenter requested the EIS address the impacts from concurrent shipping of SNF by the Holtec project and the proposed DOE repository shipping campaign that is described in the NWTRB report.

Response: *SNF transportation has occurred in the U.S. for several decades, although not at the volumes planned by Holtec for the proposed CISF project. The technology, experience, regulations, and oversight exist to safely transport SNF, but these continue to evolve to meet future challenges. The EIS is focused on evaluating the potential environmental impacts of the proposed Holtec CISF project and the associated transportation of SNF that would be needed for Holtec to operate the proposed CISF. The NRC staff acknowledges there are a variety of complex issues associated with the current Federal SNF management policies and programs that also include matters with the transportation of SNF as documented in the cited NWTRB and GAO reports, of which the NRC staff is aware and has reviewed. The cited reports are aimed at focusing the attention of Congress and Federal agencies on issues to facilitate future planned SNF management and associated transportation campaigns safely and efficiently and in compliance with existing statutes and regulations. Some of the topics are specific to the national SNF management program (e.g., repository program) and others are more broadly applicable to any SNF transportation, including that proposed for the Holtec CISF. While* *challenges were identified and described by these agencies, the reports did not identify insurmountable issues that would prevent future transportation of all SNF in the U.S., including the transportation proposed for the proposed Holtec CISF. Some matters may delay the transportation of some SNF until a later time, while other SNF faces fewer challenges and could be shipped sooner. Overall, many of the identified challenges present potential impediments to schedules and possibly execution of later phases of the proposed CISF if those issues were to become too difficult or costly to overcome (i.e., the CISF could be a smaller facility than expected). Additionally, several of the challenges are being addressed by long-term research programs such as the studies noted in comments. In developing the EIS, in accordance with the NRC NEPA implementing regulations and associated guidance and practices, the NRC staff balanced providing adequate context and transparency while reducing unnecessary bulk describing related topics, programs, and research that are related to the proposal under review but are not likely to change the evaluation of potential impacts. In that regard, the EIS would not be substantively improved by describing the information in the cited reports.*

Regarding comments that the EIS should address the impacts from concurrent shipping of SNF by the Holtec project and the proposed DOE repository shipping campaign, the NRC staff notes that the two proposed transportation campaigns are separate proposals that address transportation of essentially the same national SNF inventory and therefore would have offsetting effects if both occurred concurrently. As described in the response to comments on the number of shipments (Section 2.9.11 of this appendix), a primary justification for utilizing a CISF is the current unavailability of a national repository. The NRC staff expects that when a repository becomes available then shipments would be less likely to travel from reactors to the CISF when they could travel directly to a repository. This could be affected by the order of receipt of SNF at a repository, so some overlapping transportation may still occur nationally if both projects were active at the same time. However, under such a scenario, there would be differences in destinations and routes and a lower likelihood that impacts would overlap.

No changes were made to the EIS as a result of these comments.

Comments: (98-43-7) (168-9-6) (224-8) (237-2-11) (237-2-14) (237-2-16) (237-2-19) (237-3-5) (328-2-5) (328-2-6) (375-3-3) (382-7)

D.2.9.24 Transportation of SNF—Impact Analysis Approach-Risk Assessment Applicability—Burn-up

The NRC staff received comments about the burn-up characteristics of the SNF considered in the NUREG–2125 analysis, which was limited to 45 GWd/MTU [gigawatt-days per metric ton of uranium], and therefore was not high-burn-up fuel. The commenters noted the trend of increasing burn-up limits and that high-burn-up fuel contains more fission products, which could increase gamma radiation doses.

Response: *"Burn-up" refers to a measure of the energy produced by an amount of uranium in the nuclear fuel used to generate electricity in an operating reactor. The NRC staff acknowledges the increasing burn-up trend in power generation and that some isotopes in the SNF increase as does the gamma radiation dose from higher burn-up of SNF. Within the context of the EIS transportation impact analysis, increasing burn-up would not affect estimated incident-free doses because the calculated doses are based on the dose rate at a 1m [3.3 ft] distance from the cask, and that parameter in the EIS analysis is assumed to be at the maximum dose rate allowed by regulation. Casks certified for transportation of high-burn-up SNF would have to meet the same dose rate limits (e.g., by increasing SNF cooling time prior to* *shipment, adding shielding, or decreasing the number of fuel assemblies allowed) and therefore the dose rate at 1m [3.3 ft] from the cask surface would be the same as assumed in the EIS. Under accident conditions, the increased inventory from high-burn-up SNF could affect doses from accidents involving a release of radioactive material; however, the EIS analysis did not evaluate accidents involving release of radioactive material based on the technical analyses of cask responses to severe accident conditions in NUREG–2125. The commenter is correct that the analysis in NUREG–2125 did not quantitatively estimate risks from accidents involving high-burn-up SNF, but it did provide a qualitative description of expected impacts on the results and concluded that the effect would not change the conclusions of the study. Additionally, the Yucca Mountain Final Supplemental Environmental Impact Statement (DOE, 2008a) considered accidents involving releases of high-burn-up SNF and estimated low accident risks. Overall, the effect of changing burn-up assumptions would not change the results or conclusions of the EIS impact analysis. The NRC continues to study the effects of increasing burn-up on the safety of SNF, canisters, and casks to inform its regulatory decisions.*

No changes were made to the EIS as a result of these comments.

Comments: (237-2-21) (251-5) (285-5) (285-6) (286-6) (290-6)

D.2.9.25 Transportation of SNF—Infrastructure

The NRC staff received comments expressing concerns about the condition of the transportation infrastructure, including roads, rail lines, and bridges. Commenters requested that the EIS include an evaluation of infrastructure condition and related issues. Some commenters described improvements that have been made to the local rail lines or those in New Mexico. Commenters were concerned about applicable roles and responsibilities, regulations, and oversight to ensure the safety of using the existing infrastructure for the transportation of SNF. Some commenters were concerned about where the funding would come from to upgrade rail lines and whether there were contingencies if upgrades were not made by private railroads. Commenters suggested that the track-inspection protocols should be described in the EIS and suggested a need to halt shipments if conditions are unsafe. Commenters were concerned about the influence of a changing climate on infrastructure including severe weather, heat, and flooding. Concerns were expressed about the potential for infrastructure-related accidents. Some commenters referred to the American Society of Civil Engineers (ASCE) infrastructure report card and its poor ratings as an indication of potential problems for safe transportation of SNF. Other commenters were concerned about road and other infrastructure improvements that might be needed to move SNF from reactor sites without rail access. One commenter disagreed with the NRC staff evaluation under cumulative impacts due to underlying infrastructure concerns.

Response: *The NRC staff is aware of and understands concerns about aging transportation infrastructure, which have been widely reported. While challenges remain in addressing specific parts of the nation's aging infrastructure, the NRC has reasonably concluded that radioactive materials can be transported safely based on existing safety practices and regulations. For the CISF project, Holtec has proposed shipping SNF to and from the CISF nationally by rail, and therefore the remainder of this response is focused on the rail infrastructure. Despite comments to the contrary, the NRC reviewed the latest (2017) ASCE infrastructure report card (ASCE, 2017) and noted improvements to infrastructure and related funding from the prior analysis of the rail infrastructure. The most recent rating (based on a typical best to worst A through F system of grading) for the national rail infrastructure is a B rating. The NRC staff also recognizes that railroads, for example, have track-maintenance and inspection programs* *necessary for continued economic viability, and therefore the NRC staff have reasonably concluded that it is unlikely that the rail infrastructure would be allowed to degrade to a point where safety would be significantly affected. Based on these considerations, the NRC staff determined that a nationwide analysis of infrastructure in the EIS is not needed. Regarding analysis of reactor sites with no rail access, EIS Section 4.3.1.2.2 describes these circumstances and incorporates analysis results from a prior impact analysis. That analysis does not address in detail the infrastructure improvements that would be needed at these sites because such work would be conducted to allow removal of SNF from these sites regardless of whether the proposed CISF project is approved or not. The NRC staff expects that the inspection of the railroad infrastructure would be addressed by the rail industry under DOT oversight. The DOT is currently updating its Safety Compliance Oversight Plan for Rail Transportation of High-Level Radioactive Waste and Spent Nuclear Fuel, and the NRC staff expects that when that plan is available, additional detail on DOT rail infrastructure inspections will be available.*

No changes were made to the EIS as a result of these comments.

Additional information on cost associated with the proposed project are in EIS Chapter 8, and Section 2.20 of this appendix.

Comments: (23-6) (54-14) (65-2) (73-1) (73-2) (75-4) (98-30-14) (98-36-7) (98-38-9) (98-51-3) (99-11-2) (99-35-6) (146-8) (165-2) (167-1-6) (170-13-4) (188-9) (213-2) (213-4) (213-5) (213-6) (213-7) (213-9) (213-10) (213-12) (224-14) (237-2-20) (252-3) (280-9) (307-1-11) (324-1-8) (324-1-11) (324-1-14) (357-7) (364-1-21) (373-18) (375-3-2) (382-6)

D.2.9.26 Transportation of SNF—Infrastructure—Rail Weight Limits

The NRC staff received a comment from NMED that the EIS did not address the weight capacity of existing rail systems or the proposed rail spur. They further noted that the DOT Federal Rail Administration (FRA) had established the S-2043 rail car as the standard and that the EIS failed to incorporate how this standard would be met in transportation planning with the licensee, shipper, and railroad industry. Other commenters expressed concerns about the safety of running heavy loads on railroad tracks.

Response: *The EIS evaluates the potential environmental impacts of the action as proposed by Holtec. The Holtec proposal did not include any commitments to utilize the S-2043 rail car design but also did not rule out the use of that potential option. S-2043 is an AAR rail industry standard for a new railcar and is not required by DOT's FRA. The S-2043 is specifically designed for use in the transportation of heavy SNF cask payloads that would exceed existing railroad industry gross vehicle weight limits for loaded railcars. This rail industry standard was intended to satisfy applicable industry standards and DOT requirements and reduce the potential for derailments by including special requirements for railcar coupling systems, brakes, equipment monitoring, and dynamic load testing.*

The DOE has developed a design and prototype railcar based on the S-2043 standard (AFS, 2018; OFS, 2019). This DOE "Atlas" railcar addressed the extra weight of loaded SNF casks in part by increasing the number of axles to help distribute the load. The DOE development process includes approvals by AAR and FRA (OFS, 2019). As described in EIS Section 3.3.2, the operational details of proposed CISF SNF transportation shipments have not yet been determined and are not known with any certainty. Shippers and carriers are ultimately responsible for ensuring that shipments are configured and routed so that loaded railcars are *appropriately matched with track infrastructure specifications, including weight limits. Ensuring loads do not exceed infrastructure limits is a core function of daily railroad operations that is closely monitored, because it is necessary to ensure safety under FRA oversight and protect shipments and valuable infrastructure.*

No changes were made to the EIS as a result of these comments.

Comments: (99-17-9) (146-7) (322-9) (328-2-8) (364-2-1)

D.2.9.27 Transportation of SNF—Inspections

The NRC staff received a comment that EIS Section 2.2.1.7, addressing the proposed transportation activities, did not address radiological or rail safety inspections of the waste. The commenter noted that some states, including Missouri, have statutes that allow for inspections of shipments that exceed a certain level of radioactivity. They recommended that the EIS include a discussion of how inspections would occur during transit, and how coordination with states that perform inspections would occur. Another commenter suggested the EIS should study locations for stationary dosimeters along the shipment routes, including, but not limited to, areas where the unit train is parked, the yard where the fuel canisters are loaded from the trucks to the train, and side tracks that the unit train could use.

Response: *The roles of the DOT and the NRC in the coregulation of the transportation of radioactive materials are documented in an MOU (44 FR 38690; July 2, 1979). The MOU states, regarding inspections, that each agency will conduct an inspection and enforcement program within its jurisdiction to assure compliance with its requirements. The NRC would assist the DOT, as appropriate, in inspecting shippers of fissile materials and of other radioactive materials in quantities exceeding Type A limits. The DOT and the NRC would consult each other on the results of their respective inspections in the areas where the results are related to the other agency's requirements, and each would take enforcement action as it deems appropriate within the limits of its authority. The NRC would be the lead agency to carry out on-site inspection activities for its licensee-shippers and licensee-shipper-private carriers with respect to the requirements of 10 CFR 71 and 49 CFR. These inspections would be carried out in conjunction with the integrated program of inspection and enforcement for NRC licensees, and principally would involve the shipper type requirements, including those in 49 CFR Parts 171 to 173, and 178 of DOT regulations.*

As also stated in the MOU, DOT is the lead agency to carry out inspection activities concerning carriers and compliance with DOT's mode-specific requirements, including rail, in 49 CFR Part 174. As such, in-transit inspections would generally fall under DOT oversight. States may have additional inspection activities, pursuant to State requirements as the commenter noted. Because inspections are typical governmental activities to verify compliance with regulations, these activities were not described in the EIS in Chapter 2, "Proposed Action and Alternatives," which focuses on the activities Holtec proposed. The NRC staff notes that the radiological impacts to railyard workers and inspectors at stops was included in the SNF transportation impact analysis in EIS Section 4.3.1.2.2.1. The DOT is currently updating its Safety Compliance Oversight Plan for Rail Transportation of High-Level Radioactive Waste and Spent Nuclear Fuel, and the NRC staff expects when that plan is available, additional detail on DOT inspections will be available.

No changes were made to the EIS as a result of these comments.

Comments: (119-3) (213-13)

D.2.9.28 Transportation of SNF—Routing

The NRC staff received comments about the routing of proposed SNF shipments. Commenters expressed concern that the EIS is inadequate because it does not disclose the SNF transportation routes (e.g., road, rail, and waterway) to the proposed Holtec CISF. Some commenters suggested that without actual routes, the SNF transportation risk analysis in the EIS is inadequate. Other comments noted the public cannot adequately comment on the impacts without proposed routes. Some commenters questioned whether only rail transportation would be used for SNF shipments, asked whether agreements were in place, and requested details of the railroads that would be used and whether they could handle the increased loads of SNF shipments. Another commenter referred to the referenced YM EIS and suggested that knowledge of reactor locations and railroad lines should be sufficient to identify routes and such information should be included in the EIS. Another commenter requested using routes that bypass major population centers. A request was made for the NRC to evaluate the vulnerabilities of specific transportation routes based on the quality of the infrastructure and susceptibility to extreme weather associated with global climate change.

Response: *EIS Section 3.3.2 describes that because no arrangements have yet been made regarding which nuclear power plants would ship SNF to the proposed CISF, the exact locations of SNF shipment origins have not been determined. Therefore, the details regarding the specific routes that would be used also are not known at this time. Potential origins of SNF shipments for the proposed action (Phase 1) include existing shut down and decommissioned reactor sites. If the proposed CISF is loaded to full capacity, then it is reasonable to assume that shipments of SNF would come from most or all existing reactor sites nationwide although these sites also have an option to expand existing onsite storage capacity. The exact rail routes for SNF transportation to and from the proposed CISF would be determined in the future, prior to making the shipments, in accordance with the physical security requirements in 10 CFR 73.37, which are further described in NUREG–0561, "Physical Protection of Shipments of Irradiated Reactor Fuel," Revision 2 (NRC, 2013b). To evaluate the potential impacts of these shipments, representative or bounding routes applicable to a national SNF shipping campaign are used. The EIS section further states that maps of representative routes are described in the YM FEIS (DOE, 2008a,c) and in NUREG–2125 (NRC, 2014b). The YM EIS was cited in this context so that individuals interested in potential route-specific details could consult detailed maps and other information documented in that analysis.*

Because arrangements for transportation of SNF and specific route determinations would be made in the future, and there are a variety of options for national SNF transportation routes from existing reactor sites, the EIS analysis considered a bounding representative route based on the longest route evaluated in the SNF transportation risk assessment in NUREG–2125 (NRC, 2014b). Based on the NRC staff's technical knowledge of transportation risk assessment calculations, the NRC staff does not expect that the conclusions of the EIS SNF transportation impact analysis would change if more detailed route information were considered in the analysis. Additional information about the representative route approach and consideration of other modes of transport is provided in other responses within this section. Comments pertaining to infrastructure and other accident scenarios including extreme weather are addressed, respectively, in Sections 2.9.25 and 2.9.19 of this appendix.

No changes were made to the EIS as a result of these comments.

Comments: (90-2) (93-2) (98-37-3) (99-35-1) (109-9) (152-1) (157-3-14) (221-5) (237-2-6) (290-3) (332-8) (339-3)

D.2.9.29 Transportation of SNF—Testing and Certification of Transportation Packages

The NRC staff received comments focused on NRC testing and certification of transportation packages. Some commenters asserted that the review process was flawed or incomplete. Topics of interest among commenters included the applicability of required tests and analyses to real-world conditions; the use of modeling analyses in package certifications; and the publication and availability of NRC cask system certification reviews.

Response: *Concerns about the NRC's safety programs, including the certification of casks systems for transportation, are outside the scope of the EIS. The scope of the EIS includes an evaluation of the potential environmental impacts from the proposed CISF. Transportation cask certification requirements and associated safety concerns are addressed as part of licensing of individual canister and cask designs. If the NRC grants a license for the proposed CISF, the applicant will be required to transport SNF using approved shipping containers. Reevaluation of approved shipping containers is not part of the proposed action. The EIS considered the potential environmental impacts of transportation of SNF based on information about NRC-certified cask systems and expected performance. The NRC documents applicable to cask system certification reviews are available on the NRC website, although proprietary information and some safeguards-related information is not disclosed to the public.*

No changes were made to the EIS as a result of these comments.

Comments: (54-12) (98-28-3) (98-48-6) (99-11-1) (146-10) (167-4-4) (167-9-1) (167-10-1) (170-16-1) (237-2-18) (251-4)

D.2.9.30 Transportation of SNF—Mitigation Measures

The NRC staff received comments recommending specific mitigations to further reduce the likelihood of an accident. A major rail industry association described the safety benefits of using a railcar that is compliant with the AAR S-2043 performance specification and the use of dedicated trains for the transportation of SNF. The noted benefits of the railcar design included better handling characteristics and the ability to use the most current technology available to assist in the prevention of derailments. The commenter noted the S-2043 specification requires on board defect detection systems, which monitor the train for equipment-caused symptoms that are known to cause derailments and alert the train crew of any anomalies before potentially causing a derailment. The commenter stated the use of rail equipment conforming to S-2043 would allow the cars to be interchanged in the North American Rail network under AAR interchange rules and that if Holtec were to attempt to transport SNF and HLRW using equipment not conforming to S-2043, separate agreements would have to be made with each carrier in the transportation route. The commenter further suggested that the use of dedicated trains would eliminate the need for switching railcars and trains at railyards and the associated potential for related accidents as well as the possibility of a derailment of an unrelated car causing an incident or derailment. The commenter described examples of agencies that support the implementation of S-2043 or the use of dedicated trains including DOE and FRA. The commenter described how safety, security, and efficiency would be enhanced by requiring that any new equipment built for the transportation of SNF and HLRW to and from the proposed CISF be transported on dedicated trains meeting S-2043 standards and called on the NRC to require Holtec to meet the commitment to safety exemplified by the railroads and the DOE.

Another commenter was concerned about hazmat fires and noted the National Transportation Safety Board (NTSB) has recommended the replacement of older tanker cars with newer models that have more features to protect against a catastrophic release of hazardous materials. They requested that SNF not share track with other hazardous materials.

Response: *The roles of the DOT and the NRC in the co-regulation of the transportation of radioactive materials are documented in an MOU (44 FR 38690; July 2, 1979). Generally, the DOT is responsible for regulating safety for transportation of all hazardous materials, including radioactive materials, and the NRC is responsible for regulating safety in receipt, possession, use, and transfer of byproducts, source, and special nuclear materials. The NRC reviews and approves or denies package designs for fissile materials and for other radioactive materials (other than low specific-activity materials) in quantities exceeding Type A limits, as defined in 10 CFR Part 71. These NRC requirements are separate from railcar and other railroad safety requirements associated with the transportation of SNF, which are within the purview of the DOT. The NRC also reviews proposed routes for security purposes and physical security plans in accordance with requirements in 10 CFR Part 73, "Physical Security of Plants and Materials."*

According to the MOU, the DOT develops safety standards for several aspects of transportation including the mechanical conditions, construction requirements, and tie-down requirements of carrier equipment; the procedures for loading, unloading, handling, and storage in transit; and any special transport controls (excluding safeguards) necessary for radiation safety during carriage. In contrast, the MOU states that the NRC develops safety standards for design and performance of the above identified packages with respect to structural materials of fabrication, closure devices, structural integrity, criticality control, containment of radioactive material, shielding, generation of internal pressure, internal contamination of packages, protection against internal overheating, and quality assurance. Beyond these, the MOU states that DOT is responsible for the regulation of all other safety requirements. As such, DOT has regulatory authority over rail requirements.

The current action under review is whether to grant a license to Holtec that would authorize Holtec to construct and operate a CISF. In their license application, Holtec did not commit to using S-2043-compliant railcars or dedicated trains, although they did not rule out their use. The license, if granted, does not address the design, certification, or safety of railroad equipment or railroad operations, and the NRC does not have jurisdiction over the means of transport provided that the shipper uses approved licensed containers. Therefore, the NRC staff expect the decisions about these matters would be addressed by shippers and carriers under the oversight of the DOT. If the DOE is the shipper, then the NRC staff expect an S-2043-compliant railcar would be used on a dedicated train. If NRC licensees are shippers, then the specific configuration of shipments is less certain; however, as described in EIS Section 4.3.1.2.2, all shipments must comply with applicable NRC and DOT regulations for the transportation of radioactive materials in 10 CFR 71 and 73 and 49 CFR 107, 32 171–180, and 390–397, as appropriate to the mode of transport. Additionally, NRC certifies SNF packages to maintain safety functions under both normal conditions of transport and hypothetical accident conditions; therefore, safety would be maintained under various transportation conditions.

The NRC staff acknowledge that transportation safety can be further enhanced by using an S-2043-compliant or similar railcar and dedicated trains. Within the context of the EIS, these are considered potential mitigation measures; and in response to these comments, text has been added to the list of mitigations NRC staff identified in EIS Table 6.3-2. Regarding the comment about further limiting the proximity of SNF shipments and flammable hazardous *materials, for similar reasons as stated previously, implementing such measures is beyond NRC jurisdiction. The DOT is currently updating its Safety Compliance Oversight Plan for Rail Transportation of High-Level Radioactive Waste and Spent Nuclear Fuel, and the NRC staff expect when that plan is available, additional detail on related DOT safety measures will be available.*

No changes were made to the EIS as a result of these comments beyond the changes to EIS Table 6.3-2.

Comments: (250-6) (261-1) (261-2) (324-1-15)

D.2.10 Comments Concerning Water Resources

D.2.10.1 Water Resources: General—Groundwater Springs and Wells

The NRC received comments regarding the presence of springs near the proposed project area and the potential for surface contamination to infiltrate and cause both spring and groundwater contamination. One commenter identified a discrepancy between a figure and text within the EIS regarding the presence of a(n) (abandoned) water well. This commenter also requested additional information be added to the EIS to discuss the water quality impacts of the proposed project on the two springs and laguna wetlands and suggested these springs be used as environmental monitoring points. Another commenter questioned if the springs were still flowing, the location of brines near Laguna Gatuna from samples taken in 2007, and whether the brine water could come into contact with the SNF canisters with the potential for corrosion. One commenter, NMED, stated that any release of contaminants to shallow groundwater at the proposed project area could migrate to wells, springs, and playas (lagunas), causing a potential hazard to public health and the environment.

Response: *The NRC staff reviewed the EIS and the available information on the abandoned water well shown in EIS Figure 3.5-5, including the report referenced by Holtec's ER and the New Mexico Office of the State Engineer's (NMOSE's) Point of Diversion database (NMOSE, 2020). The location for this well came from Holtec's ER, which references the ELEA siting study conducted in 2007. According to the ELEA siting study, on March 19, 1968, the location marked was a well within the proposed project area described as an open hole of unknown depth that encountered water at a depth of approximately 76 m [249 ft] below the ground surface; however, as of 1984, it was abandoned. However, the NMOSE database did not show a water well, abandoned or otherwise, at or near the location of the abandoned well shown in EIS Figure 3.5-5 or within the proposed project area. Based on its review, the NRC staff added text to EIS Section 2.2.1.1 stating that there is one abandoned water well within the proposed project area. Because the well has been abandoned for over 30 years, the proposed facility is a passive system with zero effluent, and the presence or absence of the well is not within the footprint of the proposed project activities, the NRC staff conclusions regarding surface water and groundwater remain the same: SMALL.*

As described in EIS Section 3.5.1.1, a brine spring with minimal discharge flows toward Laguna Plata. This has been described as a "seep" by the Center for Excellence in Hazardous Materials Management (CEHMM). In EIS Section 3.5.4.2, the staff references a 2007 water sample taken from a brine spring within the proposed project area that flows into Laguna Gatuna. This spring is also mentioned in EIS Section 3.6.3. Although the Laguna Gatuna spring was flowing sufficiently to provide a water sample in 2007, during the 2018 NRC site visit (ADAMS Accession No. ML18164A217) and the CEHMM 2019 site visit, the spring was not *flowing. Text has been added to EIS Sections 3.5.1.1 and 3.5.4.2 to describe that there is no evidence of the spring flowing in recent years and to state that the spring might intermittently flow into Laguna Gatuna. These additions do not result in any change to the NRC staff's impact determinations.*

As described in EIS Sections 3.5.2.2 and 4.5.2, shallow (alluvial) groundwater at the proposed project area was not encountered above 28.4 m [93.1 ft] and is discontinuous. Because of (i) the adherence to Federal, State, and local rules and regulations, (ii) the discontinuous nature of shallow groundwater at the proposed project area, and (iii) the minimal groundwater discharge via springs in the proposed project area, the NRC staff do not anticipate that groundwater contamination from the proposed CISF project would occur, nor would contamination be anticipated to migrate to water supply wells, springs, or surface water resources (i.e., Laguna Gatuna or Laguna Plata) via spring discharge. Regarding the comment that springs should be monitoring locations, Holtec has not proposed to monitor springs as part of its monitoring program, and NRC regulations do not require use of this location for monitoring.

As described in EIS Sections 4.5.1.1.2 and 4.5.2, the SNF canisters do not contain any material in liquid form and are sealed to prevent any liquids, such as precipitation, stormwater runoff, flooding, or even groundwater seepage (including brine), from contacting the SNF assemblies, resulting in no potential for radiological surface water contamination during normal operations, groundwater radiological contamination via infiltration of contaminated surface water, or radiological groundwater discharge. Potential non-radiological surface water contamination from other activities, such as erosion or leaks and spills of fuels and lubricants, is possible. However, as addressed in EIS Sections 4.4 and 4.5, adverse impacts from these sources, including contaminated infiltration, are expected to be mitigated by adherence to applicable local, State, and Federal regulations, permits, and plans. As described in EIS Sections 4.4 and 4.5, Holtec would obtain a NPDES industrial stormwater permit to address potential impacts on water resources (both surface water and groundwater) and provide mitigation as needed to maintain water quality standards and avoid degradation of water resources at or near the proposed CISF project. As part of the NPDES permit, Holtec would develop a Storm Water Pollution Prevention Plan (SWPPP) that would prescribe BMPs to be employed to reduce impacts to water quality during the license term. As further described in EIS Sections 4.4 and 4.5, Holtec would develop and implement a Spill Prevention Control and Countermeasure (SPCC) Plan to minimize adverse impacts to water resources from leaks and spills of fuels and lubricants from vehicles and equipment. The NPDES permit, SWPPP, and Spill Prevention, Control, and Countermeasure (SPCC) Plan would remain valid throughout all phases of the proposed project. In addition, Holtec would be required to comply with State of New Mexico water quality regulations and standards and to obtain necessary permits for protection of groundwater and surface water in accordance with the New Mexico Administrative Code (NMAC) 20.6.2. For example, as described in EIS Section 4.5.2, Holtec may need to obtain a groundwater discharge permit from NMED for any discharges from the proposed CISF that could directly or indirectly impact groundwater (NMAC 20.6.2.3104).

Comments: (157-1-19) (157-2-11) (237-3-18) (328-2-12) (328-2-13)

D.2.10.2 Water Resources: General—Impacts to Water Resources

The NRC received numerous comments regarding the potential impacts from the proposed CISF project on local, regional, and national groundwater and surface water features. Specifically, several commenters stated that the EIS does not adequately address potential impacts on local lagunas (playas) and aquifers from radiological and non-radiological contamination. One commenter noted that there was a potential impact from mineral extraction altering the surface flow characteristics. A few comments mentioned water-related regulatory requirements, such as the Safe Drinking Water Act and the New Mexico Administrative Code and the applicability of those regulations to the proposed project. One commenter noted that there is a lot of discussion about water resources in the EIS; however, water is not the primary issue, due to the arid climate of the area. Another commenter stated that EPA made comments concerning drainage patterns, floodplains, groundwater characterization, groundwater quality and quantity impacts, mitigation measures, and regulatory and permitting requirements. The same commenter stated that NMED recommended a hydrological study. Another commenter requested that NRC respond to NMED's comments. One commenter stated that the current water quality was already poor and therefore the proposed project should not be allowed to further degrade the water quality in the area. One commenter suggested the NRC staff increase the impact to water resources from small to a larger value. Another commenter was concerned about the impact to drinking water. Several commenters were concerned about the potential for leakage from the proposed CISF. A commenter stated that the NRC staff failed to consider the cultural impacts for generations of New Mexicans due to contamination of drinking water resources.

Response: *The NRC staff carefully evaluated water resources in the area of the proposed CISF, the reasonably foreseeable impacts of the proposed action, and mitigation measures to avoid or reduce potential impacts. In EIS Section 3.5, the NRC staff identified local and regional water resources near the proposed projected area. The NRC staff, in EIS Section 4.5, then evaluated the potential environmental impacts from the proposed CISF project on these water resources. As described in EIS Section 4.5.1, the potential impacts to surface water are primarily from erosion runoff, spills and leaks of fuels and lubricants, or stormwater discharges, and do not include leakage from the spent fuel canisters because there would be no liquid contained in those canisters. As described in EIS Section 4.5.2, the potential impacts to groundwater are primarily from consumptive groundwater use and potential contamination from spills and leaks of fuels and lubricants, and do not include the leakage from spent fuel canister because there is no liquid contained in those canisters. The potential for nonradiological surface water and groundwater contamination would be mitigated by the implementation of and adherence to applicable local, State, and Federal regulations, permits, and plans. As described in EIS Section 4.5, Holtec would obtain a NPDES industrial stormwater permit to address potential impacts on water resources (both surface water and groundwater) and provide mitigation as needed to maintain water quality standards and avoid degradation of water resources at or near the proposed CISF project. As part of the NPDES permit, Holtec would develop a SWPPP that would prescribe BMPs to be employed to reduce impacts to water quality during the license term. As further described in EIS Section 4.5, Holtec would develop and implement a SPCC Plan to minimize adverse impacts to water resources from leaks and spills of fuels and lubricants from vehicles and equipment. The NPDES permit, SWPPP, and SPCC Plan would remain valid throughout all phases of the proposed project. In addition, Holtec would be required to comply with State of New Mexico water quality regulations and standards and to obtain necessary permits for protection of groundwater and surface water in accordance with NMAC 20.6.2. For example, as described in EIS Section 4.5.2, Holtec may need to obtain a groundwater discharge permit from NMED for any discharges from the proposed CISF that could directly or indirectly impact groundwater (NMAC 20.6.2.3104).*

With regards to radiological contamination, the SNF canisters do not contain any material in liquid form and are sealed to prevent any liquids, such as precipitation, stormwater runoff, flooding, or even groundwater seepage, from contacting the SNF assemblies, resulting in no *potential for radiological surface water contamination during normal operations, groundwater radiological contamination via infiltration of contaminated surface water, or radiological groundwater discharge. Based on the design of the SNF assemblies, the proposed CISF project, and the mitigation measures, including the Federal, State, and local rules and regulations, the NRC staff determined that neither local nor regional water supply sources would be adversely impacted by the proposed CISF project.*

As described in EIS Section 4.5 and mentioned previously, Holtec would be subject to applicable Federal, State, and local rules and regulations for the protection of groundwater and surface water quality. The State of New Mexico rules and regulations protecting water resources and stipulating water quality standards for specific uses are set forth in NMAC 20.6.2 administered by NMED. Federal rules and regulations protecting water resources and stipulating water quality standards are set forth in the Clean Water Act and Safe Drinking Water Act administered by EPA. Therefore, the NRC staff concludes that the proposed CISF project would not adversely impact water quality, locally or regionally. Furthermore, the regulation of current water quality of drinking water and mitigation or cessation of groundwater contamination from sources other than the proposed project, such as from oil and gas exploration as discussed in EIS Section 5.5.2, are not within the jurisdiction of the NRC and, therefore, are beyond the scope of this EIS.

With regards to drainage patterns, as described in EIS Sections 3.5.1 and 4.5.1, Holtec stated that Laguna Plata and Laguna Gatuna would receive all runoff from the proposed project and would be able to accept all the runoff from the design storm (24-hour/19-cm [7.5-in]) without overtopping (flooding). Furthermore, as described in EIS Section 4.5.1.1, Holtec has committed to erosion and sediment control BMPs (e.g., sediment fences) to minimize any adverse effects, such as erosion and sedimentation on surface water drainages. Therefore, the NRC staff does not anticipate the proposed project to impact drainage patterns. The NRC's safety evaluation, conducted in parallel with this environmental review and documented in an SER, evaluates the safety of the proposed project, considering factors such as the impact of the local environment on the proposed facility (e.g., the integrity of the facility considering seismic activity, potential flooding). Findings of the safety evaluation are documented in the NRC SER. The NRC would only grant a license for the proposed CISF if it finds that there is reasonable assurance of adequate protection of public health and safety.

The NRC staff compiled all public comments by topic and responded in this appendix to all public comments that EPA and NMED submitted to the NRC regarding the proposed CISF project. One commenter appears to raise a concern regarding EPA comments that were not submitted to the NRC for this project; the NRC staff is not able to address comments unless they have been received. NMED comments regarding water resources included comments pertaining to the hydrological relationship between the lagunas (i.e., Laguna Gatuna and Laguna Plata) and shallow (alluvial) groundwater, which are addressed in Section 2.12.1 [Water Resources: Surface Water—Potential Impacts to the Lagunas] of this appendix. The EPA and NMED comment letters are available in ADAMS using Accession Numbers ML20262G991 and ML20268C322, respectively.

The NRC staff reviewed the public comments, the EIS, and the available information and determined that the determination of a SMALL potential environmental impact on both surface water and groundwater resources for all stages (i.e., construction, operation, and decommissioning) of the proposed CISF project remains appropriate.

No changes were made to the EIS as a result of these comments.

Comments: (93-10) (98-23-11) (98-47-4) (157-3-20) (198-1) (205-1) (215-3) (224-21) (251-15) (269-3) (270-2) (310-5) (310-8) (310-12) (328-1-11) (328-2-10) (329-4) (334-1) (338-2) (339-1) (375-2-8)

D.2.10.3 Water Resources: General—Water Supply

The NRC received comments with concerns regarding the source of water to be used for the proposed CISF and water supply shortages in the region surrounding the proposed project area. Commenters, including NMED, were specifically concerned about the potential for the drinking water supply to decline, the potential for groundwater contamination with respect to groundwater being the water supply for the area, and future water availability of the Ogallala. One commenter asked about the consumptive water the proposed CISF required for onsite concrete fabrication. Another commenter requested clarification in the EIS on the possible water lines that Holtec is proposing to use, the source of potable water, and the construction of proposed water lines for use in project activities.

Response: *As described in EIS Section 4.5, the NRC staff assessed the potential impacts of the construction, operation, and decommissioning of the proposed CISF project on water resources, including water supply and water quality in the area of the proposed project, and determined the primary impact to groundwater resources would be from consumptive groundwater use. The peak rate of consumptive groundwater use at any point of the proposed CISF project (Phases 1-20) is estimated to be no greater than 114 liters per minute (Lpm) [30 gallons per minute (gpm)]. This peak water usage accounts for the overlap between operation of initial phases and construction of subsequent phases. As described in EIS Section 4.5.2.1.1, construction of the proposed action (Phase 1) would require the largest volume of water for the proposed CISF project. The bounding value for the total volume of water (including water required for cement mixing) that may be consumed was calculated by extrapolating over the 2-year construction stage for the proposed action (Phase 1) and is 119,376,746 L [31,536,000 gal]. As further described in EIS Section 4.5.2.1.1, Holtec received a letter from the Double Eagle potable water system, which would supply water for the proposed CISF, stating that their system has a supply capacity greater than 7,570 Lpm [2,000 gpm], which greatly exceeds the expected construction stage water demands of all support buildings, along with the concrete batch plant. To help mitigate any potential strain on the water system from consumptive use, Holtec has proposed utilizing water storage tanks.*

In New Mexico, water rights are regulated through the NMOSE, who is responsible for administering available water supply, preventing waste, and ensuring that water is available for the future. The City of Carlsbad provides water for customers in accordance with City of Carlsbad's water rights and the water permits the NMOSE issues. With regards to the future availability of water from the Ogallala Aquifer, in a letter to Holtec, the City of Carlsbad confirmed that the Double Eagle Water System, which withdraws water from the Ogallala Aquifer as well as from the Capital Reef Aquifer, would be able to provide sufficient water to the proposed CISF project (Holtec, 2020b). As described previously, the Double Eagle potable water system, which would supply water for the proposed CISF, stated that their system has a supply capacity greater than 7,570 Lpm [2,000 gpm], which greatly exceeds the peak rate of consumptive groundwater use at any point of the proposed CISF project (Phases 1-20), which is estimated to be no greater than 114 Lpm [30 gpm] (Double Eagle Water Supply, 2021). Holtec would be responsible for procuring the water supply and any necessary permits, and would be subject to all applicable Federal, State, and local rules and regulations regarding the purchasing, pumping, treating, storing, using, and disposing of potable and non-potable water.

As described in EIS Section 4.4.1.2, the subsurface geologic conditions at the proposed project area are not conductive to karst development or subsidence, and the proposed project would be required to be designed and operated in such a way that it can safely withstand seismic events, such as earthquakes, limiting the potential for groundwater contamination from the proposed project. Furthermore, as described in EIS Section 4.5.2, the SNF canisters do not contain any material in liquid form and are sealed to prevent any liquids, such as precipitation, stormwater runoff, flooding, or even groundwater seepage, from contacting the SNF assemblies, resulting in no potential for radiological groundwater or aquifer contamination during normal operations. Limited potential groundwater contamination from other non-radiological operations activities, such as the infiltration of water contaminated by leaks and spills of fuels and lubricants is possible. However, contamination is expected to be mitigated by adherence to applicable local, State, and Federal regulations, permits, and plans, such as an NPDES industrial stormwater permit, SPCC plan, and a NMED groundwater discharge permit, if required.

Water for the proposed CISF project will be supplied by the City of Carlsbad Water Department, which withdraws water from the Capital Reef Aquifer and from the Ogallala Aquifer via the Double Eagle Water System. Potable water will be supplied via the existing water supply pipeline currently in place at the proposed project area with the potential for an additional water supply line with potable or non-potable from the City of Carlsbad's Double Eagle Water System. Should the new water line be constructed, it would be placed along the rail right-of-way to minimize ground disturbance. Although the Double Eagle Water System website states that the system only provides non-treated (non-potable) water to customers, on December 1, 2020, the NRC staff confirmed in a phone call with Ron Myers, Director of Utilities for the City of Carlsbad, that the Double Eagle Water System does provide potable water to certain service areas. Because the proposed project has not been licensed and construction has not started, it has not been determined whether the project will receive potable or non-potable water from the Double Eagle Water System (Double Eagle Water Supply, 2021). Concrete manufacturing can use non-potable water for concrete mixing. However, because having a useable water source would be needed for a fully functional CISF, the NRC staff anticipate that Holtec would utilize and/or construct any water supply lines needed, and that placement of these water lines would abide by and be constructed to meet all State of New Mexico guidelines and regulations and would be collocated along the rail line.

No edits were made to the EIS in response to these comments.

Comments: (91-4) (98-14-3) (98-21-3) (99-35-5) (151-9) (157-2-1) (329-6) (368-5) (377-2) (377-3) (377-4)

D.2.11 Comments Concerning Groundwater

D.2.11.1 Water Resources: Groundwater/Aquifers—Groundwater and Aquifer Impacts from the Proposed CISF Project

The NRC received several comments about the potential impacts the proposed CISF project could have on groundwater resources, specifically local aquifers as well as the Ogallala Aquifer. Commenters expressed concern about a lack of protection of groundwater resources, with several commenters specifically mentioning both radiological and nonradiological contamination and the potential migration of contaminants via prevailing weather patterns and karst conduits. One commenter stated that the proposed project area is located over a perched aquifer with variable water levels. Another commenter questioned the EIS analysis and inquired about the NMED and EPA reviews. A couple commenters had specific concern about the potential contamination of the Ogallala Aquifer. One commenter provided a citation to the location of aquifers in the region. One commenter also used the subsurface characteristic of the Waste Isolation Pilot Plant (WIPP) site to state that human error at the proposed CISF could result in large scale contamination. Two commenters stated that there was an aquifer in the nearby grasslands. One commenter stated that there are no aquifers in the area to contaminate.

Response: *EIS Section 3.5 describes and characterizes potentially impacted water resources in the region and vicinity of the proposed CISF, including the Ogallala Aquifer. As described in EIS Section 3.5.2.2, the Ogallala Aquifer is not present beneath the proposed CISF project area and the Ogallala Formation (i.e., the stratigraphic formation that, where saturated, forms the Ogallala Aquifer) has been mostly stripped away in southern Lea County, which is where the proposed project would be located. Groundwater is the primary source of water in the vicinity of the proposed project area and generally comes from wells drilled in the Dockum Group and the Quaternary alluvium. In the proposed project area, groundwater in the Dockum Group is saturated at depths of 76 to 126 m [250 to 415 ft] below ground surface and flows to the southwest, away from the Ogallala Aquifer. One commenter stated the proposed project is above a major aquifer and provided a link to a Texas Water Development Board map. The NRC staff reviewed the map; however, the map was of Texas and did not include the proposed project area, which is in Lea County, New Mexico. The aquifers present at the proposed facility do not include the aquifer associated with the Otera Mesa grasslands. Therefore, the NRC staff did not evaluate an impact to that aquifer in the EIS.*

Regarding the presence of a perched aquifer and potential to encounter groundwater from proposed project activities, the NRC staff acknowledged in EIS Section 4.5.2.1.1 that the water level in the near surface water table (alluvial aquifers) at the proposed project area could be directly impacted by infiltration at nearby playa lakes (i.e., Laguna Plata and Laguna Gatuna) and thereby an increase in infiltration could cause a decrease in the depth to groundwater where alluvial groundwater is present. However, as also described in EIS Sections 3.5.1.1 and 4.5.2.1, precipitation infiltration from Laguna Plata and Laguna Gatuna is limited by the amount of precipitation and the evaporation rate of the area. Furthermore, as described in EIS Sections 3.5.2.2 and 4.5.2, groundwater at the proposed project site was not encountered above 28.4 m [93.1 ft] and was found to be discontinuous. Therefore, due to the discontinuous presence and the depth of groundwater at the proposed CISF as compared to the maximum depth of excavation for the proposed CISF project {7.6 m [25 ft]}, in addition to the limited infiltration of surface water, the NRC staff does not anticipate groundwater to be encountered.

Because the SNF canisters contain no liquid component and are sealed to prevent any liquids from contacting the SNF assemblies, there is no potential for radiological contamination of underlying groundwater or aquifers via a liquid pathway (such as a leaking canister). As detailed in EIS Section 4.5, the NRC staff expects the potential adverse impacts to surface water and groundwater resources to be mitigated by adherence to applicable local, State, and Federal regulations, permits, and plans. As described in EIS Section 4.5, Holtec would obtain a NPDES industrial stormwater permit to address potential impacts on water resources (both surface water and groundwater) and provide mitigation as needed to maintain water quality standards and avoid degradation of water resources at or near the proposed CISF project. As part of the NPDES permit, Holtec would develop a SWPPP that would prescribe best management practices (BMP)s to be employed to reduce impacts to water quality during the license term. As further described in EIS Section 4.5, Holtec would develop and implement a SPCC Plan to minimize adverse impacts to water resources from leaks and spills of fuels and lubricants from vehicles and equipment. The NPDES permit, SWPPP, and SPCC Plan would remain valid throughout all phases of the proposed project. In addition, Holtec would be *required to comply with State of New Mexico water quality regulations and standards and to obtain necessary permits for protection of groundwater and surface water in accordance with NMAC 20.6.2. For example, as described in EIS Section 4.5.2, Holtec may need to obtain a groundwater discharge permit from NMED for any discharges from the proposed CISF that could directly or indirectly impact groundwater (NMAC 20.6.2.3104). The NRC staff expects these regulatory protective and mitigation measures are adequate to reasonably control the migration of any contaminants contained in erosion runoff or a spill or leak of fuels or lubricants into local or regional water supply sources, including via karst conduits. In addition to being described in EIS Sections 4.4 and 4.5, mitigation measures for water resources are discussed in EIS Chapter 6. The NRC safety evaluation has not identified any credible accidents that could result in a radiological release. For additional information on accidents, see EIS Section 4.15 and Section 2.25 [Comments Concerning Accidents] of this appendix.*

Both EPA and NMED have submitted public comments that are available in ADAMS using Accession Numbers ML20262G991 and ML20268C322, respectively. The NRC staff reviewed and provided responses to those comments throughout this appendix and provided edits and clarifying and supplemental information in the EIS, as appropriate.

No changes were made to the EIS as a result of these comments.

Additional responses to comments regarding karst development can be found in Section 2.13.2 [Geology and Soil Resources—Sinkholes and Subsidence] of this appendix. Additional responses to comments on groundwater characterization can be found in Section 2.11.2 [Water Resources: Groundwater/Aquifers—Groundwater Characterization] of this appendix.

Comments: (22-9) (98-45-5) (109-20) (136-4) (137-2) (146-15) (169-6-1) (170-2-4) (172-7) (224-19) (224-27) (244-2) (289-5) (290-9) (310-11) (315-6) (319-16) (342-1) (378-17) (379-10) (379-12) (379-13) (379-14) (380-3) (380-19) (380-23) (395-4)

D.2.11.2 Water Resources: Groundwater/Aquifers—Groundwater Characterization

The NRC staff received numerous comments stating that the EIS does not adequately characterize groundwater resources at and near the proposed CISF. Several commenters stated that the EIS is inconsistent in describing the presence of groundwater at the proposed location, including shallow alluvial groundwater and groundwater under artesian pressure. Commenters also requested additional boreholes and groundwater monitoring wells to be drilled to provide data for more sufficient characterization of the lithology, groundwater presence, and water quality at the proposed CISF. One commenter questioned whether there was potable water present at the proposed project area. NMED stated that potable groundwater has existed within 9.6 km [6 mi] of the proposed CISF project area as confirmed by historical chemical analyses demonstrating that two such wells, located near Halfway southwest of the proposed site, produced freshwater. NMED further stated that a complete hydrologic conceptual model of the proposed project area should be developed for the EIS to sufficiently characterize the site, including a description of the hydraulic relationship between shallow groundwater, springs, and local playas. NMED further commented that the EIS is inconsistent in describing groundwater resources in the area and onsite at the proposed CISF. NMED also stated that the EIS should address the impact on the proposed CISF of groundwater accumulation in the alluvium.

Response: *The NRC staff reviewed the source materials used to describe groundwater resources at the proposed project area as well as the EIS characterization of groundwater presence and quality to ensure consistency throughout the EIS. The NRC staff also verified EIS* *data with the NMOSE's Point of Diversion database (NMOSE, 2020) to ensure the description of local groundwater use in the EIS was accurate and up to date. However, the NMOSE data did not provide any additional information regarding the presence of groundwater near or at the proposed project area. As described in EIS Section 3.5.2, shallow (alluvial) groundwater is discontinuous in the vicinity and beneath the proposed CISF. The alluvial groundwater in the vicinity of the proposed project {within 10 km [6 mi]}, as noted in EIS Sections 3.5.3.2 and 3.5.3.3, is used primarily for stock watering due to its poor quality. With regards to the depth of groundwater at the site, as shown in EIS Figure 3.5-5, groundwater levels in some alluvial wells near the proposed project area occurs at depths less than the maximum excavation of the proposed project {7.6 m [25 ft]}. However, as described in EIS Section 4.5.2, shallow groundwater at the proposed project site, specifically where the project would be constructed, was not encountered above 28.4 m [93.1 ft] and was found to be discontinuous. Due to the discontinuous nature and the depth of groundwater at the proposed CISF as compared to the depth of excavation, the NRC staff do not anticipate that groundwater would be encountered during construction of the facility.*

One commenter mentioned a water table approximately 10.4 m [34 ft] below the proposed project area. Well ELEA-2 was drilled, within the proposed project area, to a depth of 30 m [100 ft] into the Dockum Group. Over several days, water rose in ELEA-2 to a depth of 10.4 m [34 ft] below the ground surface due to artesian pressure (i.e., pressure in a confined aquifer that causes water in a well to rise above the top of the aquifer). Because of the artesian pressure, the water level in the well is not indicative of the depth to water at that location. As described in EIS Section 3.5.2.2, lithologic characterization indicated that the water-bearing zone in the Dockum Group in this well consists of either fractures or sandy zones between the depths of 25.9 to 30 m [85 to 100 ft].

With regards to the presence of potable water at the proposed project area, the NRC staff acknowledges that wells completed in Quaternary and Triassic formations within a 10 km [6 mi] radius of the proposed project area have been reported to produce freshwater. As shown in EIS Figure 3.5-5, a well completed in Quaternary deposits approximately 3.2 km [2 mi] southwest of the proposed project area is reported to have produced freshwater. In addition, as shown in EIS Figure 3.5-6, a BLM test well completed in Triassic deposits approximately 6.4 km [2 mi] southwest of the proposed project area is reported to have produced groundwater with a total dissolved solids (TDS) concentration of 424 mg/l [424 ppm]. Regarding NMED's comment about freshwater measured in wells at Halfway, New Mexico, the NRC staff located a report by Kelly (1984) that documents chemical analyses of water from wells at Halfway, New Mexico, which is located approximately 3.2 km [2 mi] southwest of the proposed project area. The chemical analyses were conducted in 1969 and the only constituents measured were chloride {362 mg/l [362 ppm]} and sulfate {309 mg/l [309 ppm]} (Kelly 1984, Appendix B). In addition, the wells at Halfway, New Mexico, were reported to be abandoned (Kelly, 1984). Based on chemical analyses of waters from wells (including those at Halfway) and springs in the areas of the Salt Lakes in western Lea County, New Mexico, which include Laguna Gatuna, Laguna Plata, and Laguna Totson, the report stated that there is very little potable water in the area of the Salt Lakes. The NRC staff revised text in EIS Sections 3.5.3.2, 4.5.1.1, 4.11.1.1, and 5.5.2 to state that very little potable water exists in the vicinity {i.e., within 10 km [6 mi]} of the proposed CISF project area. The NRC staff also added text in EIS Section 3.5.4.2 describing the chemical analyses of water from the wells at Halfway, New Mexico, as documented in the report by Kelly (1984). The impact determinations in the EIS are not affected by this information.

The NRC staff did not identify any other discrepancies in the EIS regarding the characterization of groundwater presence, quality, or use near the proposed project area. The NRC staff note that the descriptions of the previously mentioned characteristics do vary within the EIS; however, the variance is between the description of regional characteristics and local characteristics (e.g., those on or within very close proximity to the proposed project area).

Regarding concerns about potential groundwater contamination, the robust design and construction of the SNF storage systems and environmental monitoring measures described in EIS Chapter 7 make the potential for a release of radiological material from the proposed CISF project unlikely. As described in EIS Section 4.5.2, the SNF canisters do not contain any material in liquid form and are sealed to prevent any liquids, such as precipitation, stormwater runoff, flooding, or even groundwater seepage, from contacting the SNF assemblies, resulting in no potential for radiological contamination of groundwater or nearby surface water; therefore, there is no need for a groundwater monitoring program. Furthermore, a complete hydrologic conceptual model is neither a regulatory requirement nor is it necessary to reasonably assess impacts to groundwater resources. Additional responses to comments regarding groundwater monitoring can be found in Section 2.11.3 [Water Resources: Groundwater/Aquifers—Groundwater Monitoring] of this appendix.

Comments: (170-15-3) (224-22) (237-3-11) (237-3-14) (237-3-16) (310-1) (310-2) (310-7) (310-9) (328-1-9) (328-1-12) (328-1-15) (375-1-6) (375-2-3) (378-15) (378-16) (380-25)

D.2.11.3 Water Resources: Groundwater/Aquifers—Groundwater Monitoring

The NRC staff received comments expressing concern over the lack of groundwater monitoring in the EIS, including determination of background groundwater constituent concentrations and installation of monitoring wells. NMED raised concerns that the EIS does not discuss the background groundwater monitoring that Holtec stated it would complete prior to construction of the proposed facility in Appendix J of their ER. NMED also stated that data from these monitoring wells are necessary for the adequate characterization of groundwater and surrounding lithology.

Response*: EIS Sections 3.5 and 4.5.2 describe and EIS Figure 3.5-5 depicts the discontinuous nature of shallow groundwater at the proposed project area. As detailed in EIS Section 3.5.2.2, two groundwater investigations were conducted at the proposed project area, one in 2007 by ELEA, and the second in 2017 by GEI Consultants (ELEA, 2007; GEI Consultants, 2017). Two wells were drilled and monitored in 2007, and three wells were drilled and monitored in 2017. One of the 2007 wells (ELEA-2) and two of the 2017 wells [B170(MW) and B101(MW)] showed evidence of groundwater. The shallowest depth to groundwater at the proposed project site was 28.4 m [93.1 ft]. Due to the discontinuous nature and the depth of the shallow groundwater compared to the depth of the proposed CISF {7.6 m [25 ft]}, the NRC staff does not anticipate that the groundwater would be adversely impacted due the construction or operation of the facility. Therefore, the NRC staff concludes that additional hydrogeologic characterization, including groundwater monitoring data, is not needed to support its impact determination in the EIS.*

The NRC staff acknowledges Holtec's statement that it will perform a baseline groundwater monitoring, sampling, and testing program prior to construction and/or significant site disturbance associated with the proposed CISF. The details of this program, including well locations, are described in Appendix J of Holtec's ER. The groundwater sampling program, as proposed by Holtec, will include 14 principal aquifer wells screened in the Santa Rosa

Formation to provide primary baseline groundwater sampling results, six aquifer wells screened in the Chinle Formation to identify potential discontinuous aquifers, and nine shallow aquifer wells screened in soil or the upper Chinle Formation to identify if there is a connection between shallow groundwater at the site and the playa lakes. Soil sampling and rock coring would be performed during construction of each well to characterize soil and sediment lithologic properties. Groundwater quality sampling and testing with concurrent groundwater level measurements would be performed quarterly. The NRC staff added text to EIS Section 4.5.2.1.1 to describe the proposed baseline groundwater monitoring, sampling, and testing program.

With regards to groundwater monitoring during normal operations, as described in EIS Section 4.5.2.1.2, impacts to groundwater from potential radiological contamination is unlikely because of the design and construction of the SNF storage systems. The SNF canisters do not contain any material in liquid form and the SNF transportation and storage canisters are sealed to prevent any liquids from contacting the SNF assemblies, resulting in no potential for radiological groundwater contamination during normal operations. Potential groundwater contamination from non-radiological operations activities, such as the infiltration of water contaminated by leaks or spills of fuels and lubricants is possible. However, as described in EIS Section 4.5, contamination is expected to be mitigated by adherence to applicable local, State, and Federal regulations, permits, and plans, such as an NPDES industrial stormwater permit, SWPPP, and SPCC Plan. In addition, as described in EIS Section 4.5.2, Holtec may need to obtain a groundwater discharge permit from NMED for any discharges from the proposed CISF that could directly or indirectly impact groundwater (NMAC 20.6.2.3104).

Comments: (224-20) (224-23) (310-3) (310-10) (328-1-13) (328-3-1)

D.2.11.4 Water Resources: Groundwater/Aquifers—Hydrologic Connection of Surface Water and Groundwater

The NRC staff received comments regarding a hydrologic connection between groundwater and surface water, such as Laguna Gatuna and Laguna Plata, at and near the proposed CISF project site. Several commenters, including NMED, expressed concern regarding impacts to groundwater (i.e., groundwater recharge) from infiltration of surface water. One commenter questioned the impact surface water infiltration, especially during flash floods, would have on groundwater levels. Another commenter expressed concerns over karst formations regarding the connection to local playas, and the potential to facilitate hydrologic connections between groundwater and surface water features. NMED also stated that the Holtec ER was incorrect and contradicted information in the EIS concerning precipitation infiltration, groundwater recharge, and playa water loss mechanisms.

Response: *As described in EIS Section 3.5.2.2, groundwater in the Quaternary alluvium within and in the vicinity of the proposed project area occurs by infiltration along stream channels or on the flanks of the playas. As described in EIS Section 3.5.1.1, precipitation infiltration can occur in both Laguna Plata and Laguna Gatuna, but is minimal due to the rapid rate of evaporation, which is the primary mechanism for water loss in the lagunas. The NRC staff clarified text in EIS Sections 3.6.3 and 5.5.1 to reflect that evaporation is not the only mechanism of water loss in Laguna Gatuna. As further described in EIS Section 4.5.2.1.1, because groundwater occurs in monitoring well ELEA-2, which is close to Laguna Gatuna, it has been hypothesized that the water level in the playa lakes controls the near surface water table at the proposed project area. As described in Section 2.11.3 [Water Resources: Groundwater/Aquifers—Groundwater Monitoring] of this appendix, Holtec will perform a baseline groundwater monitoring, sampling,* *and testing program prior to construction and or significant site disturbance associated with the proposed CISF. The groundwater sampling program, as Holtec proposed, will include the installation of shallow aquifer wells screened in the soil or the upper Chinle Formation to further identify if there is a connection between shallow groundwater at the site and the playa lakes.*

As described in EIS Section 3.5.2.1, due to the semiarid climate in the region of the proposed project area, recharge by infiltration from precipitation is significant only during intense rainfall events (storms) of long duration and frequent occurrence. As described in EIS Section 4.5.1.1.1, based on a flooding analysis for full build-out (Phases 1-20), Holtec concluded that both Laguna Plata and Laguna Gatuna would be able to accept runoff from a 24-hour/19-cm [7.5-in] storm event with excess freeboard. As part of its safety review conducted in parallel with the EIS, the NRC staff evaluates the potential for natural external events, including flooding, to adversely impact the proposed CISF. Findings of the evaluation will be documented in the NRC SER. NRC would grant a license for the proposed CISF only if there is sufficient basis to find that there is reasonable assurance of adequate protection of public health and safety.

As described in EIS Section 4.5.2.1, infiltration of stormwater runoff and leaks and spills of fuels and lubricants can potentially affect the groundwater quality of near-surface aquifers during all phases of the proposed CISF project. Potential contamination from infiltration of stormwater runoff and leaks and spills of fuels and lubricants is expected to be mitigated by adherence to applicable local, State, and Federal regulations, permits, and plans, such as a NPDES industrial stormwater permit, SPCC Plan, and a NMED groundwater discharge permit, if required. As described in EIS Section 4.5.2.1, a NPDES permit would set limits on the amounts of pollutants entering ephemeral drainages that may be in hydraulic communication with alluvial aquifers at the proposed project. The NPDES permit and associated SWPPP would specify additional mitigation measures and BMPs that Holtec would implement to prevent and clean up spills. Holtec may also need to obtain a NMED groundwater discharge permit, which would further limit the amounts of pollutants allowed to infiltrate into groundwater.

The NRC staff evaluated the potential for karst features to be present at the proposed project area in EIS Section 4.4.1.2. The NRC staff determined that subsurface geologic conditions at the proposed project area are not conducive to karst development or subsidence because no thick sections of soluble rocks are present at or near the ground surface. The shallowest formation containing relatively thick soluble materials (i.e., gypsum and halite) is the Rustler Formation, which is located over 305 m [1,000 ft] below the depth of the proposed CISF design and is unlikely to be impacted by the proposed CISF project. Additional information on responses to comments concerning karst development at the proposed site can be found in Section 2.13.2 [Geology and Soil Resources—Sinkholes and Subsidence] of this appendix.

In response to the comment from NMED about information in the ER that is incorrect and that it contradicts information in the EIS, the NRC staff did not base its description of the affected environment and impact assessment of the proposed CISF project solely on information from Holtec's ER. As described in Section 2.1.3 [NEPA Process: General—Adequacy of Information and/or Analyses] of this appendix, the NRC staff independently reviewed and evaluated the information and analyses provided in the applicant's license application, ER, SAR, and applicant responses to requests for additional information prepared and submitted by the NRC staff. In addition, the NRC staff independently collected and reviewed additional information related to the proposed CISF project and its environs. The NRC analyses in the EIS use both applicant and independently sourced information to reach evaluation conclusions. Documents relied upon for the NRC's analysis are publicly available and cited in the EIS.

No changes were made to the EIS as a result of these comments.

Comments: (237-3-17) (310-4) (310-13) (310-15) (328-1-10) (328-1-14) (328-1-16) (379-11)

D.2.11.5 Water Resources: Groundwater/Aquifers—References Used in the EIS

One commenter expressed concerns regarding the references used to characterize regional groundwater resources. Specifically, the commenter was concerned about the age of references and requested more recent sources of information to describe and evaluate transient conditions, including groundwater presence, quality, and development. The commenter suggested using the Texas Water Development Board’s 2016 Report as a source of information for the description of the Capitan Aquifer.

Response: *The NRC staff reviewed the Texas Water Development Board Report the commenter referenced and noted that the report characterizes and describes the portion of Capitan Reef Complex Aquifer in Texas but does not address the portion in New Mexico where the proposed project is located. The NRC staff perform due diligence in the gathering of information when characterizing and evaluating all resources areas. For water resources, the NRC staff reviewed information from the Holtec application, RAI responses, and independent resources (both historic data and recent studies) to establish credible and applicable references. Factors such as the date of publication, concurrence with similar studies, and geospatial relevance were used to determine what references were used. The NRC staff determined that references contained in the EIS are both credible and applicable to the proposed project area.*

No changes were made to the EIS as a result of these comments.

Comments: (157-2-10) (157-2-13)

D.2.12 Comments Concerning Surface Water

D.2.12.1 Water Resources: Surface Water—Potential Impacts to the Lagunas

The NRC staff received comments about the impacts the proposed CISF project could have on lagunas, specifically Laguna Gatuna and Laguna Plata. Some commenters expressed concerns over the lagunas becoming radiologically contaminated. Other commenters expressed concern over general laguna nonradiological contamination and degradation, including potential adverse impacts to the local ecology. One commenter asked about a water quality sample taken from Laguna Gatuna. NMED stated that the EIS should include additional detail on the impacts to the playas from significant storm events and stormwater runoff. NMED further questioned whether stormwater and industrial wastewater would be discharged to the lagunas. NMED also stated that Laguna Plata would receive all impacted stormwater from the proposed project but also stated that the EIS was inconsistent regarding which laguna would receive stormwater runoff. NMED and other commenters made comments regarding regulatory processes, such as obtaining Section 401 Certification, discharging water to the lagunas, the designation of Laguna Gatuna and Laguna Plata as Waters of the United States, the designation and protection of playas as Waters of the State, and the applicability of NMAC 20.6.2 and 20.6.4. One commenter said that there are at least 20 circular playas within the area of the proposed project and implied that they are protected waters.

Response: *The NRC staff carefully evaluated water resources in the area of the proposed CISF, the reasonably foreseeable impacts of the proposed action, and mitigation measures to avoid or reduce potential impacts. As described in EIS Section 3.5.1.1, surface water features near the proposed project area include Laguna Plata and Laguna Gatuna. The EIS also notes that NMED identified approximately 20 circular playas within or adjacent to the proposed project footprint. However, NRC reviewed references, including two ecological surveys of the area, which did not confirm these playas. Water quality in Laguna Gatuna and Laguna Plata, when present, is described in EIS Sections 3.5.1.3, 3.6.3, and 4.5.1 and is characterized as highly mineralized and not suitable as drinking water or favorable for the development of aquatic or riparian habitat. In 2007, water samples taken from Laguna Gatuna showed TDS concentrations of up to 300,000 mg/L [300,000 ppm], which classifies the water as brackish {TDS > 10,000 mg/L [10,000 ppm]} and non-potable {TDS > 500 mg/L [500 ppm]}. As described throughout the EIS, specifically in EIS Sections 3.5.1.4 and 4.5.1.1.1, both Laguna Plata and Laguna Gatuna would receive runoff from the proposed project area and a flooding analysis performed by Holtec concluded that the lagunas would be able to accept runoff from a 24-hour/19-cm [7.5-in] storm event with excess freeboard. The USACE determined there are no jurisdictional wetlands present at the proposed CISF, nor are there any which would receive runoff or otherwise be impacted by the proposed project; therefore, Section 401 certification would not be required (USACE, 2021).*

As described in EIS Section 4.5.1.1.2, the SNF canisters do not contain any material in liquid form and are sealed to prevent any liquids, such as precipitation, stormwater runoff, flooding, or even groundwater seepage, from contacting the SNF assemblies, resulting in no potential of radiological surface water contamination during normal operations. Potential non-radiological surface water contamination from other activities, such as leaks or spills of fuels and lubricants or erosion, is possible. However, as addressed in EIS Sections 4.4.1 and 4.5.1, adverse impacts from these sources are expected to be mitigated by adherence to applicable local, State, and Federal regulations, permits, and plans, such as an NPDES industrial stormwater permit, SPCC Plan, and SWPPP BMP implementation. In addition to being described in EIS Sections 4.4 and 4.5, mitigation measures are discussed in EIS Chapter 6.

In evaluating potential nonradiological environmental impacts, the NRC considers applicable local, State, and Federal rules and regulations. The handling of all nonradiological waste generated by the proposed project, including any sanitary waste and industrial wastewater, would be dispositioned according to applicable State and Federal rules and regulations and therefore are not anticipated by the NRC staff to impact local water resources. As noted above, all stormwater and discharges to water resources will be subject to applicable local, State, and Federal rules and regulations, including NPDES permit requirements and any required NMED permits or standards, such as those contained in NMAC 20.6, if applicable.

The NRC staff have added text to EIS Section 3.5.1 to include a description of Waters of the State and their protections under the State of New Mexico as well as adding a reference to NMAC 20.6.4 in EIS Section 4.5.1.1 to emphasize New Mexico water rules and regulations. The NRC staff have also added a reference to the SPCC Plan in EIS Section 4.5.1.1.1 to ensure consistency in describing what plans Holtec will develop and implement to protect water resources.

Comments: (99-31-8) (168-2-7) (240-3-14) (310-18) (310-19) (328-1-17) (328-1-19) (328-3-5) (378-12) (378-13) (378-14) (404-1)

D.2.12.2 Water Resources: Surface Water—Precipitation, Runoff, and Flooding

The NRC received several comments regarding the characterization of local precipitation events and the potential impact of stormwater runoff from the proposed CISF project on Laguna Gatuna, Laguna Plata, and local floodplains. The commenters were concerned about increased stormwater runoff and its potential to change surface water flow paths. The commenters also noted concerns about impacts from current and future storms influenced by climate change on floodplains and flooding, especially on the flooding of Laguna Gatuna and Laguna Plata. Several commenters requested additional floodplain analyses to be included in the EIS. One commenter cited the FEMA National Flood Hazard Map's designation of the proposed project area as an area of undetermined but possible flood hazard. Another commenter stated that adverse impacts would only occur in the case of major flooding events. NMED commented that the EIS does not account for seasonal variations in the lagunas and subsequent infiltration.

Response: *In EIS Section 3.5.1, the NRC staff identified local and regional surface water features and watersheds and checked for the presence of any nearby floodplains. As described in EIS Section 4.5.1, the NRC staff then evaluated the impact of the proposed CISF project on the nearby surface water resources identified in EIS Section 3.5.1. As described in EIS Sections 3.5.1 and 3.7.1, the proposed project area is in a semi-arid climate with precipitation events usually in the form of erratic, unpredictable, and sometime violent thunderstorms that can leave several centimeters [inches] of rain in Laguna Gatuna and Laguna Plata in relatively short periods of time. These storms can occur at any point in the year but are most likely to occur in the summer, specifically during the area's wettest months of July and August. The lagunas are typically dry, but when precipitation events occur, infiltration is limited by the rapid rate of evaporation.*

With regards to stormwater runoff and its potential to change surface water flow paths, as described in EIS Section 4.5.1.1.1, Holtec has committed to BMPs (e.g., sediment fences) to minimize any adverse effects, such as erosion and sedimentation, on nearby surface water drainages.

Holtec conducted an analysis to evaluate the potential effects of rainfall-induced stormwater runoff at the proposed CISF project site. The Holtec analysis used a 24-hour/19-cm [7.5-in] storm event, which equates to approximately a 200-year storm (i.e., a storm so large it would only be expected to occur once every 200 years) (NOAA, 2017), and accounted for surface water flow paths and increased stormwater runoff from the proposed CISF. As described in EIS Sections 3.5.1 and 4.5.1, Laguna Plata and Laguna Gatuna would receive all runoff from the proposed project and, according to Holtec's analysis, would be able to accept all the runoff from the design storm {24-hour/19-cm [7.5-in]} without overtopping (flooding). The NRC staff reviewed the FEMA flood hazard designation of the area. FEMA designated the proposed project area as an area of undetermined flood hazard (FEMA, 2020). Therefore, this information does not contradict the EIS or provide additional information regarding floodplains at or near the proposed project area. As part of its safety review conducted in parallel with the EIS, the NRC staff evaluate the potential for natural external events, including flooding, to adversely impact the proposed CISF. Findings of the evaluation are documented in the NRC SER. The NRC would only grant a license for the proposed CISF if it finds that there is reasonable assurance of adequate protection of public health and safety, including with respect to the effects of external events on the proposed CISF.

With regards to the impacts of climate change on flooding at the proposed CISF site, as described in EIS Section 3.7.1.2, the National Ocean and Atmospheric Administration (NOAA) *projected no increase or upward trend in the frequency of extreme precipitation events in New Mexico due to climate change. Therefore, the NRC staff does not expect that climate change will increase the potential for flooding of Laguna Gatuna and Laguna Plata over the license term of the proposed project (40 years).*

No changes were made to the EIS as a result of these comments.

Comments: (99-31-9) (99-35-2) (157-2-7) (157-2-9) (157-2-12) (157-3-2) (310-6) (310-14) (328-1-18) (329-5)

D.2.13 Comments Concerning Geology and Soils

D.2.13.1 Geology and Soil Resources—Seismicity

The NRC staff received comments expressing concerns about seismicity (earthquakes) in the vicinity of the proposed CISF. Many commenters, including NMED, were concerned about risks to the proposed CISF from recent earthquakes induced by oil- and gas-related activities, including fracking and fluid injection into disposal wells. These commenters pointed out that the EIS has no analysis of the long-term impacts that increased seismic events from fracking and fluid injection will have on facility infrastructure (e.g., the storage modules and buried casks) and does not provide specific information on facility design safeguards. Another commenter stated that it is acknowledged that the area of the proposed repository should be free of significant seismic events, but the EIS does not define "significant seismic events."

Some commenters, including NMED, discussed that earthquakes in the vicinity of the proposed CISF project have occurred since the draft EIS was published {e.g., a magnitude 5.0 earthquake in West Texas near the New Mexico border on March 26, 2020, a magnitude 2.17 just outside of Lovington and Hobbs, and a cluster of earthquakes with magnitudes ranging from 3.1 to 2.3 in June 2020 approximately 29 km [18 mi] northeast of the proposed CISF} and that the EIS should discuss these earthquakes. NMED and another commenter noted that the EIS should include more recent research and data, including an updated seismic hazard map and current seismic monitoring data by the Texas Bureau of Economic Geology TexNet and the New Mexico Tech Seismological Observatory. One commenter stated that the driving mechanism for the increasing trend in the number and magnitude of earthquakes in the area of the proposed site is not understood and that a full subsurface basement fault study is needed to determine the probability of major seismic events. This commenter also stated that the seismic models cited in the EIS are inaccurate as they limit the natural laws of seismicity with their inputs and that these models cannot be used to safely build the proposed CISF storage facility. Another commenter questioned the statement in the EIS at page 3-24 that a 2018 study by Snee and Zobach from Stanford University concluded that existing faults located in the western Delaware Basin where the proposed project area is located are unlikely (<10 percent probability) to slip in response to fluid-pressure increase. The commenter stated that nothing in the text of the Stanford study makes this statement.

Response*: EIS Section 3.4.4 provides information on seismicity in the area of the proposed CISF project, including (i) recorded earthquakes in the region surrounding the proposed CISF, (ii) seismic source zones within 320 km [200 mi] of the proposed CISF and the causes of seismic activity in these zones, and (iii) earthquake probability in southeastern New Mexico where the proposed CISF would be located. As described in EIS Section 4.4.1.2, operation of the proposed CISF would not be expected to impact the potential for seismic events because the project would be located in an area of southeastern New Mexico that has low seismic risk* *and the proposed facility, which would have a maximum depth of 7.6 m [25 ft], would not intersect any active faults. As part of its safety review of the application conducted in parallel with this EIS, the NRC staff evaluates the potential for seismic events to adversely impact the proposed CISF. This evaluation includes the potential for oil and gas exploration and development activities to induce earthquakes or any other ground motion, and the potential for these events to adversely impact the proposed CISF. Findings of the safety evaluation are documented in the NRC SER. The NRC would only grant a license for the proposed CISF if it finds there is reasonable assurance of adequate protection of public health and safety.*

The NRC staff acknowledges that the EIS does not define "significant seismic events." However, as described in EIS Section 4.4.1.2, the proposed CISF must meet specific design and operational criteria to ensure that it can safely withstand seismic events. In accordance with 10 CFR Part 72, Subpart F, "General Design Criteria," and Section 72.122, "Overall requirements," the NRC staff evaluates the design of the facility to determine whether structures, systems, and components important to safety would withstand the effects of natural phenomena such as earthquakes, and this evaluation is documented in the NRC SER. In addition, in accordance with 10 CFR 72.103, "Geological and seismological characteristics for applications for dry cask modes of storage on or after October 16, 2003," the NRC staff investigates the geological, seismological, and engineering characteristics of a site and its environs in sufficient scope and detail to (i) permit an adequate evaluation of the proposed site, (ii) provide sufficient information to support evaluations performed to arrive at estimates of the standardized design earthquake ground motion, and (iii) permit adequate engineering solutions to actual or potential geologic and seismic effects at the proposed site. These investigations are also documented in the NRC SER.

The NRC staff recognizes that earthquakes in the region of the proposed CISF have occurred since the draft EIS was published. The NRC staff added information about more recent earthquakes that have occurred in the region to EIS Section 3.4.4. The NRC staff also recognizes that the U.S. Geological Survey (USGS) published an updated hazard map and that the Texas Bureau of Economic Geology Texnet Seismic Monitoring Program and the New Mexico Tech Seismological Laboratory provide information on recent recorded earthquakes in Texas and New Mexico. The NRC staff revised EIS Section 3.4.4 to include an updated USGS hazard map and information on earthquakes recorded in the region of the proposed CISF by the University of Texas Bureau of Economic Geology's Texnet Seismic Monitoring Program and the New Mexico Tech Seismological Observatory. These updates to the EIS did not change the overall analysis or impact determinations.

The NRC staff disagrees with the comment that the driving mechanism for the increasing trend in the number and magnitude of earthquakes in the area of the proposed project is not understood and that the seismic models cited in the EIS are inaccurate. As described in EIS Section 3.4.4, active seismic areas within 320 km [200 mi] of the proposed CISF project area in west Texas and to the south and southeast correlate with the locations of oil and gas fields, and seismic activity is likely induced by production, secondary recovery, and waste injection into deep wells. The USGS estimates of earthquake probability and magnitude discussed in EIS Section 3.4.4 consider a wealth of geologic and seismic information, including the history of earthquakes on a given fault, the history of small earthquakes, the amount of ground shaking past earthquakes produced, the location and distribution of faults in a given region, and how the rocks and sediments respond to ground shaking. USGS seismic hazard maps, as depicted in EIS Figure 3.4-10, are created to provide accurate and detailed information to assist engineers in designing buildings, bridges, highways, and utilities to withstand shaking from earthquakes. The NRC staff also disagrees with the comment that questioned whether the 2018 study by

Snee and Zobach concluded that existing faults located in the western Delaware Basin where the proposed project would be located are unlikely (<10 percent probability) to slip in response to fluid pressure increase. In the section entitled "Slip potential on mapped faults" in Snee and Zoback (2018), the authors state, "We find that large groups of mostly north-south-striking faults, predominantly located along the Central Basin Platform, the western Delaware Basin, and large parts of the Northwest Shelf have low fault slip potential at the modeled fluid-pressure perturbation." Figure 3 of Snee and Zobach (2018) also illustrates that faults in the Central Basin Platform, western Delaware Basin, and large parts of the Northwest Shelf have a low fault slip potential (<10 percent probability). Therefore, no changes were made to the EIS as a result of these comments.

Comments: (90-13) (99-40-7) (109-17) (116-13) (169-10-3) (237-4-1) (237-4-2) (237-4-3) (237-4-4) (290-10) (303-8) (307-1-15) (310-16) (322-5) (322-6) (322-7) (328-2-1) (328-2-2) (328-2-3) (343-2) (383-7) (395-3) (397-1)

D.2.13.2 Geology and Soil Resources—Sinkholes and Subsidence

The NRC staff received comments expressing concerns about the potential for sinkhole development and subsidence in the proposed project area. Commenters were concerned about the existence of karst conditions (e.g., voids and sinkholes) at and beneath the proposed project area. Many commenters were concerned about the potential risks to the proposed CISF from the development of sinkholes associated with oil and gas extraction, abandoned oil and gas wells, saltwater disposal wells, and brine wells. Other commenters were concerned about the potential risks to the proposed CISF from subsidence associated with potash mining. Commenters stated that the DEIS does not adequately address the potential of future sinkhole development and subsidence within the area because of ongoing oil and gas extraction, abandoned oil and gas wells, brine wells, and potash mining. One commenter noted that a remote sensing study (Zhang et al., 2018) indicated that future subsidence events from potash mining in the vicinity of the proposed site are highly probable. One commenter stated that the integrity of abandoned oil and gas wells within the proposed CISF project area be evaluated to determine the potential for sinkhole development. Other commenters noted that the Jal and Wink sinkholes in the region of the proposed CISF site resulted in dissolution of soluble formations at depths of 305 m [1,000 ft] or more, a depth similar to the shallowest soluble material.

Among these comments, the NRC staff received several comments from NMED expressing concerns about subsidence and sinkhole development. NMED stated that the proposed CISF project area is unsuitable for SNF storage because it is underlain by shallow groundwater and subject to concerns about ground subsidence and sinkhole development. NMED pointed out that dissolution of the Salado Formation associated with oil and gas operations is the primary cause of sinkhole development in the region. NMED questioned the assertion in the EIS that the CISF project area has a low potential for sinkhole development based on the absence of thick sections of soluble rock near the land surface. NMED also pointed out that lithologic borings located within the proposed Holtec facility encountered slickensides, vertical to sub-horizontal fractures of many inches in length, high fractured zones, and the presence of moisture in core sections in the Chinle Formation, which contradict the EIS assertion of low risk for sinkhole development. NMED noted that at least 18 plugged and abandoned wells located on the proposed CISF project area and one plugged saltwater disposal well located northeast of the proposed project area could contribute to sinkhole formation and potential subsidence if the casing on these wells has been compromised. In addition, NMED pointed out that ground subsidence related to potash mining has been documented in the region and must be evaluated in greater detail for the potential risk to the stability of the proposed CISF.

Response*: The EIS includes a characterization of geologic features in the vicinity of the proposed project area, including the potential for subsidence or formation of sinkholes. EIS Section 3.4.5 provides information on the development of karst features and sinkholes in the lower Pecos region of west Texas and southeastern New Mexico. As described in EIS Section 3.4.5, many of the sinkholes in this region are of anthropogenic (man-made) origin and associated with improperly cased abandoned oil and water wells, or with solution mining of salt beds in the shallow subsurface. As further described in EIS Section 3.4.5, the Wink sinkholes in Texas and the Jal Sinkhole near Jal, New Mexico, were formed by dissolution of salt beds in the Salado Formation caused by improperly cased oil and water wells. The NRC staff evaluated the potential for karst features to be present at the proposed project area in EIS Section 4.4.1.2. The NRC staff determined that subsurface geologic conditions at the proposed project area are not conducive to karst development or subsidence because no thick sections of soluble rocks are present at or near the ground surface. The shallowest formation containing relatively thick soluble materials (i.e., gypsum and halite) is the Rustler Formation, which is located over 305 m [1,000 ft] below the depth of the proposed CISF design and is unlikely to be impacted by the proposed CISF project. Below the Rustler Formation is the Salado Formation, which consists mainly of halite and some anhydrite. Like the Rustler Formation, the Salado Formation is unlikely to be impacted by the proposed project due to its depth below ground surface. In addition, because the proposed CISF project operations do not produce any liquid effluent that could facilitate dissolution of halite or gypsum, the NRC staff does not anticipate that the proposed CISF would lead to the development of sinkholes or subsidence.*

The NRC staff acknowledge that borings described in the 2017 site characterization report encountered slickensides, vertical to sub-horizontal fractures of many inches in length, high fractured zones, and the presence of moisture in core sections in the Chinle Formation (GEI Consultants, 2017). Similar observations of fractures (fissures) and slickensides in the Dockum Group in the area of the proposed CISF project were reported by Powers (2014). Powers (2014) interpreted the fractures and slickensides to be pedogenic in origin (i.e., formed during soil deposition and induration), rather than fractures and slickensides formed by collapse due to karst processes. The NRC staff also note that none of the borings described in the 2017 site characterization report (GEI Consultants, 2017) encountered karst features such as voids or solution cavities formed by dissolution processes. The NRC staff have determined that fractures and slickensides encountered in site characterization borings are not evidence of subsurface dissolution and sinkholes and will not change the overall analysis or impact determination in the EIS.

As part of its safety review conducted in parallel to this EIS, the NRC staff evaluates the potential risks to the proposed CISF from sinkhole development and subsidence from ongoing and future oil and gas extraction, abandoned oil and gas wells, brine wells, and potash mining. Findings of the safety evaluation are documented in the NRC SER. The NRC would only grant a license for the proposed CISF if it finds that there is reasonable assurance of adequate protection of public health and safety.

No changes were made to the EIS as a result of these comments.

Comments: (99-31-7) (99-35-3) (109-13) (151-8) (157-2-6) (157-2-8) (157-3-1) (157-3-17) (157-3-18) (157-3-21) (157-3-24) (170-2-3) (237-3-15) (307-1-14) (307-1-16) (310-17) (319-8) (328-1-7) (328-1-20) (328-1-21) (328-1-22) (343-1) (375-1-7) (380-17) (395-5) (397-2) (397-3)

D.2.13.3 Geology and Soil Resources—Site Characterization

The NRC staff received comments regarding geological site characterization for the proposed CISF project. Some commenters noted that the geology of the site and surrounding area has been well characterized and is well known from the WIPP geology investigation and drilling logs in the area, as well as the Global Nuclear Energy Partnership (GNEP) characterization process. Other commenters expressed concerns about site characterization and geological information in the EIS. NMED stated that the proposed CISF is geologically unsuitable and that there is an inadequate conceptualization of the geologically unsuitable site in the EIS. A commenter noted that the proposed CISF appears to be in the central to eastern portion of the Delaware Basin, not the western portion as characterized in the EIS. Another commenter urged the NRC to withhold license approval and require Holtec to map the subsurface using modern techniques such as 3D seismic imaging to ensure no potential hazard, such as substantive karst, hydraulic fracturing, or wastewater disposal wells are close to the site. Other commenters stated that the subsurface has not been adequately characterized for karst and that techniques (e.g., electrical resistivity tomography, ground penetrating radar, acoustic and active source seismic surveys, and electronic resonance) should be used to locate potential karst features beneath the site. A commenter questioned the values of *in situ* permeability for the Santa Rosa Formation reported in the EIS (3.4×10^{-7} to 9.2×10^{-7} cm/s). The commenter stated that these values seem unrealistically low for the reported lithology of “fine- to coarse-grained sandstone, with minor reddish-brown siltstones, and conglomerates” and especially for a formation described in the EIS as a “major aquifer.” The commenter asked if an effort was made to verify the typical permeability of the Santa Rosa Formation in the area of the proposed CISF as reported in scientific literature. Another commenter stated that the EIS insufficiently characterizes the Chinle Formation, specifically the fractured nature of the formation and how accumulated water at the interface might move. Another commenter noted that boring logs identified fractured rock beneath the site in the Chinle and Santa Rosa formations.

Response: *EIS Section 3.4 presents information on the geology of the proposed CISF project area, both local and regional. The NRC staff considers the geologic information presented in EIS Section 3.4 adequate to conceptualize the geology of the proposed site. EIS Section 3.4.1 describes the stratigraphic, lithologic, and structural characteristics of Permian to Quaternary geologic units in the Delaware Basin of southern Lea County, New Mexico, where the proposed CISF would be located. EIS Section 3.4.2 presents information on the site-specific geology of the site, including topography, surface geologic units and soils, and subsurface stratigraphy. A geologic cross-section constructed from available oil and gas and water well logs is provided in EIS Figure 3.4-7 and shows subsurface stratigraphy within and in the vicinity of the proposed CISF project area. The NRC staff notes that NMED has described the proposed CISF site as “geologically unsuitable” based on concerns about seismicity, subsidence, and sinkhole development. In accordance with 10 CFR Part 72, Subpart E, “Siting Evaluation Factors,” Section 72.90, “General considerations,” the NRC safety staff evaluates site characteristics that may directly affect the safety or environmental impact of the proposed CISF. The NRC staff’s responses to NMED’s specific concerns about seismicity, subsidence, and sinkhole development and the EIS are provided in Section 2.13.1 [Geology and Soil Resources—Seismicity] and Section 2.13.2 [Geology and Soil Resources—Sinkholes and Subsidence] of this appendix.*

The NRC staff recognize that the proposed CISF project is located in the northeastern Delaware Basin as illustrated in EIS Figure 3.4-3, rather than the western Delaware Basin. The NRC staff revised text in EIS Section 3.4.4 accordingly.

Regarding the information gathering commenters suggested, NRC regulations do not require Holtec to use specific techniques or technologies to gather geologic information as long as sufficient information is provided to make a licensing determination. The NRC staff considers the stratigraphic, structural, and geotechnical information Holtec provided in its ER and Holtec responses to NRC RAIs sufficient to evaluate potential geologic hazards such as karst development at the proposed project area and in the surrounding region. The NRC staff responses to specific concerns about karst development at the proposed project area are provided in Section 2.13.2 [Geology and Soil Resources—Sinkholes and Subsidence] of this appendix. As described in this section, the NRC staff determined that subsurface geologic conditions at the proposed project area are not conducive to karst development or subsidence because no thick sections of soluble rocks are present at or near the ground surface. Regarding the typical permeability of the Santa Rosa Formation, no additional information was found in the scientific literature to verify the permeability values measured at the proposed site (GEI Consultants, 2017). As described in EIS Section 3.5.2.1, on a regional scale, the Santa Rosa Formation is a major aquifer; however, reported water yields in the Santa Rosa Formation in southeastern New Mexico and west Texas are variable and are likely due to differences in the lithologic properties (Nicholson and Clebsch, 1961; Richey et al., 1985). Wells completed in the Santa Rosa in the vicinity of the proposed CISF project have low yields with specific capacities of 0.14 to 0.2 gpm/f of drawdown (Powers et al., 1978). Based on the reported low yields from wells in the Santa Rosa in the vicinity of the proposed site, the low permeability values measured at the site are realistic. The NRC staff recognizes that fractures in the Chinle and Santa Rosa formations were encountered in borings described in the 2017 site characterization report (GEI Consultants, 2017). Powers (2014) also reported an occurrence of fractures (fissures) in the Dockum Group in the area of the proposed CISF project. Powers (2014) interpreted the fractures to be pedogenic in origin (i.e., formed during soil deposition and induration), rather than fractures formed by tectonic processes.

Beyond those changes previously described in this response, no changes were made to the EIS as a result of these comments.

Comments: (98-14-5) (98-34-5) (98-47-3) (98-49-3) (157-2-4) (170-22-9) (237-3-12) (237-3-19) (237-4-19) (240-3-18) (328-1-6)

D.2.13.4 Geology and Soil Resources—Soil Contamination, Disposal, and Replacement

The NRC staff received comments expressing concerns about soil contamination, disposal, and replacement at the proposed CISF project area. Commenters were concerned about potential radiological soil contamination if SNF were to leak. One commenter was concerned about soil disposal and asked how soil excavated during facility construction would be disposed. Another commenter was concerned about soil replacement during decommissioning. This commenter noted that replacement soil is an essential resource that would have to be taken from somewhere else and this would not be a SMALL impact.

Response: *As described in EIS Section 4.4.1.2, the SNF canisters and storage systems are designed to robustly contain radiological materials. As further described in EIS Section 4.5.1.1.2, the SNF canisters do not contain any material in liquid form and are sealed to prevent any liquids from contacting the SNF assemblies. Therefore, there is no potential for radiological contamination of soils via a liquid pathway (such as a leaking canister). The NRC staff added text in EIS Section 4.4.1.2 to clarify that SNF canisters are sealed to prevent liquids from contacting the SNF and therefore there is no potential for radiological contamination of soil* *from a leaking canister. As described in EIS Section 4.4.1.1, approximately 135,517 m^3 [177,250 yd^3] of soil would be excavated for each phase (1-20) of the proposed CISF project, and Phase 1 would include excavation of approximately 61,547 m^3 [80,500 yd^3] of soil for construction of the site access road, railroad spur, security building, administration building, and parking lot. As further described in EIS Section 4.4.1.1, excavated soil would be stockpiled inside the 421-ac [1,040-ac] proposed project area, but outside the 114.5-ha [283-ac] protected area, and approximately 10 percent of the stockpiled soils would be used for backfill and site grading. The remaining stockpiled soils would be stored onsite or disposed at an approved offsite disposal facility. As described in EIS Section 4.4.1.3, after project facilities and infrastructure are removed, disturbed areas would be regraded with fill from stockpiles, covered with topsoil, contoured, and reseeded with native vegetation. Therefore, excavated soil stockpiled during construction would be sufficient to meet the needs of decommissioning.*

Other than the aforementioned clarifications, no changes were made to the EIS as a result of these comments.

Comments: (99-9-8) (157-1-17) (252-15) (379-4)

D.2.14 Comments Concerning Ecology

D.2.14.1 Ecology—Concerns About Impacts to Migratory Birds and Lagunas

The NRC received comments that the EIS does not adequately evaluate impacts on wintering birds such as sandhill cranes and predatory birds such as raptors that may use Laguna Gatuna. One commenter asked about BLM's comments on the EIS analysis regarding migratory bird impacts. A commenter stated that several agencies, including EPA, FWS, NMED, and the New Mexico Department of Game and Fish (NMDGF), have attested to the significance of Laguna Gatuna for migratory birds and that those agencies have argued that Laguna Gatuna should be identified as a “Water of the United States” protected under the Clean Water Act.

Response: *In its evaluation of potential ecological impacts in the EIS, the NRC staff consulted with several agencies, including BLM, FWS, NMED, and NMDGF, and reviewed independent information sources, including comments on the proposed project during the scoping period. EIS Section 3.6.4 describes the BLM’s proposed management of salt playas in the area, and states that Laguna Plata is nominated as an area of critical environmental concern (ACEC) by the BLM Carlsbad Field Office because of its use by migratory birds. The ACECs in the vicinity of the proposed Holtec CISF are currently under consideration and are not final BLM designations. EIS Sections 4.6 and 5.6 discuss potential ecological impacts from the proposed project, including potential impacts on the playas and on migratory birds such as the sandhill crane and predatory birds that may follow them to watering locations. The EIS considered many factors as part of the impact analysis, including, but not limited to, assessing Laguna Gatuna as a salt playa and the other playas present in the region. The NRC staff concludes in EIS Section 4.6.1.1 that while migratory birds could temporarily use the proposed CISF project area and lagunas for a resting ground and may also be vulnerable to proposed CISF project activities, (i) there is no viable aquatic habitat or aquatic life such as fish or macroinvertebrates in the proposed CISF project area for the facility to impact, (ii) virtually no vegetation was observed on the portion of the shore of Laguna Gatuna that is included as part of the proposed CISF project area (EIS Section 3.6.2), (iii) there is no commercial agriculture within 10 km [6 mi] of the proposed CISF project area (EIS Section 3.2.2) that could support invertebrates such as insects in sufficient numbers that could support wintering bird migration populations, and (iv) the salinity of the playa lakes would limit waterfowl and other avian species from relying on the* *playa lakes as a long-term water source. For these reasons, the NRC staff determines that the analysis for ecological impacts for the proposed project is sufficient.*

With respect to the comment concerning Laguna Gatuna's status as a "Water of the United States," a USACE-approved jurisdictional determination is not available for Laguna Gatuna (EIS Section 3.5.1.5). However, the playa does not have a surface connection to a traditional navigable waterway, nor is it adjacent to jurisdictional waters. Additional information about the playa is provided in EIS Sections 3.5, 4.5, and 5.5, and in responses to comments in this appendix Section 2.10[Comments Concerning Water Resources]..

No changes were made to the EIS as a result of these comments.

Comments: (117-10) (310-20) (378-18) (378-19)

D.2.14.2 Ecology—Ecological Surveys

The NRC staff received comments about the ecological surveys that were conducted at the proposed project area and provided in the license application. The commenter questioned the validity of how and when the ecological surveys were conducted. The commenter restated statements made in the EIS about the ecologic resources in the vicinity of the proposed project area and stated the NRC incorrectly evaluated the information. Specifically, the commenter noted that one of the surveys was conducted over a one-day period during a season when reptiles would be difficult to observe.

Response: *EIS Section 3.6 summarizes the ecological surveys that were conducted in the proposed project area and references independent sources that the NRC staff reviewed and analyzed to describe and evaluate ecological resources in the proposed project area. EIS Section 4.6.1 describes the potential impacts on ecological resources from the proposed project.*

The two ecological surveys provided in Holtec's application and referenced by the commenters are only two of the sources of information that NRC staff considered for the ecological analysis. The NRC staff analyzed available data from multiple sources and agencies with specialized knowledge in ecology. The NRC obtained an official FWS species list, which analyzed threatened and endangered species that may occur in the proposed project location, in compliance with the Endangered Species Act (ESA), Section 7 consultation requirements. Additionally, the NRC staff met with the NMDGF to determine the potential presence of sensitive species in the project area. The FWS official species lists are valid for 90 days, and the NRC staff regularly requested updated species lists during the EIS review process and updated the EIS as accordingly (EIS Sections 3.6 and 4.6).

Under some circumstances, other Federal or State agencies such as FWS, BLM, and NMED may have regulatory authority to require additional surveys. The NRC does not have the obligation to ensure, or the regulatory authority to enforce, that surveys are conducted according to the standards established by other agencies with regulatory authority. While the NRC staff supports, in EIS Section 4.6.1.1, the NMDGF recommendation that Holtec conduct a more thorough biological survey of the project footprint and a 0.8-km [0.5-mi] buffer, the NRC was able to independently verify and corroborate information necessary to determine ecological impacts of the proposed project. That same EIS section provides NRC staff's basis for the ecological impact conclusion in the EIS. The NRC staff states that because (i) the area surrounding the proposed CISF project is largely undeveloped; (ii) there is abundant suitable *habitat in the vicinity of the project to support displaced animals; (iii) the proposed action (Phase 1) construction activities would have "No Effect" on Federally listed species; and (iv) there are no rare or unique communities, habitats, or wildlife on the proposed CISF project, the NRC staff concludes that impacts to wildlife from the proposed action (Phase 1) for construction would be minor and would not noticeably change the population of any species. Additional surveys could inform the applicant about where mitigation measures could be implemented; however, additional surveys would not change the NRC's conclusion that the proposed project would not noticeably change the population of any species.*

Regarding prior ecological surveys referenced in the GNEP Siting Report, the NRC staff acknowledge that the ADAMS accession number provided in the draft EIS did not include all the attachments, including the ecological surveys. The NRC staff revised the EIS to include the four ADAMS accession numbers that contain the entire GNEP report (i.e., ADAMS Accession Nos. ML17310A225, ML17310A227, ML17310A230, and ML17310A231). Additional information on ecological mitigations and other agency recommendations is provided in Section 2.14 of this appendix [Comments Concerning Ecology].

Comments: (237-4-10) (237-4-11) (237-4-12) (237-4-13)

D.2.14.3 Ecology—Impacts on Vegetation

The NRC staff received comments about potential impacts on vegetative communities from the proposed action. A commenter questioned what a moderate impact implied and specifically what the adverse impacts would be on vegetative communities. Another commenter stated that the NRC staff's statement about removal of vegetation for the proposed project in comparison to the regional ecological system needs to be justified. One commenter asked about the estimated timeframe for reestablishing vegetation. Two commenters asked about what happens if revegetation efforts are not successful.

Response*: The NRC staff evaluated potential impacts on vegetation in EIS Sections 4.6 and 5.6. The definition of a moderate impact is provided in EIS Executive Summary and Sections 2.4, 4.1, 5.1.2, and Chapter 9 (specifically, that "moderate" is defined as noticeable, but not destabilizing, impacts). EIS Section 4.6.1.1 describes the effects that the proposed project would have on vegetation, such as the potential for the introduction and spread of noxious weeds and the change in vegetation species' composition, abundance, and distribution within and adjacent to disturbed areas, which would affect ecosystem function in the area where vegetation is removed or disturbed.*

EIS Section 4.6.1.1 was revised for clarity to include the acreage {approximately 2.5 million ha [6.1 million ac]} of regional Apacherian-Chihuahuan mesquite upland scrub ecological system in the ecoregion where the proposed project would be located. This additional information further supports the NRC staff's conclusion that removal of 48.3 ha [119.4 ac] of vegetation for the proposed action (Phase I) and removal of approximately 133.5 ha [330 ac] of vegetation from the construction of full build-out (Phases 1-20) would be sufficiently small as to not be noticeable within the larger ecological system.

EIS Section 4.6.1.1 states that, according to the BLM, establishment of mature, native plant communities may require decades. EIS Section 2.2.1.4 briefly describes the decommissioning and reclamation activities. As part of the reclamation activities for the proposed project, Holtec commits to revegetating disturbed areas and soil stockpiles with native vegetation species. The NRC staff would undertake a separate evaluation and NEPA review and prepare an EA or

EIS, as appropriate, at the time the Final Decommissioning Plan is submitted to the NRC. The NRC is not bound by State guidelines and does not have statutory authority to impose revegetation requirements on private land. The revegetation plan for the rail spur would comply with the latest BLM guidelines on revegetation in effect at that time for details such as soil preparation, type of seed mix, fertilizing, time of year to plant, and watering frequency. The revegetation plan for the proposed project would comply with current relevant State guidelines for revegetation in effect at the time of implementation.

Additional information about recommended mitigations is provided in response to other comments in this appendix in Section 2.14.6 [Ecology—Recommended Mitigation Measures and Guidelines].

Comments: (381-2) (381-4) (381-5) (381-10) (381-23)

D.2.14.4 Ecology—Potential Impacts on Ecological Resources

The NRC staff received comments about potential impacts on ecological resources from the proposed project. A commenter stated that disturbing pristine habitat is not necessary. Other commenters referred to the potential effects on wildlife, special ecosystems, critical habitat in the area, and the Lesser prairie-chicken and the dunes sagebrush lizard. One commenter asked for an update on the status of the Lesser prairie-chicken. One commenter stated that the definition of MODERATE impact has not been provided, and ecological consequences have not been specified. The same commenter also inquired about the reclamation process and the potential impacts if the rail spur was not removed during decommissioning.

Response*: The NRC staff reviewed the critical habitat and Federally threatened and endangered species in the region and found that no designated critical habitat for any Federally threatened or endangered plant or animal species occurs within Lea County. A species' habitat range is generally a large area where a species may occur but does not necessarily mean that suitable habitat exists in the entire range or that the species occurs regularly across the entire range. Two areas identified as critical habitat for Federally listed species are located in Eddy County, approximately 64 km [40 mi] from the proposed CISF project.*

EIS Figure 3.6-5 depicts the habitat ranges for the Lesser prairie-chicken and dunes sagebrush lizard. Information about the Lesser prairie-chicken and the dunes sagebrush lizard, which are not Federally threatened or endangered species, is provided in EIS Section 3.6.5. The NRC staff also evaluated potential impacts on ecological resources, including critical habitat and Federally threatened and endangered species in EIS Section 4.6 and 5.6 and determined that there would be "No Effect" on experimental or Federally listed species and "No Effect" on any existing or proposed critical habitats. Regarding the status of the Lesser prairie-chicken, the species is still "under review." The FWS has not issued the species status assessment that was expected to be completed in 2017.

The EIS Executive Summary and EIS Sections 2.4, 4.1, and 5.1.2 provide NRC definitions for SMALL, MODERATE, and LARGE impact determinations. EIS Section 4.6 explains the potential ecological impacts (or consequences, as the commenter requested) that could occur as a result of the proposed action, such as the specific amount of land and vegetation that would be disturbed, land clearing activities that would result in habitat loss, noise and vibrations from heavy equipment and traffic, fugitive dust, creation of open trenches and steep-sided pits, increased soil erosion from surface-water runoff, sedimentation of playa lakes and gullies, and the presence of construction personnel. EIS Section 4.6 also discusses the potential for the *introduction and spread of noxious weeds, the potential for surface-water runoff that could change water levels and water quality in the playa lakes near the proposed CISF project, and from increased siltation that could degrade nesting habitat around the edges of the playa lakes near the proposed CISF project. No commenters provided specific additional information regarding how activities at the proposed CISF site could otherwise affect ecological resources that are not already considered in NRC's analysis in the EIS.*

EIS Sections 2.2.1.4 and 2.2.1.7 describe the decommissioning and reclamation activities. EIS Section 4.6.1.3 (i) explains Holtec's proposed activities to restore the project area; (ii) states that the establishment of mature, native plant communities may require decades; and (iii) states that Holtec would also have a continued legal obligation to comply with the ESA, the Migratory Bird Treaty Act (MBTA), and the Bald and Golden Eagle Protection Act (BGEPA), as well as mitigation measures BLM and NMDOT require to limit potential effects on wildlife. The NRC cannot impose mitigation outside its regulatory authority under the Atomic Energy Act (AEA). Mitigative measures would be negotiated by the applicant and the agency with statutory authority.

No changes were made to the EIS with respect to these aspects of the comments.

Additional information about comments on migratory birds and nearby lagunas is provided in this appendix, Section 2.14.1 [Ecology—Concerns About Impacts to Migratory Birds and Lagunas].

With respect to the comment about rail spur decommissioning, the EIS was reviewed by BLM staff. EIS Section 4.6.1.3.1 provides an impact analysis if the rail spur were removed during decommissioning. The NRC added text to EIS Section 4.6.1.3.1 to clarify that there would be SMALL impacts on ecological resources if the rail spur were not removed at the end of the proposed CISF's licensed life. The NRC staff also updated references in EIS Sections 3.6 and 4.6 based on more recently available sources; however, these changes did not change the conclusions in the EIS.

Comments: (64-5) (99-36-2) (109-18) (117-9) (126-4) (149-3) (172-8) (266-11) (337-2) (341-14) (356-1) (364-2-7) (378-20) (381-7) (381-9) (381-11) (381-19)

D.2.14.5 Ecology—Radiological Impacts on Ecological Resources

The NRC received a comment asking about radiological dose rates to biota in comparison to DOE technical standard rates and DOE thresholds.

Response*: The radiation dose rate estimates and the comparison with the DOE technical standards that are included in the ecological impact analysis are provided for the purpose of evaluating potential environmental impacts. As noted in the EIS, there are currently no Federal standards that directly limit radiation doses to wildlife, although related scientific research continues to develop the information base necessary to assess whether such standards are needed. During operations, the NRC would require radiation monitoring in onsite work areas and beyond the controlled area for compliance with NRC safety standards for protection of workers and the public. Compliance with the public dose limits at the controlled area boundary would result in dose rates that are well below the DOE technical standards for protection of wildlife described in the EIS. Storage cask dose rates and resulting impacts during operations are expected to be comparable to the estimates described in the EIS analysis.*

No changes were made to the EIS as a result of this comment.

Comment: (381-6)

D.2.14.6 Ecology—Recommended Mitigation Measures and Guidelines

The NRC staff received comments about mitigations and recommendations made in the EIS that would reduce potential impacts on ecologic resources. A commenter asked who would enforce and validate that the recommendations are followed. One commenter stated that there are no recommendations provided in the EIS that would alleviate a potential moderate impact on vegetation. One commenter asked whether the NMDGF recommendations to conduct additional surveys had been met and if the NRC would issue a license if the NMDGF recommendations are not met. A commenter asked why Holtec has a choice whether it complies with NMDGF guidelines for conducting wildlife inventories. A commenter asked whether the NRC staff's conclusion on ecological impacts assumes that Holtec is following the NMDGF recommendations or if the recommendations can be dismissed or ignored. A commenter stated that the recommendations should be followed and documented for easy reference. A commenter asked whether Holtec commits to following the recommendations to further limit the potential impacts from operation of the rail spur. One commenter made an editorial comment that the mitigations that are described in EIS Section 4.6.1.2 are not also included in EIS Section 4.6.1.1.

Response: *Ecological mitigation measures Holtec proposed and additional mitigation measures are described in EIS Section 4.6.1 and EIS Tables 6.3-1 and 6.3-2. The NRC staff makes its impact determinations considering both mitigation measures proposed and committed to by the applicant. If mitigations are not committed to or otherwise enforceable, the NRC does not consider them in making impact determinations. For example, EIS Section 4.6.1 states that Holtec would use mitigation measures for soil stabilization and sediment control, comply with a SWPPP, and revegetate disturbed areas with native plant species; therefore, the NRC staff concludes that impacts to vegetation from the proposed action (Phase 1) for construction would be noticeable within the proposed project area, but would not destabilize the vegetative communities at the proposed CISF project, resulting in a MODERATE impact (draft EIS page 4-44, line 16). These conclusions are made prior to the discussion of recommended mitigations and guidelines that the NRC staff or other agencies identify, but do not have the authority to enforce. Where such additional mitigations and guidelines exist, the NRC staff's analysis also provides impact conclusions should those mitigations and recommendations be followed. For example, EIS Section 4.6.1.1 states that, should Holtec choose to follow the NMDGF fencing and trenching design recommendations (with which the NRC concurs, per EIS Chapter 6), effects on all wildlife would be reduced. The NRC staff recognizes the potential confusion and has edited the section to reorder the paragraphs to facilitate readers' understanding of the impact determinations, but no additional changes to the text were made.*

The purpose of a NEPA review is to disclose potential environmental impacts; mitigation measures are considered in the analysis but may not be within the authority of the regulatory agencies. Additional requirements from other agencies beyond those requirements that are within the NRC's authority would be likely to reduce the impacts that the NRC staff have evaluated.

Regarding mitigation measures for the rail spur, the BLM would issue a separate permit for the construction of a rail spur on BLM-managed land. The BLM may require that Holtec follow specific mitigation measures as a condition of issuing a permit. The NRC's EIS is not required *to include all possible mitigations that BLM may require Holtec to follow. As a cooperating agency, BLM has reviewed this EIS and concurs with the potential ecological impacts of building and operating the proposed rail spur on BLM-managed land, as described in the EIS.*

Regarding the editorial comment about mitigation measures discussed in draft EIS Section 4.6.1.2, the draft EIS on page 4-52 lines 21-27 states that "Holtec would continue the mitigation measures implemented during construction discussed in EIS Section 4.6.1.1; these would limit potential effects on wildlife during the proposed action (Phase 1) operations stage. These mitigations include revegetating disturbed areas and soil stockpiles with native vegetation species, monitoring leaks and spills of oil and hazardous material from operating equipment, placing fencing around the protected area, minimizing fugitive dust, and restricting the use of heavy trucks and earth-moving equipment during daylight hours." The commenter mistakenly missed the discussion of these mitigations in draft EIS Section 4.6.1.1 on page 4-44 lines 32-41. The NRC staff recognizes that the portion of the statement that describes placing fencing around the protected area is not located in draft EIS Section 4.6.1.1 because fencing would be implemented during project operations. Therefore, the NRC staff revised the statement in final EIS Section 4.6.1.2 to clarify that placing fencing around the protected area is a mitigation measure that would be implemented during operations in addition to the mitigation measures discussed in EIS Section 4.6.1.1. Additional information on ecological mitigations and other agency recommendations is provided in Section 2.14.3 of this appendix [Ecology—Impacts on Vegetation] and Section 2.14.2 [Ecology—Ecological Surveys].

Comments: (237-4-14) (375-2-16) (379-17) (379-18) (379-19) (381-3) (381-8) (381-22)

D.2.15 Comments Concerning Meteorology and Air Quality

D.2.15.1 Meteorology and Air Quality—Baseline Conditions

The NRC staff received a comment requesting that EIS Section 5.7 and EIS Table 5.7.1 discuss radioactive emissions in the area.

Response*: In the EIS, the NRC staff addresses cumulative radiological impacts as a public and occupational health topic (EIS Section 5.13) rather than an air quality topic (EIS Section 5.7). In EIS Section 5.13, the NRC staff analyzes the cumulative radiological impacts from both the proposed CISF and past, present, and reasonably foreseeable future actions within the geographic scope of analysis. This analysis includes consideration of documented radiological impacts (including emissions) from other facilities based on sources of radiation exposure in the region (EIS Sections 3.12.1.2) and past, present, and reasonably foreseeable future actions (EIS Section 5.1.1). As described in EIS Section 3.12.2, under normal operations, the use of NRC-certified storage casks at the proposed CISF project would fully contain the stored radioactive material. Therefore, the proposed CISF is not expected to release radioactive materials to either air or water. In response to this comment, the NRC staff has revised text in EIS Sections 4.7 and 5.7 (i.e., the air quality sections) to include a reference statement that the radiological issues are addressed in the EIS public and occupational health sections.*

Comment: (252-4)

D.2.15.2 Meteorology and Air Quality—Cumulative Air Quality Impacts

The NRC staff received a comment concerning cumulative air quality impacts. One commenter stated that the impact analyses in EIS Chapter 4 evaluated the CISF project impacts in isolation and did not consider cumulative air quality impacts, specifically in conjunction with an operating onsite oil well. This commenter further stated that air permitting normally considers cumulative impacts.

Response: *In EIS Section 4.7, the NRC staff analyzes the impacts from the proposed CISF to air quality. In EIS Section 5.7, the NRC staff analyzes the cumulative impacts to air quality, which considers the impacts of the proposed CISF in conjunction with impacts from other past, present, and reasonably foreseeable future actions, including oil and gas production. Concerning the onsite operating oil well, EIS Section 3.2.4 states that this well operates at minimum production levels to maintain mineral rights. As described in EIS Section 4.7.1.1, the comparison of pollutant concentrations to regulatory thresholds in the EIS does not document or represent a formal determination for air permitting but instead provides context for understanding the magnitude of the proposed CISF project air emissions, which are predominately from mobile and fugitive sources rather than stationary sources.*

No changes were made to the EIS as a result of this comment.

Comment: (157-3-3)

D.2.15.3 Meteorology and Air Quality—Impacts from SNF Transport

The NRC staff received a comment concerning air quality impacts from transportation of SNF. The commenter stated that the EIS underestimates the SNF rail transportation operation stage impacts because the air emissions were averaged out over a year rather than compared to 24-hour standards.

Response*: In EIS Section 4.7, the NRC staff analyzes the impacts from SNF transportation to air quality.*

The assessment of SNF transportation impacts in the EIS with respect to air quality is qualitative rather than quantitative. As such, there was no comparison of estimated emission levels to thresholds for any specific time period (e.g., annual or 24 hour). As described in EIS Section 4.7.1.1.3.1, SNF transportation on the rail spur occurs intermittently over the 8.9-km [5.5-mi] length of the rail spur rather than continuously generating emissions from a specific stationary location. As described in EIS Section 4.3.1.2.2.1, the proposed action (Phase 1) would have 500 SNF shipments and full build-out (Phases 1 -20) would have 10,000 SNF shipments. As described in EIS Section 1.2.1, the timeframe associated with SNF transportation for the proposed action (Phase 1) is 1 year and for full build-out (Phases 1-20) is 20 years. Based on this information, there would be less than two SNF shipments per day on the rail spur for the proposed action (Phase 1) and full build-out (Phases 1-20). Because of the intermittent and widespread nature of these emissions, the NRC staff concludes that the impact determination in the EIS Section 4.7.1.1.3.1 (i.e., potential impacts to air quality during rail spur operations is SMALL) is appropriate and not underestimated. Similarly, the NRC staff notes that the Continued Storage GEIS, NUREG–2157 (NRC, 2014a), concluded that the SNF transportation impacts by rail for away-from-reactor ISFSIs were also SMALL based on a qualitative assessment of the intermittent and widespread nature of the emissions.

No changes were made to the EIS as a result of this comment.

Comment: (382-21)

D.2.15.4 Meteorology and Air Quality—Monitoring and Mitigation

The NRC staff received comments concerning air quality monitoring and mitigation. Several commenters stated that the EIS did not indicate whether nonradiological air monitoring will be conducted to confirm the estimated emission levels used to determine the non-radiological air quality impacts. One commenter requested clarification on what fugitive dust mitigation measures would be implemented during construction and if water was used, how much of it would be used daily.

Response: *As described in EIS Section 4.7.1, the EIS impact determinations relied, in part, on the estimated emission levels specified in EIS Section 2.2.1.6. Based on three key factors (i.e., the proposed CISF emission levels relative to permitting thresholds, the existing air quality, and the proximity of the emission sources to the receptors), the NRC staff concludes that the potential impacts to air quality for the peak-year (as well as each individual stage) for the proposed action (Phase 1) and full build-out (Phases 1-20) would be SMALL. Nonradiological air monitoring is outside of the NRC's jurisdiction. However, the proposed project would be expected to comply with all State of New Mexico air quality standards as well as National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration (PSD) thresholds. As stated in EIS Table 6.3.1, the applicant proposes to suppress fugitive dust by spraying water or other techniques. As described in EIS Section 4.5.2.1.1, the groundwater impact assessment considers the total consumptive water use rate for the proposed CISF activities, which includes dust suppression; however, a separate, specific consumptive water use rate for the dust suppression activity was not provided and is not needed to determine the impact to the resource.*

No changes were made to the EIS as a result of these comments.

Comments: (157-1-18) (375-2-18) (381-12) (381-20)

D.2.16 <u>Comments Concerning Climate Change</u>

D.2.16.1 Climate Change—Contribution of the Proposed Project to Climate Change

The NRC staff received two comments concerning the contribution of the proposed project to greenhouse gas emissions and climate change. Commenters expressed concern that the EIS analysis for greenhouse gas emissions from the proposed project did not extend in time beyond the initial 40-year license term. One commenter stated that the EIS analysis should consider the greenhouse gas emissions from SNF transportation and full build-out (Phases 1-20).

Response: *In EIS Section 1.2.1, the NRC staff specifies that the time period analyzed in the EIS is the proposed CISF initial license term of 40 years. As further described in EIS Section 1.2.1, after the 40-year timeframe, Holtec would be required to submit a license renewal request if it plans to continue CISF operations and would therefore be subject to a new safety and environmental review [Environmental Assessment (EA) or EIS]. As a result, the analysis of greenhouse gas emissions in this EIS did not extend beyond the initial 40-year license period. See Section 2.6.4 [Assumptions—Timeframe of the Proposed Action] of this appendix for additional information regarding the time period of the EIS analysis.*

In EIS Section 1.2.1, the NRC staff specifies that the proposed action is the issuance of an NRC license to Holtec to construct and operate the initial phase (Phase 1) of the proposed project to store up to 8,680 MTUs [9,568 short tons] in 500 canisters. As described in EIS Section 1.2.1, expansion of the proposed project (Phases 2-20) is not part of the proposed action. The NRC staff, as a matter of discretion, considered these expansion phases in its description of the affected environment and impact determinations in the EIS, where appropriate, to conduct a bounding analysis for the proposed CISF project. EIS Tables 2.2-1 and 2.2-2 provide estimated greenhouse gas emissions for the proposed CISF for both the proposed action (Phase 1) and the expansion phases (Phases 2-20), respectively. In EIS Table 5.7-2, the NRC staff estimates the greenhouse gas emissions for SNF transportation for both the proposed action (Phase 1) and full build-out (Phase 1-20). In EIS Section 5.7.2.1, the NRC staff assesses the impacts from these emissions by comparing the proposed CISF and SNF transportation emissions to EPA thresholds for both the proposed action (Phase 1) and full build-out (Phases 1-20).

No changes were made to the EIS as a result of these comments.

Comments: (240-2-8) (373-19)

D.2.16.2 Climate Change—Mitigation

The NRC staff received a comment comparing Holtec's proposed greenhouse gas mitigation to the NRC staff's recommended mitigation. The commenter stated that the issue of greenhouse gas emissions from the proposed CISF are not appropriately considered by Holtec due to lack of proposed mitigation by Holtec.

Response: *In EIS Section 2.2.1.6, the NRC staff provides the estimated greenhouse gas emissions for the proposed CISF based on information Holtec provided. In EIS Section 5.7.2.1, the NRC staff estimates the greenhouse gas emissions from SNF transportation and assesses the impact of these emissions by comparing the proposed CISF and SNF transportation emissions to EPA thresholds associated with air permitting requirements to provide context for understanding the magnitude of emissions. In EIS Chapter 6, the NRC staff specifies the mitigation measures that the applicant proposed (EIS Table 6.3-1) and additional mitigation measures NRC staff identified that could potentially reduce impacts (EIS Table 6.3-2). The primary mitigation measures that would apply to greenhouse gases are mitigation measures that reduce combustion emissions; however, the applicant did not propose any (i.e., commit to implement any) of these mitigation measures, whereas the NRC staff recommended mitigation measures for consideration. EIS Table 6.3-2 includes a single list of mitigation measures for both fugitive dust and combustion emissions, because some mitigation measures reduce both fugitive dust and combustion emissions. As described in EIS Section 6.3, the NRC cannot impose mitigations (as a requirement) outside its regulatory authority under the AEA.*

No changes were made to the EIS as a result of this comment.

Comment: (128-5)

D.2.16.3 Climate Change—Overlapping Impacts and Impacts on the Proposed Project

The NRC staff received comments expressing concern regarding the potential impacts of climate change on the proposed CISF and SNF transportation. Several commenters stated that the EIS does not address climate change. One commenter stated that the EIS does not consider the impact of wildfires as the result of climate change and primarily discusses water-use conflicts. Other commenters expressed concerns about or requested the EIS analyze the impacts of climate change on the storage of SNF at the proposed CISF; specifically, impacts due to excessive heat. Commenters identified specific natural phenomena and weather events within the context of climate change that they are concerned about, including drought, ambient air temperature, wildfires, water stress, and dust storms. Other commenters expressed concern over the uncertainties associated with climate change when assessing possible impacts. One commenter stated that severe climate change impacts can exceed the ability to prevent the spread of radioactive contamination. Another commenter stated that the EIS must analyze the impacts of climate change on casks and canisters in relation to their ratings. Other commenters expressed concerns about or requested that the EIS analyze the impacts of climate change on the national rail and highway transportation infrastructure. While commenting on climate change impacts, one commenter raised the issue of the timeframe of the EIS analyses.

Response*: The NRC staff addresses climate change in several ways in the EIS. In regard to climate change impacts on the proposed CISF, the NRC safety evaluation, as required by regulations in 10 CFR Part 72, will consider the effects of credible natural hazards and phenomena, including severe weather events, on the design and operation of the proposed CISF. The regulations require that the applicant consider external natural events, estimate the frequency and severity of these, and discuss the records or historical data used to determine them. The NRC safety staff will review these evaluations to confirm that the proposed CISF adequately protects against these natural events.*

EIS Section 4.15 (Accidents) describes the process of how the NRC safety evaluation considers the potential impacts on SNF storage at the proposed CISF from natural phenomena, severe weather, and environmental conditions, including extreme environmental temperature. The NRC safety evaluation also considers accident events such as fire, partial blockage of SNF storage canister basket vent holes, and complete blockage of air inlet and outlet ducts. EIS Section 4.15 includes consideration of climate change and describes that to whatever extent climate change alters the magnitude and frequency of natural phenomena during the proposed CISF project license term, the NRC, under its oversight authority, can require licensees to implement corrective actions to identify and correct conditions adverse to safety. Uncertainty associated with climate change is reflected in the range of values for the parameters described in EIS Section 3.7.1.2, and as described in EIS Section 4.15, if climate change influences on natural phenomena create conditions adverse to health and safety, the NRC would have sufficient time to ensure that there is reasonable assurance of adequate protection of public health and safety in operating the CISF.

The NRC staff also addresses climate change in EIS Section 2.2.1.6, in which estimated greenhouse gas emissions that would result from the proposed CISF are provided. In EIS Section 5.7.2.1, the NRC staff estimates the greenhouse gas emissions from SNF transportation and assesses the impacts of these emissions by comparing the proposed CISF and SNF transportation emissions to EPA thresholds associated with air permitting requirements to provide context for understanding the magnitude of emissions.

The NRC staff also addresses climate change by assessing the overlapping environmental impacts of the proposed CISF and climate change. In EIS Section 3.7.1.2, the NRC staff characterizes historical climate change conditions and provides climate change projections relevant for the proposed project area. As described in EIS Section 5.7.2.2, the NRC staff concludes that (i) water scarcity would be the most likely area where impacts from both climate *change and the proposed action could overlap, and (ii) this overlapping impact would likely be minor.*

The NRC staff considers some topics commenters raised beyond the scope of the EIS. The impacts of climate change on cask and canisters in terms of their certification is beyond the scope of the environmental analysis in this EIS because cask and canister safety is assessed as part of the safety evaluation. See Section 2.26 of this appendix for additional information concerning cask and canister certification. The impact of climate change on the national transportation infrastructure is considered beyond the scope of the EIS because the routes for transportation have not yet been established and the need for infrastructure upgrades to address climate change impacts is speculative. See Section 2.9.25 of this appendix for additional information concerning transportation infrastructure and who is responsible for maintaining it.

No changes were made to the EIS as a result of these comments.

For additional information regarding the timeframe of the EIS analysis, see Section 2.6.4 [Assumptions—Timeframe of the Proposed Action].

Comments: (22-12) (98-21-2) (99-40-8) (116-14) (167-13-6) (168-2-5) (172-11) (213-3) (224-26) (293-3) (315-7) (324-1-10) (324-1-18)

D.2.17 Comments Concerning Socioeconomics

D.2.17.1 Socioeconomics—Economic Development Alternatives

The NRC received several comments expressing various opinions about economic development in the region. Several commenters voiced general disagreement that the proposed CISF project would be a favorable economic development opportunity in the region. Commenters stated that they preferred other energy projects or the recreational and medicinal cannabis industry to diversify the economy over the proposed project. One commenter described nine key target industry sectors and economic assistance opportunities that are important in New Mexico.

Response*: The NRC staff does not analyze the market conditions or business decisions of the entity submitting a license request as part of its licensing review. This environmental review focuses on the potential environmental impacts that could result from the proposed CISF and the impacts to those who live, work, or recreate in and around the proposed CISF project. State and regional economic development decisions are not within the scope of the environmental review and are not addressed in the EIS. Additional information on the NRC's economic analysis is provided in EIS Sections 3.11 and 4.11, and additional information on the alternatives evaluated in the EIS is provided in Section 2.7 [Comments Concerning Alternatives] of this appendix.*

No additional changes were made to the EIS as a result of these comments.

Comments: (98-25-1) (98-31-9) (99-9-7) (99-28-2) (374-4)

D.2.17.2 Socioeconomics—Economic Impacts

The NRC staff received comments about the socioeconomic impacts from the proposed project. Some commenters stated that the EIS fails to provide thorough information on statewide economic development efforts, and on financial impacts from employment and revenues in the area. One commenter stated that the wealth in the region from the oil industry is not evenly distributed. Some commenters questioned what the economic impact would be as a result of an accident or contamination from the proposed project on other industries, including economic impacts on the oil and gas industry, and asked who would compensate the State of New Mexico and communities for any revenue losses. One commenter stated that the proposed action is safer and economically superior compared to the No-Action alternative.

Response*: In EIS Sections 4.11 and 5.11, the NRC staff evaluated the potential economic impact of the proposed CISF on employment and revenues from the proposed project. The NRC staff applied the U.S. Department of Commerce Bureau of Economic Analysis (BEA), Economic and Statistics Division's economic model called RIMS II to estimate the change in local economy, including jobs, from the proposed project. Regarding the comment about the uneven distribution of wealth, the NRC staff provided detailed information on multiple census levels including the census block level, census county division level, and county level regarding low-income families and individuals (EIS Section 3.11 and Appendix B). Supplemental information on the assumptions and calculations of the potential economic impact from the proposed project is provided in EIS Appendix B. A cost-benefit analysis is included in the EIS in Chapter 8 with supplemental information provided in Appendix C.*

The purpose of the EIS is to evaluate reasonably foreseeable environmental impacts, not speculative events or worst-case scenarios. The very low risk of accidents due to construction, operation, and decommissioning of the facility is addressed in EIS Section 4.15 and will be verified in the NRC's safety analysis. The EIS also notes in Section 8.3.2.1 that Holtec has proposed a license condition addressing liability and financial assurance arrangements with its customers that would be applicable to events occurring during CISF operations. That license condition will address liability and financial assurance arrangements with its customers that would be applicable to events occurring during CISF operations. The NRC staff will consider this proposed condition in its safety review. The NRC's safety review also considers the financial capability of the applicant to construct, operate, and decommission the facility, with funding assurances required for decommissioning activities. The EIS socioeconomic and cost-benefit analyses do not estimate the cost for any accidents or assess the economic cost to other resources from an accident because the NRC staff has not identified any credible accidents at the proposed CISF, and the EIS SNF transportation analysis assumes no releases if an accident occurred. EIS Section 8.3.2.1 also discusses the availability of liability coverage under the Price-Anderson Act for incidents of radiological release during SNF transportation.

The NRC does not have regulatory authority to advise States and local officials on infrastructure projects or economic development decisions. Beyond determining compliance with the NRC's regulatory standards, the NRC does not exercise regulatory authority over the business decisions of private companies or organizations such as ELEA or Holtec.

No changes were made to the EIS as a result of these comments.

Comments: (98-11-5) (105-4) (168-16-7) (168-26-2) (169-8-8) (169-8-10) (170-15-4) (170-17-1) (215-9) (231-8) (243-3) (247-20) (259-3) (323-1-4) (359-3) (374-6) (379-5) (380-16) (380-24)

D.2.17.3 Socioeconomics—Impact on Other Industries

The NRC staff received several comments that expressed concern that the proposed CISF project would jeopardize other important industries in southeastern New Mexico, including oil and gas, potash, tourism, dairy and livestock products, fruit and nut farms, and ranching. One commenter stated that construction would disrupt grazing operations on neighboring public lands and reduce forage through the spread of noxious weeds. Some of those commenters stated that the risks associated with the proposed project are not worth the potential impacts on other jobs and industries in the region. Several commenters stated that they think the project is safe and would not jeopardize the environment or other industries in the region, such as cattle grazing or farming. One commenter stated that the proposed project would undermine business confidence and jeopardize business growth in the region. Another commenter stated that social concerns that communities might have, including the concept of disparate impacts, should be evaluated. One commenter stated that the EIS does not consider impacts to oil and gas development in the area.

Response: *The NRC staff recognizes the importance of other industries in the region, particularly agriculture, mineral extraction, oil and gas extraction, and tourism, and the importance that they have on the regional economy. The purpose of the EIS is to evaluate reasonably foreseeable environmental impacts, not speculative events or worst-case scenarios. EIS Section 4.11 provides additional information on the NRC's economic analysis for this project, including financial provisions for potential liability due to accidents. The NRC conducts a concurrent safety review of the application along with the environmental review that will be published in a Final Safety Evaluation Report; the results of the NRC's safety review will address the analysis in Holtec's application that there are no credible accidents that would result in a release of radioactive material into the environment. The EIS socioeconomic and cost-benefit analyses do not estimate the cost for any accidents or assess the economic cost to other resources from a potential accident, and the EIS SNF transportation analysis assumes no releases of radiological material if an accident occurred during transport of the SNF from origin site to the proposed facility.*

Regarding comments about potential impacts to local cattle ranchers, the NRC staff evaluated potential impacts to grazing in EIS Section 4.2.1.1. The proposed project would eliminate grazing on 133.5 ha [330 ac] of land that would result in a loss of 0.01 percent of the land available for grazing in Lea County. The NRC staff concluded that there would be only a minor impact on local livestock production in Lea County because there is abundant open land available for grazing around the storage and operations area and surrounding the proposed project area. Additional information regarding potential impacts on agriculture is provided in Section 2.8.7 of this appendix [Land Use—Potential Impacts on Agriculture].

Regarding the concern that the proposed project would reduce forage for grazing cattle on neighboring public lands through the spread of noxious weeds, the NRC staff evaluated impacts on vegetation from the proposed project that could occur within an approximate 3.2 km [2 mi] radius of the proposed project area in EIS Section 4.6. The NRC staff evaluated potential impacts on vegetation as result of cumulative impacts that could occur within an approximate 8-km [5-mi] radius from the middle of the proposed CISF project area in EIS Section 5.6. The EIS addresses the potential spread of noxious weeds during operations in Section 4.6.1.2. No noxious weeds have been identified at the proposed project area and Holtec stated in its ER that it would control new growth of noxious weeds with appropriate spraying techniques. The NRC staff also recommended in EIS Section 4.6.1.2.1 that Holtec implement additional steps to monitor for and mitigate the potential spread of weeds that may occur along the rail spur. The

BLM, not NRC, will provide relevant requirements in a permit to construct the rail spur to mitigate the spread of noxious weeds. Additional information regarding potential impacts on vegetation is provided in Section 2.14.3 of this appendix [Ecology—Impacts on Vegetation].

Regarding the assessment of property values near the proposed CISF and along the transportation routes, the valuation of agricultural products grown in the region, and related impacts on businesses and farmers as a result of these valuations due to the existence of the proposed action (Phase 1), the NRC staff determined that positive or negative impacts on these markets are too speculative to project and evaluate in detail and are outside the scope of this EIS. Additionally, a detailed analysis of how public perception could potentially influence other industries in the vicinity of the proposed project and along transportation routes is speculative and also outside the scope of this EIS. Similarly, the desire that communities should be compensated for being willing to host a CISF is outside the scope of this EIS and the NRC's regulatory authority.

The effects of the proposed project on land use, including use of public lands and rights-of-way, recreational and tourism sites, wilderness areas, and visual and scenic resources in the area are assessed in EIS Sections 4.2 and 4.10. The future use of land in the area for extractive purposes (i.e., potash and oil and gas) is speculative because assumptions about future uses would be based only on the current ownership of subsurface mineral rights and not actual uses. Therefore, the EIS does not attempt to quantify the potential revenues that could potentially be generated from various combinations of land uses near the proposed CISF. EIS Section 4.2.1 discusses potential impacts to mineral extraction activities in the vicinity of the proposed project, and the NRC staff concludes that the land use impacts from the proposed project would be SMALL. The NRC staff also concludes in EIS Section 5.2 that the proposed CISF would add a SMALL incremental effect to the MODERATE impacts to land use from other past, present, and reasonably foreseeable future actions in a 10-km [6-mi] area around the proposed project. Several responses to comments in this appendix provide additional information on oil and gas leasing: Section 2.8.5 [Land Use—Oil and Gas Leasing], Section 2.8.6 [Land Use—Potash Leasing], and Section 2.8.4 [Land Use—Mineral Extraction Activities].

Regarding jobs and the potential effects that the proposed project could have on the overall local economy in the region, EIS Section 4.11 includes an explanation of development of the socioeconomic ROI (i.e., where the most socioeconomic changes are expected to occur from the proposed CISF) and a discussion of the major industries and employers within the socioeconomic ROI. EIS Section 4.11 also provides an analysis of potential socioeconomic impacts that could occur from the proposed CISF with respect to taxes, employment, housing, and public services. The NRC staff applied the U.S. Department of Commerce BEA, Economic and Statistics Division's economic model called RIMS II to estimate the change in local economy, including jobs, from the proposed project. In EIS Section B.1, the NRC staff explain that the RIMS II estimates account for inter-industry direct and indirect impacts, as well as for induced impacts that are associated with the purchases employees made. EIS Chapter 5 evaluates potential cumulative impacts from a variety of past, present, and reasonably foreseeable future actions that could affect individuals and communities within 80 km [50 mi] of the proposed CISF, including past and future boom and bust cycles in the region from the oil and gas industry. The NRC staff determined that the evaluation of impacts on other industries in the ROI is sufficient. In addition, EIS Chapter 8 includes a cost-benefit analysis, as explained in Section 2.20 [Comments Concerning Cost Considerations] of this appendix. EIS Section 4.15 includes an explanation of credible accidents, as determined by the NRC safety evaluation, and EIS Chapter 5 includes reasonably foreseeable events as part of the cumulative impacts *analysis, and further discussion on the accidents analysis is provided in Section 2.25 [Comments Concerning Accidents] of this appendix.*

No changes were made to the EIS as a result of these comments.

Comments: (17-1) (22-8) (22-10) (49-3) (54-3) (96-6) (97-3) (98-45-2) (99-1-2) (99-30-6) (146-14) (151-11) (156-3) (167-6-7) (168-16-5) (168-20-5) (168-21-1) (169-8-5) (169-8-6) (170-2-5) (170-15-7) (240-3-1) (307-2-2) (322-3) (326-1) (326-2) (343-6) (374-2) (374-3) (374-5)

D.2.17.4 Socioeconomics—Jobs

The NRC received comments about potential jobs that would result from the proposed Holtec CISF. Some commenters asked how many of the estimated new jobs that would be created by the proposed CISF project would go to local residents. Some commenters stated that the employment opportunities are not worth the risk of the proposed CISF project, while other commenters stated that, with the employee base present in the area, the proposed project would create jobs as well as other opportunities. One commenter suggested jobs could be created from renewable energies.

Response: *Socioeconomic impacts, such as labor and income associated with the construction, operation, and decommissioning of the proposed CISF and availability of workforce in the region are described and analyzed in EIS Section 4.11. In particular, the NRC staff considered the potential socioeconomic impacts from the potential direct and induced jobs created, which Holtec estimated to be up to 135 jobs during peak employment. However, specific hiring decisions (e.g., locations for employee recruitment, salaries, and benefits) are outside the jurisdiction of the NRC and outside the scope of the EIS.*

The licensing action being evaluated by the NRC is the storage of SNF at the proposed CISF. Therefore, renewable energy is not an alternative to the proposed action that would meet the purpose and need. Additional information about the alternatives considered in this EIS is provided in this appendix in Section 2.7 [Comments Concerning Alternatives]. Comments addressing general concerns and opposition are addressed in Section 2.35 [Comments of General Opposition] of this appendix.

No changes were made to the EIS as a result of these comments.

Comments: (32-1) (79-5) (90-12) (98-46-2) (99-29-7) (99-35-4) (99-41-9) (116-12) (145-1) (168-16-6) (175-2) (214-3) (254-5) (257-2) (308-4)

D.2.17.5 Socioeconomics—Population Projections

The NRC staff received comments about population estimates in the EIS. One commenter stated that the text in EIS Section 4.11.1.1 regarding the potential number of new people that may move into the region is inconsistent with information provided in EIS Table 4.11-2. The same commenter stated that, because the population in the EIS reflects 2017 estimates and no population estimates are provided at the time that construction starts, if the license is issued, the percent increase of new workers moving into the ROI would be less than the EIS estimates. The same commenter also questioned whether population projections should be considered for determining housing impacts. One commenter had concerns about the increasing population in the region that could result from population migration due to natural disasters such as wildfires.

Response: *The NRC staff acknowledges the discrepancy the commenter pointed out in the draft EIS and has corrected the error in EIS Section 4.11.1.1 to be consistent with EIS Table 4.11-2. This correction does not change the conclusions of the EIS.*

The NRC staff agrees that it is possible that the percent increase of new workers moving into the ROI may be less at the time construction starts if a license is issued. The NRC analysis is conservative in this regard and is based on the most recent U.S. Census Bureau (USCB) 5-year American Community Survey data. EIS Section 5.11 explains that forward-looking population projections through 2060 for this area have not been accurate enough to provide reliable information, and that the population growth predictions are difficult, actual population size predictions are likely unreliable, particularly where the oil and gas industry boom and bust cycles dominate the socioeconomic landscape.

The NRC staff considered housing needs for up to 57 new households in the 4-county ROI during concurrent construction and operations of the full build-out of the proposed CISF project (a 37-year time period) in EIS Section 4.11.1, and in context of potential future populations and other actions in the region through 2060 in EIS Section 5.11. EIS Section 5.11.1 states that the NRC staff anticipates that, although exact numbers are unpredictable, there will be a rise and fall of population in the geographic scope of the analysis in the future. EIS Section 5.11 states that the NRC staff has confidence that the regional plans described to build additional housing, improve traffic congestion, and improve water systems located within the geographic scope for this socioeconomic analysis are sufficient to support the anticipated population rise and fall of the region through 2060. Therefore, the NRC staff evaluation of housing impacts in the ROI is reasonable.

Independent of these comments on the EIS, the population data was updated throughout the EIS to reflect the newly available USCB data for the period between 2015 and 2019. The population updates did not change the EIS conclusions.

Comments: (289-2) (381-16) (381-17) (381-18)

D.2.17.6 Socioeconomics—Positive Economic Development

The NRC staff received several comments that support the proposed project because of its potential to provide the region with jobs, economic development opportunities, and economic diversification in the region. Some commenters stated support of the proposed project because of the project's potential to provide the region with economic development opportunities that would stabilize economic fluctuations in other industries. Some commenters stated that the revenues generated from the proposed project would be beneficial to the region. Some commenters cited the existing presence of nuclear technology and workers in the region to support an additional nuclear project.

Response: *The NRC staff analyzed the potential socioeconomic impacts that could result from the construction and operation of the proposed CISF. EIS Section 4.11 describes potential effects on employment, housing, tax structure, and community services within the region of influence. The NRC staff also conducted a cost-benefit analysis of the proposed project, which is provided in EIS Chapter 8. However, the NRC staff does not base licensing decisions on the economic benefits or costs of a proposed project.*

The NRC staff updated the EIS with the most recently available socioeconomic data. Related changes were made to EIS Section 4.11 to further clarify the estimated revenues from the *proposed CISF project and the estimated annuities that Holtec anticipates would be paid to the State and local government.*

No further changes were made to the EIS text as a result of these comments.

Related comments that were made in support of the project are found in Section 2.36 of this appendix [Comments of General Support].

Comments: (23-9) (34-6) (60-3) (78-2) (98-4-2) (98-5-2) (98-5-3) (98-7-3) (98-12-1) (98-17-1) (98-17-3) (98-22-2) (98-55-4) (99-7-2) (99-8-1) (169-13-4) (175-1) (245-2)

D.2.17.7 Socioeconomics—Socioeconomic Assumptions

The NRC staff received comments about assumptions made in the EIS for the socioeconomic assessment including assumptions related to the number of materials purchased locally for the proposed project, the number of indirect jobs that the project would create, and gross receipt taxes (GRT). Some commenters were concerned about the additional burden the proposed project would have on public services or community infrastructure.

Response: *The comment that Holtec did not provide an estimate regarding the number of materials that would be purchased locally for the proposed project is correct. EIS Section 4.11.1.1 states "(t)he NRC staff estimates that applicants purchase approximately 10 percent of their construction materials locally (NRC, 2016); however, Holtec did not provide a detailed estimate of the types and quantities of materials or where materials would be purchased or sourced; therefore, a detailed analysis of the sources for these materials and supplies has not been conducted, and the estimated tax implications from these purchases are not evaluated in this EIS." The reference cited is based on NRC's experience established from previous projects, which indicate that applicants purchase approximately 10 percent of their construction materials locally. Therefore, the NRC staff believes this is an appropriate assumption for its analysis because it accounts for some goods being locally purchased.*

Regarding the local tax revenues that could result from the proposed project, the NRC staff does not disagree that there could be minor income tax benefits as a result of GRT from the proposed project. The socioeconomic analysis in the EIS is intended to provide a reasonable estimate of the potential effects within the ROI, based on the information provided in the application. As previously stated, Holtec did not provide a detailed estimate of the types and quantities of materials or where materials would be purchased or sourced, and the NRC staff did not speculate about the many assumptions that would be necessary to separately calculate the GRT impact with precision. However, the RIMS II estimate for the region does account for the economic value generated from taxes and provides sufficient information to conclude that the proposed project would generate a positive effect. EIS Section 8.3.1 states that for the duration of the license term, the proposed CISF would positively impact local finances through increased taxes and revenue.

Contrary to the comment regarding NRC's lack of analysis of additional burden, the NRC staff did perform an analysis in the EIS that concludes that the proposed project would have a minor additional burden on public services or community infrastructure. EIS Table 6.3-1 provides Holtec's proposal to limit potential socioeconomic impacts, which is to "(p)referentially source the labor force from the surrounding region to reduce any burden on public services and community infrastructure (e.g., housing, schools) in nearby towns." The commenter may have confused this proposed mitigation with the NRC staff's analysis of potential impacts on public *services as stated in EIS Section 4.11. The EIS evaluates the additional burden that the proposed project would place on public services or community infrastructure. EIS Section 4.11 describes that an increase of less than 0.1 percent of the overall population in the ROI would result in a SMALL impact on public services.*

The NRC staff considered transportation, infrastructure, personal support (e.g., hospitals and police), and utilities including drinking water quantity in the socioeconomic impact analysis on public services. The NRC staff does not anticipate a decline in revenue because of land use conflicts with the oil and gas industry. However, revenue declines may result from the typical boom and bust cycles of the oil and gas industry; such sudden economic changes are too speculative to evaluate and are, therefore, not analyzed in this EIS. To clarify, SMALL impacts do not mean that there would be no impacts, but rather that they would be minor. The NRC defines SMALL impacts as those impacts that would neither destabilize nor noticeably alter any important attribute of the resource.

Additional information on land use can be found in EIS Sections 3.2, 4.2, and 5.2.

No changes were made to the EIS as a result of these comments.

Comments: (157-3-5) (157-3-7) (157-3-8) (157-4-3) (157-4-10) (247-21)

D.2.17.8 Socioeconomics—Taxes, Royalties, and Property Values

The NRC staff received comments about various estimates and outcomes from the proposed project related to taxes, royalties, and property values. One commenter suggested that an annual royalty charge should be paid to the State of New Mexico in return for accepting the risk of the proposed CISF project. Two commenters called on residents to demand to see revenue-sharing agreements between Holtec and municipalities, and to ask additional questions about contract details. Another commenter stated that the socioeconomic impact is not small or moderate, citing that the EIS does not consider the impact on property values for every homeowner along the proposed rail or trucking routes for this project. One commenter stated that property values increased after the WIPP facility was developed, and a different commenter stated that studies showed that property values went down because of a proposed [low-level] radioactive storage facility in Texas. One commenter stated that the EIS does not provide a basis for the proposed annuity payments.

Response: *EIS Section 4.11 provides an analysis of estimated economic benefits and costs directly associated with the proposed action or alternatives (e.g., costs for building and constructing the proposed Holtec CISF), and EIS Chapter 8 includes a cost-benefit analysis comparing the major costs and benefits associated with the proposed CISF.*

EIS Section 4.11.1.2 references Holtec's RAI response dated March 15, 2019, (Holtec, 2019) which states that Holtec would expect to pay annuity payments in the range of $15 million to $25 million to Lea County, Eddy County, and to the cities of Hobbs and Carlsbad. The NRC staff added text in EIS Section 4.11 to further clarify the estimated revenues from the proposed CISF project, and the estimated annuities that Holtec estimates would be paid to the State of New Mexico and local government. The NRC does not have regulatory authority to influence decisions of State and local tax officials in determining what is taxed, how taxes are collected, how tax revenue is allocated, and how property values are determined. As stated in the Holtec Scoping Summary Report, beyond determining compliance with the NRC's regulatory *standards, the NRC does not exercise regulatory authority over the business decisions of private companies or organizations such as ELEA or Holtec.*

Regarding the assessment of property values along the transportation routes, the NRC staff determined that positive or negative impacts on property values are speculative to project and evaluate in detail. The analysis of such issues is outside the scope of this EIS, which is to identify impacts because of the proposed action of building and operating a CISF. Additionally, a detailed analysis of how public perception could potentially influence other industries in southeastern New Mexico and along transportation routes is speculative and outside the scope of this EIS. Similarly, the notion that communities should be compensated for being willing to host a CISF is outside the scope of this EIS and outside NRC authority.

Other than the clarification edits to EIS Section 4.11, no changes were made to the EIS as a result of these comments.

Comments: (74-11) (98-38-4) (98-55-3) (98-56-6) (98-58-9) (157-3-4) (167-8-5) (307-1-13)

D.2.18 Comments Concerning Environmental Justice

D.2.18.1 Environmental Justice—Concerns About Environmental Justice

The NRC staff received many comments about environmental justice concerns. Several commenters expressed disagreement with the proposed project based on environmental justice and disagreement regarding the environmental justice conclusions in the EIS. Some commenters cited a failure to address public comments that have been submitted to the NRC about environmental justice and disproportionately high and adverse impacts to minority and low-income populations. Other commenters stated that the proposed project poses an environmental justice violation. Several other commenters also stated that the proposed project demonstrates environmental racism, an extension of nuclear colonialism, and that it is unfair to license the proposed CISF in New Mexico because of the large number of other nuclear-related facilities and past nuclear activities in the State of New Mexico. Some commenters provided a reference to a map where nuclear-related facilities and other features such as landfills, releases of hazardous materials, and oil and gas development in the State of New Mexico are located; some of those facilities are legacy nuclear testing or radiological facilities, and others are current or proposed facilities. One commenter provided an article about the history of environmental racism. Some commenters stated that the Waste Control Specialists' existing low-level waste facility and the proposed ISP high-level waste CISF in Andrews County, Texas, should be included in the Holtec EIS environmental justice analysis. A few commenters stated that an accident would devastate other industries, indigenous people, and low-income communities. Several commenters expressed their opposition to moving spent nuclear fuel across the United States to a predominantly minority or impoverished community. Commenters also stated that the lack of consent-based siting is an environmental injustice. A few commenters stated that the Tribes should have been consulted about the proposed project. As part of their comments focused on environmental justice, two commenters also noted concerns about the geologic stability of the site. Two commenters stated that the NRC committed an environmental justice violation because a group of largely Hispanic people bringing forth contentions were not recognized as having legal standing in the Holtec proceedings by the ASLB.

The NMED staff stated that (i) minority and low-income populations in New Mexico have already been disproportionately affected from nuclear energy and weapons programs of the United States, and (ii) the EIS fails to support how New Mexicans, who they state are disproportionately at greater risk, will be adequately protected from exposure to the radioactive and toxic contaminants that the proposed action could release to air and water.

Response: *The NRC staff evaluated environmental justice impacts in detail in EIS Sections 4.12 and 5.12. The purpose of the evaluation is to determine the potential physical environmental impacts and the potential radiological health effects from constructing, operating, and decommissioning and reclaiming the proposed CISF, including the rail spur, to identify means or pathways for the proposed project to disproportionately affect minority or low-income populations. The environmental justice impact analysis performed for the EIS was conducted in accordance with the NRC's "Final Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions" (69 FR 52040) and NUREG–1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs" (NRC, 2003), which describes environmental justice procedures to be followed in NEPA documents prepared by the NRC's Office of Nuclear Material Safety and Safeguards (NMSS). These guidance documents and the EIS's analysis of human health and the environment are consistent with the Council on Environmental Quality's "Environmental Justice Guidance Under the National Environmental Policy Act" (CEQ, 1997) and the Federal Interagency Working Group on Environmental Justice and the NEPA Committee's "Promising Practices for Environmental Justice Methodologies in NEPA Reviews" (EPA, 2016). The NRC staff's methodology for the EIS's environmental justice analysis is explained in response to comments in Section 2.18.3 of this appendix [Environmental Justice—NRC's Environmental Justice Methodology].*

The NRC strives to conduct its regulatory responsibilities in an open and transparent manner, consistent with the NRC Approach to Open Government (https://www.nrc.gov/public-involve/open.html). The NRC is committed to engaging with all stakeholders fairly and ethically, without discrimination or racism. All stakeholders, including government representatives, Tribal members, and members of the public, are encouraged to participate in the NRC's licensing actions. As part of the scoping process for this project that informed development of the EIS, the NRC staff conducted scoping meetings and prepared a scoping summary report (NRC, 2019a). Many comments regarding environmental justice were received during the scoping period, and the NRC staff considered each of them.

As discussed further in Section 2.2.6 of this appendix, the NRC's licensing framework is not a consent-based process; therefore, consent-based siting and requests for such are beyond the scope of this EIS. The AEA of 1954 requires that the NRC establish criteria for the licensing of nuclear facilities, including spent nuclear material storage facilities. Absent Congressional direction to do so, the NRC may not deny a license application for failure to conduct consent-based siting. The NRC licensing process does, however, offer multiple opportunities for public involvement, including an opportunity for public comment on the EIS scoping process and the draft EIS. Hearing opportunities are also available, but are subject to the procedural requirements (e.g., standing and contention admissibility) in 10 CFR Part 2. A comment response that describes the adjudicatory hearing process is provided in Section 2.1.1 of this appendix.

EIS Sections 4.12 and B.2 explain that the NRC staff considered the potential human health and environmental effects such as land use, transportation, soils, groundwater quality, groundwater water quantity, ecology, air quality, socioeconomics, and the expected radiological and nonradiological health impact from the proposed action on minority and low-income populations. The NRC staff also evaluated the potential impacts on public and occupational health and safety for the proposed action in EIS Section 4.13, including environmental transport to air, water, soil, *and subsequent inhalation or ingestion. The NRC staff also considered means or pathways for the proposed project to disproportionately affect minority or low-income populations (e.g., crop production and subsistence consumption of fish) as described in EIS Sections 4.12 and B.2. No means or pathways have been identified from the proposed project by the NRC staff, the public, Tribes, or other agencies that would have potential disproportionately high and adverse health effects on minority or low-income populations. Comments related to the assessment of transportation risks from accidents are addressed in Section 2.9 of this appendix [Comments Concerning Transportation of SNF: Safety/Accidents].*

The NRC staff reviewed the map that some of the commenters referred to in their comments that shows current and past facilities and features in New Mexico. Some of the facilities and features the commenters identified are legacy nuclear testing sites and radiological facilities. All the facilities on the map that commenters provided are within the geographic scope of influence of the proposed CISF and were considered during the draft EIS development, with the exception of the Gnome-Coach site, an underground nuclear test facility. Information about the Gnome-Coach site was added to EIS Section 5.1.1.2, and this site was evaluated within the cumulative analysis of each resource section where appropriate. The NRC staff considered potential impacts from past, present, and reasonably foreseeable future actions within 80 km [50 mi] of the proposed CISF, including the Waste Control Specialists existing low-level waste facility and the recently licensed but not constructed ISP high-level waste CISF in Andrews County, Texas. A detailed description and a map of the actions that the NRC staff considered for all resources, including environmental justice, are provided in EIS Section 5.1.

Additional information and responses to comments with concerns about potential effects on other industries in the area is provided in this appendix in Section 2.17.3 [Socioeconomics—Impact on Other Industries].

Additional information and responses to comments with concerns about the geologic stability of the site and the geologic resources is provided in this appendix in Section 2.13 [Comments Concerning Geology and Soils].

Information on accidents at the facility can be found in Sections 2.25 and during transportation in Section 2.9, of this appendix. Information about Tribal consultations is provided in EIS Sections 1.7, 3.9, and 4.9, and in Section 2.19 of this appendix [Comments Concerning Historic and Cultural Resources]. Additional information about NRC's Tribal Policy Statement (82 FR 2402) is provided in Section 2.19.6 [Historic and Cultural Resources—Tribal Sovereignty] of this appendix.

Because the USCB released updated information after the draft EIS was developed, the NRC staff made changes to relevant sections throughout the EIS, and specifically to EIS Section 4.11, to reflect the most currently available data.

No changes were made to the EIS as a result of these comments.

Comments: (70-1) (91-1) (91-3) (91-6) (91-7) (91-10) (91-11) (91-12) (91-20) (91-21) (93-6) (98-14-8) (98-23-10) (98-24-2) (98-29-7) (98-36-3) (98-36-8) (98-38-2) (98-41-4) (98-44-5) (98-45-3) (98-50-2) (98-50-3) (98-50-7) (98-51-7) (99-12-5) (99-13-2) (99-13-4) (99-14-5) (99-14-7) (99-18-2) (99-20-5) (99-21-7) (99-32-6) (99-36-5) (99-39-1) (99-40-1) (105-2) (105-3) (105-5) (105-6) (105-8) (105-9) (105-12) (107-1) (109-22) (117-6) (140-4) (151-2) (167-8-6) (167-13-5) (168-12-3) (168-20-4) (168-23-5) (169-5-8) (169-13-1) (170-10-2) (170-10-4) (170-20-3) (170-22-8) (170-22-10) (170-28-5) (184-1) (196-2) (196-7) (199-1) (215-15) (224-29)

(231-4) (231-5) (231-6) (237-4-7) (237-4-8) (240-2-17) (246-2) (251-17) (266-13) (281-4) (287-5) (291-3) (294-5) (294-7) (299-2) (307-1-22) (308-1) (315-5) (328-3-7) (337-1) (343-3) (345-5) (345-7) (351-1) (351-2) (359-4) (363-2) (364-1-8) (364-2-2) (364-2-3) (365-1) (366-1) (368-1) (368-3) (373-11) (399-1) (399-5) (399-6) (402-4) (428-5)

D.2.18.2 Environmental Justice—Concerns Along Transportation Corridors

The NRC staff received comments stating that transporting spent nuclear fuel represents an environmental justice burden. One commenter requested that national public meetings should be held along potential transportation corridors. Some commenters stated that potential environmental justice populations would be most affected by transporting spent fuel to the proposed Holtec CISF and questioned whether non-English speaking communities along transportation routes would be aware of shipments or of the proposal to construct a CISF.

Response: *The NRC staff describes in EIS Sections 3.11.1.3, 4.11, and B.2 the methods and steps that were taken to conduct the environmental justice analysis for this EIS. Responses to comments about other environmental justice concerns are provided in Section 2.18.3 [Environmental Justice—NRC's Environmental Justice Methodology] of this appendix. EIS Section 4.3.1.2.2 includes an analysis of the impacts of transportation and radiological impacts to workers and the public along representative routes (because the actual transportation routes have not yet been selected) from on-site storage facilities to the proposed Holtec CISF, and the NRC staff concluded that no significant impacts are anticipated along transportation routes. With that considered and given that exact transportation routes have not yet been identified, an environmental justice analysis of the potential effects along possible transportation routes associated with this proposed CISF was not included in this EIS. Radiological impacts to the public and workers from spent fuel shipments from a reactor site have previously been evaluated by the NRC (NRC, 2014b, 2001). Previous analyses confirmed that the radiological impacts from spent fuel transportation were low and in compliance with NRC regulations. The NRC staff concluded that the regulations for transportation of radioactive material are adequate to protect the public against unreasonable risk of exposure to radiation from spent fuel packages in transport. Therefore, disproportionately high and adverse impacts on environmental justice populations are not expected. Responses to other comments related to the assessment of transportation risks from accidents are addressed in Section 2.9 of this appendix [Comments Concerning Transportation of SNF: Safety/Accidents].*

The NRC staff is committed to ensuring an open and transparent process that allows for ample public participation. The NRC staff held public meetings near the site location during scoping, as well as draft EIS webinar meetings that were accessible to participants located throughout the country, including along transportation routes. Spanish language materials regarding the project were made available, and the public meetings were additionally advertised in both English and Spanish. Additional information about the public participation process is provided in EIS Section 1.4.1 and Section 2.2 [Comments Concerning Public Participation] of this appendix.

Responses to comments about consent-based siting are addressed in Section 2.2.6 of this appendix [NEPA Process: Public Participation—Consent Based Siting].

No changes were made to the EIS as a result of these comments.

Comments: (50-7) (98-48-3) (99-17-1) (129-2) (135-2) (146-3) (150-9) (167-1-1) (177-2) (372-21)

D.2.18.3 Environmental Justice—NRC's Environmental Justice Methodology

The NRC staff received questions and comments about the environmental justice analysis in the EIS. Commenters asked if the NRC interviewed people in different socioeconomic groups within the proximity of the proposed CISF project or along transportation corridors. One commenter stated that there is a fundamental inadequacy of doing modeling to evaluate environmental justice. Some commenters suggested that minority and low-income populations in the region of analysis are substantially more vulnerable to negative effects or may be impacted by cumulative impacts. Other commenters suggest that the NRC staff did not follow NRC's guidance, Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994), or the CEQ guidance in evaluating environmental justice impacts. Commenters pointed out that New Mexico is a majority minority state, and some commenters went on to explain that the State population should be compared to the population of the United States. Some commenters stated that the NRC staff selected an inappropriate area of assessment (some commenters stated the area is too large, while others stated the area is too small), and some commenters stated that the justification for selection of this area of assessment is not provided in the EIS. Commenters also stated that the EIS does not consider other factors such as health, economic, or occupation as part of the environmental justice analysis. Commenters also raised concerns related to environmental justice along transportation routes and legacy sites in New Mexico. Two commenters stated that a risk assessment must be done that evaluates all potential release scenarios and that quantifies impacts to vulnerable populations in New Mexico.

Response: *The NRC staff analysis of environmental justice impacts is presented in EIS Sections 4.12 and 5.12, and, as described throughout this response, the NRC staff used up-to-date information and methodology consistent with common practice to develop a robust analysis. Furthermore, the NRC staff developed a considerable list of Tribes, local agencies, and organizations (e.g., county commissioners, utilities, and economic development groups) to engage for their input into the environmental justice impact analysis or for other related review topics. The NRC staff's engagement and outreach focused on groups local to the proposed CISF project area serving the locally affected communities. Although the NRC staff did not conduct individual interviews with local residents, through the NRC's notice of intent (83 FR 13802), the NRC invited potentially affected Federal, Tribal, State, and local governments; organizations; and members of the public to provide comments on the scope of the Holtec CISF EIS, which lasted for a 120-day scoping period. Scoping activities and interactions with hundreds of members of the public are documented in EIS Section 1.7 and Appendix A of the EIS, and in the Public Scoping Summary Report, Section A.5. Additional information about the public input process is described in Section 2.2 [Comments Concerning Public Participation] of this appendix. Additional information about NRC's Tribal Policy Statement (82 FR 2402) is provided in this appendix, Section 2.19.6 [Historic and Cultural Resources—Tribal Sovereignty].*

EIS Sections 3.11.1.3, 4.12, B.2, and the comment responses in this appendix, Section 2.18.1 [Environmental Justice—Concerns About Environmental Justice] explain the policies and guidance documents that the NRC staff followed in conducting the environmental justice impact analysis for the EIS. The NRC is an independent regulatory agency under the definition provided in 44 U.S.C. §3502(5) and is excluded from the mandates of Executive Order 12898. However, the NRC, in exercising its regulatory authority, acts in a manner consistent with the fundamental guidelines expressed in the Order by adopting practices to ensure that potential environmental justice impacts are evaluated in NRC environmental reviews. The NRC environmental justice analysis practices are described in the NRC's final policy statement on the

Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions (69 FR 52040).

Consistent with NRC's Environmental Justice Policy Statement and guidance in NUREG–1748, which considers the CEQ's guidance on environmental justice, (NRC, 2003; CEQ, 1997), the NRC staff considered the racial and ethnic minorities and the low-income populations using the most current data available from the USCB in the decennial census and census estimates of the American Community Survey. The NRC staff selected geographic units of analysis {i.e., block groups within 80 km [50 mi] of the proposed facility} and reference communities (i.e., census community districts, counties, and States) to compare against the geographic units of analysis. While the NRC's guidance was developed in 2003, the methodology the NRC staff used is also consistent with the 2016 Federal Interagency Working Group on Environmental Justice and NEPA Committee recommendations on evaluating environmental justice for NEPA reviews [EPA, 2016 (referred to as the 2016 report)] that provides guidance for agencies to assess majority minority populations. As such, the NRC staff conclude that the environmental justice analysis is sufficient, and independent modeling was not necessary to make the NRC staff's impact determination.

Justification for selecting an 80-km [50-mi] geographic assessment area for this EIS is provided in EIS Section B.2. There, the EIS states, "NRC's NMSS environmental justice guidance, as found in Appendix C to NUREG–1748 (NRC, 2003), recommends that the area for assessment for a facility in a rural area be a circle with a radius of approximately 6.4 km [4 mi] whose centroid is the facility being considered. However, the guidance also states that the scale should be commensurate with the potential impact area. Therefore, for the proposed CISF project, the NRC staff determined that an environmental justice assessment area with an 80-km [50-mi] radius would be appropriate to be inclusive of (i) locations where people could live and work in the vicinity of the proposed project and (ii) other sources of radiation or chemical exposure." There are 4 block groups within 6.4 km [4 mi] of the proposed CISF – the NRC staff determined that limiting the radius to 6.4 km [4 mi] omits important information about the geographic area that may experience potential impacts from the proposed action. Assessing 115 individual block groups does not in any way dilute the potential impacts on environmental justice populations. On the contrary, using a 6.4 km [4 mi] would ignore the reality that the proposed project is located in a rural area. The NRC staff determined that by expanding the area of assessment to 80 km [50 mi], the NRC staff conservatively considered potential impacts for far more members of the community than some commenters asserted. The NRC staff determined that the impact conclusion for environmental justice would not change if the assessment were conducted on a smaller group of people (i.e., within 6.4 km [4 mi] of the proposed CISF), because there are no means or pathways for the proposed project to disproportionately affect minority or low-income populations. EIS Table B-2 provides detailed data about each of the 115 census block groups, States, and counties within the 80-km [50-mi] geographic assessment area.

EIS Section 3.11.1.3 states, "In light of high minority populations in New Mexico and to better meet the spirit of the NRC guidance to identify minority populations, the NRC staff included census block groups with a percentage of Hispanics or Latinos at least as great as the statewide average." Again, the NRC staff used this conservative measure to identify a potential environmental justice population if a block group met one or both criterion for either the State or the county, whichever is lower. EIS Table B-2 provides a comparison of each block group–each block group was assessed based on its own population characteristics against their relevant State or county criterion, whichever is lower. The NRC staff determined that this method *identified more census block groups as having a potential environmental justice population than if the criterion for only one or the other (i.e., county or State) was used for comparison.*

Environmental justice evaluates whether there are disproportionately high and adverse human health or environmental effects of Federal programs, policies, and activities on minority and low-income populations. The NRC staff followed NRC's Policy Statement and guidance documents for identifying disproportionately high and adverse human health or environmental effects on minority populations and low-income populations and determined that no disproportionately high and adverse health or environmental effects on any environmental justice populations would exist (detailed in EIS Sections 4.12 and 5.12). Thus, in the absence of impacts to mitigate, the NRC staff did not recommend additional mitigations. Holtec has committed to many mitigation measures that would limit impacts to all resource areas and to all populations.

Regarding concerns about cumulative impacts to environmental justice communities, the NRC staff's analysis in EIS Chapter 5 considers the potential for overlapping impacts from past, present, and reasonably foreseeable future actions. The cumulative impacts analysis for environmental justice (EIS Section 5.12) and public and occupational health (EIS Section 5.13) were also conducted for an 80-km [50-mi] radius. Accordingly, legacy nuclear testing or radiological facilities that are not in the vicinity of the proposed CISF (i.e., outside the radius of analysis) were not evaluated for any resource area in the EIS. All data sources referenced in this EIS are publicly available.

Because the EIS is based on available information to characterize the baseline health conditions applicable to evaluating the proposed project, no new original public health research or detailed public health assessment studies were conducted for this EIS. EIS Section 4.3.1.2.2 does, however, include an analysis of the impacts of transportation and radiological impacts to workers and the public – but not specifically environmental justice populations – along representative routes from onsite storage facilities to the proposed Holtec CISF. Comments related to the assessment of transportation of SNF are addressed in this appendix in Section 2.9 [Comments Concerning Transportation of SNF: Safety/Accidents] and Section 2.18.2 [Environmental Justice—Concerns Along Transportation Corridors].

Because the USCB released updated information after the draft EIS was developed, the NRC staff made changes to relevant data throughout the EIS to reflect updated data. However, these data updates do not result in any changes to environmental justice impact determinations, and no additional changes were made to the EIS as a result of these comments.

Comments: (41-2) (54-5) (91-9) (91-18) (98-11-6) (98-11-7) (98-15-6) (98-27-7) (99-27-7) (105-1) (157-3-13) (157-4-4) (167-14-3) (169-16-3) (170-10-3) (170-15-6) (170-22-7) (231-7) (237-4-5) (237-4-6) (237-4-9) (322-12) (328-3-6) (328-3-8) (328-3-9) (345-6) (345-8) (351-4) (362-2) (370-2) (375-1-3) (376-1-9) (376-1-13) (376-1-19) (376-2-14) (376-2-15)

D.2.18.4 Environmental Justice—Use of Shallow Aquifers

The NRC staff received a suggestion from EPA that the EIS address whether minority and low-income populations are accessing the shallow aquifers in the proximity of the proposed CISF as a water source.

Response: *The NRC staff evaluated well data for shallow groundwater wells completed in the Quaternary alluvium and Dockum Group that could influence or be influenced by the proposed* *project and that were also in a minority or low-income block group. The NRC staff defined shallow groundwater wells as wells with a depth to water less than 91.4 m [300 ft] below ground surface. The NRC staff identified 47 active shallow groundwater wells used for purposes other than commercial or industrial (8 domestic wells, 5 domestic and stock wells, and 34 stock wells), all of which are located upgradient from the proposed project (NMOSE, 2020). The two nearest wells are characterized as stock wells, located 5.55 km [3.45 mi] east-northeast and 8.62 km [5.36 mi] east-southeast of the proposed CISF site. As described in EIS Section 3.5.2.2, in the vicinity of the proposed CISF project area, groundwater in the Dockum flows to the southwest and groundwater in the alluvium is discontinuous and has saturated thicknesses that are typically less than 7.6 m [25 ft].*

The 47 wells that the NRC staff identified are located in census block groups identified as having potentially affected minority populations (EIS Figure 3.11-4); however, because the wells are located upgradient from the proposed CISF site and the alluvium in the area is discontinuous, the NRC staff determined that potentially affected environmental justice (minority) populations are unlikely to be affected by water infiltration that may occur at the proposed project area. In addition, the EIS states that there are no credible accident scenarios for the proposed CISF project and, therefore, no potential for releases of radionuclides to air or ground (including to water resources) that could result in significant effects to any offsite populations (EIS Section B.2).

Additional information on groundwater resources is available in this appendix in Section 2.11[Comments Concerning Groundwater]..

The NRC staff revised EIS Section 4.12.1.1 to include the NRC staff's determination that potentially affected environmental justice populations are unlikely to be affected by water infiltration that may occur at the proposed project area.

Comment: (232-2)

D.2.19 Comments Concerning Historic and Cultural Resources

D.2.19.1 Historic and Cultural Resources—Comments and Concerns Regarding Historic and Cultural Resources

The NRC staff received several comments that expressed general concern for potential impacts on historic and cultural resources from the proposed project, including on land culturally significant to indigenous peoples. Two commenters were concerned about impacts to historic and cultural resources from transportation accidents. One commenter also noted the legacy nuclear concerns of the Tribal communities in New Mexico. One commenter stated that the proposed project areas is located on stolen indigenous land. One commenter stated that the EIS contains inaccurate statements about historic and cultural resources.

Response: *The NRC staff evaluated information about historic and cultural resources in the Holtec ER and from independent sources as part of the environmental review process. The characterization of historic and cultural resources in the proposed CISF project area is found in EIS Section 3.9; the impact analysis from the proposed CISF is in EIS Section 4.9, and the cumulative impacts are assessed in EIS Section 5.9.*

With respect to the concerns about transportation accidents affecting culturally significant land and resources, the NRC has conducted several risk assessments and other analyses to *evaluate the safety of SNF transportation during the past four decades. EIS Section 4.3.1.2 provides the NRC staff's transportation risk assessment and describes the potential radiological impacts of the transportation of SNF. The section describes that transportation accidents resulting in a release are extremely unlikely. The EIS transportation risk impact analysis calculation for members of the public, including environmental justice populations, are estimated to be below all applicable NRC regulations. For onsite accidents, the NRC safety regulations and guidance specify that the proposed CISF be designed to withstand various credible accidents, including natural external events. The NRC SER will include an evaluation and determination of (a) the adequacy of the design to withstand credible accidents, (b) the potential for a release of radioactive material to occur as a result of any such accident, and (c) the significance of any such release. The NRC would only issue a license to construct and operate the facility if safety and security requirements evaluated in the SER are met. Therefore, the risk and potential impacts of transportation accidents as well as onsite accidents is low.*

The Federal Government has a trust responsibility to Federally recognized Tribes, which includes fiduciary obligations to Federally recognized Indian Tribes, as explained in the NRC's 2017 Tribal Protocol Manual and the Tribal Policy Statement (82 FR 2402), which sets forth principles the NRC staff must follow in its government-to-government interactions with American Indian and Alaska Native Tribes. Section 1.D of the Tribal Protocol Manual (NRC, 2018b) explains that, for Federal agencies that hold Tribal assets, the trust responsibility establishes fiduciary obligations to the Tribes, including duties to protect Tribal lands and cultural and natural resources for the benefit of Tribes and individual Tribal members/landowners. This manual also clarifies that the NRC, as an independent regulatory agency, exercises its trust responsibility through its authorizing statutes; in this case, the Atomic Energy Act, NEPA, and the NHPA of 1966, as amended.

The comment regarding the significance of the region does not provide additional information for the NRC staff to evaluate or what historic and cultural resources could be potentially harmed by the proposed project or which statements in the EIS are false. Therefore, the NRC staff is unable to respond in detail to this comment.

No changes were made to the EIS as a result of these comments.

Additional public comment responses regarding transportation of SNF can be found in Section 2.9 of this appendix.

Comments: (30-2) (91-8) (98-24-1) (98-24-11) (98-29-5) (99-21-8) (99-21-9) (99-36-3) (109-2) (260-3) (288-3) (288-4) (294-8) (334-6) (337-4) (362-1) (368-4) (378-21) (378-23) (380-4) (380-6) (380-20) (380-26) (380-27) (381-13)

D.2.19.2 Historic and Cultural Resources—Concerns About Tribal Cultural Resources at the Proposed Project Area

The NRC staff received comments expressing concern about potential impacts to culturally significant land or to historic and cultural sites (historic properties) that are significant to Tribes; specifically, the Mescalero Apache and the Hopi Tribes. Several commenters were concerned about the potential for impacts to archaeological sites associated with Laguna Gatuna and Laguna Plata. One commenter inquired about the response from the four consulting Tribes. One commenter questioned the information sources the NRC staff used to identify and evaluate the potential impacts to cultural, historic, and archaeological resources.

Response: *The NRC staff evaluated information about historic and cultural resources in the Holtec ER and from independent sources as part of the environmental review process. The characterization of historic and cultural resources in the proposed CISF project area is found in EIS Section 3.9; the impact analysis from the proposed CISF is in EIS Section 4.9, and the cumulative impacts are assessed in EIS Section 5.9.*

Regarding the concerns about sites associated with Laguna Gatuna and Laguna Plata, EIS Section 4.9 includes an explanation of the direct and indirect APEs, which outlines where potential impacts are expected to occur as a result of the proposed project. The NRC staff, with the assistance of a professional archeologist and Tribal consultation, identified a direct and indirect APE for the proposed project. The APE for direct effects includes a total area of 201.51 ha [497.93 ac], and the APE for indirect effects includes a 1.6-km [1-mi] radius around the direct APE. While a portion of Laguna Gatuna is within the indirect APE, Laguna Plata is not within either APE. In other words, there would not be any project-related ground-disturbing activities within the direct APE that might impact either laguna. A portion of the Laguna Gatuna is within the indirect APE, but no historic properties were identified within the indirect APE and therefore none would be affected by proposed site activities. For both lagunas, the stormwater water runoff from the proposed CISF may cause erosion; however, the impact from the proposed project would be limited because of Holtec's commitment to implement stormwater management practices. Therefore, the NRC staff maintain that the EIS accurately evaluated the appropriate impact determination for the identified APEs. EIS Section 5.9 also provides an analysis of the potential cumulative impacts that could occur from the proposed CISF within a geographic radius of influence that encompasses a 16-km [10-mi] radius around the proposed Holtec CISF project.

The comment about the thoroughness of the NRC review of historic and cultural resources does not provide additional information to the NRC regarding which historic and cultural sites were not considered in the EIS or what additional sources of information should be included. Therefore, the NRC staff are unable to respond in detail to the comment.

Regarding the comments about artifacts of concern to Tribes, as part of NRC's compliance with Section 106 of the NHPA, EIS Section 3.9.3 states that the NRC staff identified 11 Tribes that may attach religious and cultural significance to historic properties in the area of potential effects and invited them to be consulting parties, including the Mescalero Apache and the Hopi Tribes. The NRC staff also consulted with the NM SHPO in October 2018, which identified 4 sites within the direct area of potential effect for the project. Four Tribes, including the Navajo Nation, Pueblo of Tesuque, Hopi Tribe, and the Kiowa Tribe of Oklahoma indicated that they would like to participate as a consulting party under Section 106 of the NHPA.

The Hopi Cultural Preservation Office responded to the NRC staff's invitation for consultation in a letter dated September 16, 2019, and identified two sites of cultural significance to the Tribe–Site LA 187010 and Site LA 89676. The office stated that it "supports the identification and avoidance of our ancestral sites," and that if these sites cannot not be avoided by project activities, "this proposal may result in adverse effects to cultural resources significant to the Hopi Tribe" (Hopi Cultural Preservation Office, 2019). Site LA 187010, and Site LA 89676 are described in EIS Sections 3.9.2 and 4.9.1.1. On December 12, 2019, the NRC staff sent letters to the Navajo Nation, Pueblo of Tesuque, Hopi Tribe, and the Kiowa Tribe of Oklahoma to participate in upcoming activities associated with consultation on the project, including a site visit (NRC, 2019b).

Since the original consultation with the NM SHPO, the site footprint was revised and left only one site (of the original 4 sites) within the direct APE. On February 4, 2020, the Navajo Nation attended a site visit with the NRC staff and a professional archaeologist to evaluate the one site that remained within the direct APE. At the site visit, the group evaluated the current status of the site and decided that it was not likely to be a potentially eligible site. However, to verify the decision, the group agreed that additional testing should be completed. That testing confirmed that the site was not a potentially eligible site. On August 26, 2020, the NRC staff provided the Navajo Nation, Pueblo of Tesuque, Hopi Tribe, and the Iowa Tribe of Oklahoma with a copy of NRC's draft report on the identification of historic properties and its proposed eligibility recommendations, and the NRC staff requested that the Tribes review and comment on the report. As noted in EIS Table 3.9-1, the 4 sites originally identified within the direct APE during earlier cultural resources surveys, including the two sites the Hopi Cultural Preservation Office identified, are either no longer within the footprint of the proposed project activities or are not recommended as potentially eligible sites. The NM SHPO and the Hopi Tribe Cultural Preservation Office concurred with the NRC staff's recommendations on site eligibility.

The NHPA process has been completed, and EIS Sections 1.7.2, 3.9.2, and 4.9.1.1 and Appendix A have been updated to reflect additional Section 106 activities that occurred since the draft EIS was published, including final consultations with Tribes and NM SHPO. Based on the conclusion of the Section 106 process, the NRC staff determine that there would be no effect on historic properties from the proposed CISF. Additional information on NRC's consultations with Tribes and the NM SHPO is provided in Section 2.3 of this appendix [Comments Concerning NHPA Section 106].

Additional responses to comments about impacts to historic and cultural resources are provided throughout this section (Section 2.19) of this appendix [Comments Concerning Historic and Cultural Resources].

No specific changes were made to the EIS as a result of these comments.

Comments: (99-21-10) (99-36-4) (117-8) (362-5) (364-2-4) (378-24)

D.2.19.3 Historic and Cultural Resources—Evaluation of Direct and Indirect Effects on Historic and Cultural Resources

One commenter stated that the EIS improperly characterizes the concepts of direct and indirect effects on historic and cultural resources. For example, the commenter notes that physical impacts can be indirect, and visual or noise impacts can be direct. The commenter also stated that EIS Section 4.9 should be revised to include indirect physical effects from soil erosion, workers extending activities off-site, and the potential for vandalism to historic sites.

Response: *The NRC staff defines the area of potential effects according to guidelines the Advisory Committee on Historic Properties developed and similarly follows guidance on the characterization of direct and indirect effects. The NHPA defines "area of potential effects" as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties. While the first paragraph of EIS Section 3.9.2 states that the direct APE would coincide with the footprint of ground disturbance for the construction stage, the commenter assumes that the only effects that the NRC staff considered within this geographic APE that also correspond with the footprint of the proposed project area are strictly physical in nature. The staff considered indirect effects in its evaluation* *by identifying the indirect APE and determining whether any historic properties would be affected by the proposed undertaking.*

EIS Section 3.9.2 details that (i) the APE for direct effects includes a total area of 201.51 ha [497.93 ac], (ii) the proposed project components that would occur within the APE for direct effects, and (iii) the APE for indirect effects includes a 1.6-km [1-mi] radius around the direct APE. Effects such as soil erosion were considered for sites located within the direct and indirect APEs. The applicant has committed to implementing erosion-control activities to reduce the impacts from stormwater runoff. Clarification was added in EIS Section 3.9.2 that the APE refers to the definitions of the NHPA Section 106 – Implementing Regulations (36 CFR 800.16).

In response to a different comment in this section, Historic and Cultural Mitigation Measures, the NRC staff revised the EIS Section 4.9.1.1 and EIS Table 3.6-2 to include NRC's recommendation that all workers, including subcontractors, be trained regarding the deterrence of artifact hunting and vandalism. The NRC staff does not evaluate or speculate whether historic sites may be affected by individuals, including vandalism, that are not involved with the proposed project but does make efforts to protect sensitive information (such as the precise locations of artifacts) that could facilitate such.

Comment: (16-6)

D.2.19.4 Historic and Cultural Resources—Historic and Cultural Mitigation Measures

One commenter suggested an editorial revision in EIS Table 3.6-1 for consistency with other EIS language. The same commenter suggested that the EIS should include information from the State of New Mexico rule regarding human remains that are found on non-Federal land, and that the EIS should include additional mitigation measures to limit impacts to historic and cultural resources, (e.g., train workers in inadvertent discovery plan protocols and deterrence of artifact hunting and vandalism activities, and to document worker training). Another commenter asked if the applicant has committed to a human remains discovery plan, and what the significance an inadvertent discovery would have on the proposed project.

Response: *The NRC staff made the suggested editorial revision in EIS Table 6.3-1 as well as to EIS Table 6.3-2 for consistency. Additionally, the NRC staff added information about the New Mexico Cultural Properties Act to EIS Table 6.3-1 and EIS Section 4.9.1.1 for consistency.*

The NRC staff agrees with the suggested mitigation measures. EIS Table 3.6-1 already includes Holtec proposed mitigation measures to limit soil erosion under other resource areas. For completeness, the NRC staff added similar language in Table 3.6-1 under Historic and Cultural Resources regarding soil erosion mitigations that Holtec has proposed.

Holtec has not proposed mitigations regarding inadvertent discovery of buried resources other than following appropriate procedures should there be an inadvertent discovery. EIS Table 6.3-2, Summary of Additional Mitigation Measures the NRC Identified, does include "Prepare an inadvertent discovery plan to manage Holtec's activities, in the event of a discovery of cultural resources during any phase of the project." The NRC staff revised EIS Section 4.9.1.1 and EIS Table 6.3-2 to include the other aspects of the commenter's suggested mitigation measures (e.g., train workers in inadvertent discovery plan protocols and deterrence of artifact hunting and vandalism activities, and to document worker training). Additionally, EIS Section 4.9.1.1 was revised to clarify that procedures are in place to address inadvertent *discoveries. If archaeological resources or human remains are discovered during building-related activities, Holtec would stop work and notify the appropriate agency (New Mexico BLM Field Office or SHPO) consistent with the Native American Graves Protection and Repatriation Act (NAGPRA) guidelines and the New Mexico Cultural Properties Act.*

Comments: (16-8) (380-5)

D.2.19.5 Historic and Cultural Resources—Redacting Historic and Cultural Resource Information

The NRC staff received a comment that redacting historic and cultural information in the application is unnecessary because information about a site visit is provided in a site visit report and that the information is needed for the public to make determinations on site eligibility. Another commenter stated that the redaction is a violation of Section 106 of the National Historic Preservation Act and requested a supplemental EIS be conducted to release the information.

Response: *The NRC staff may withhold some sensitive information, per Section 304 of the NHPA. In this case, information regarding the location and character of potentially eligible historic properties is withheld to protect those resources, and the NRC staff followed the information withholding consultation process described in Section 304 of the NHPA. Appendix C of the application contains a cultural resource report and is withheld from public disclosure under NHPA, Section 304. EIS Sections 1.7.2 and 3.9 describe the steps that the NRC staff took to consult with the NM SHPO, BLM, and Federally recognized Tribes having current or historic connection to the proposed project area to determine eligibility of potential historic sites. Consulting parties are provided unredacted information as part of the consultation process. Individuals who wish to prepare a nomination to the National Register would need to work with the appropriate State Historic Preservation Officer, Federal Preservation Officer, or Tribal Historic Preservation Officer. In the case of this EIS and accompanying NHPA Section 106 consultation, the appropriate SHPO and Tribes reviewed the information, and the NM SHPO and the Hopi Tribe Cultural Preservation Office concurred with the NRC's recommendations. Additional information about the Section 106 consultation activities is provided in Section 2.3 of this appendix [NEPA Process–Section 106].*

As one commenter correctly noted, the NRC staff published a summary of a site visit report; however, the summaries contained in that report are not considered sensitive information. Additional information regarding redacted information and responsibilities under NEPA are provided in this appendix in Section 2.1.5 [NEPA Process: General—Lack of Transparency (Copyright Restrictions and Redacted Information)] and Section 2.1 [Comments Concerning NEPA Process].

No changes were made to the EIS as a result of these comments.

Comments: (260-1) (260-2) (260-4) (346-1)

D.2.19.6 Historic and Cultural Resources—Tribal Sovereignty

The NRC staff received comments calling for Indigenous sovereignty on ancestral lands and full compliance under the United Nations Declaration on the Rights of Indigenous Peoples and the Radioactive Materials and Transportation Act (with respect to transportation of radioactive materials).

Response: *The NRC has developed a Tribal Policy Statement (82 FR 2402), which sets forth principles that the NRC staff followed in its government-to-government interactions with American Indian and Alaska Native Tribes for this proposed project. The statement recognizes the Federal Trust Relationship with Indian Tribes and that the Federal government owes a general trust responsibility to Federally recognized Indian Tribes. As an independent regulatory agency that does not hold in trust Tribal lands or assets or provide services to Tribes, the NRC fulfills its trust responsibilities by implementing the principles of the Tribal Policy Statement, providing protection under its implementing regulations and recognizing additional obligations consistent with other applicable treaties and statutory authorities. The United Nations Declaration is not legally binding on the NRC. The NRC conducted government-to-government consultation with potentially affected Indian Tribes, coordinated with State Historic Preservation Officer and Tribal Historic Preservation Officers, and fulfilled the NRC's obligations under the NHPA of 1966, as amended. In engaging in government-to-government consultation and carrying out its activities consistent with the Tribal Policy Statement, the NRC's actions are consistent with many of the goals of the United Nations Declaration on the Rights of Indigenous Peoples; however, the Declaration is not a legal requirement applicable to the NRC; and, therefore, its provisions are not within the scope of this EIS.*

Additional information on the NRC staff's coordination with 11 Tribes (4 of which choose to participate in the consultation process), that may attach religious and cultural significance to historic properties in the area is provided in EIS Sections 1.7.2 and 3.9.3. Related responses to public comments that contain additional detail about NRC's consultation process with Tribes under Section 106 of the NHPA are in Section 2.19 of this appendix [Comments Concerning Historic and Cultural Resources].

No changes were made to the EIS as a result of these comments.

Comments: (98-29-8) (99-37-1) (282-2)

D.2.20 Comments Concerning Cost Considerations

D.2.20.1 Cost Considerations —Private Costs

One commenter provided their assessment that the EIS is insufficient because it focuses on private costs and does so incorrectly. The commenter stated that private costs Holtec incurred (i.e., internal costs) should be excluded because the analysis (i) includes no benefit estimates for Holtec and (ii) should focus on external costs. The commenter noted that the analysis inappropriately subtracts certain private costs avoided by reactor owners as reductions in private costs to Holtec. The commenter also noted that the distribution of costs and benefits on various groups should be presented and discussed because significant differences may exist between those who receive the benefits and those who incur the costs. The commenter stated that the cost-benefit analysis correctly describes the proper focus as societal (i.e., aggregate) rather than idiosyncratic (i.e., particularized to any individual, company, or industry). Further, the commenter noted that private costs to Holtec and private cost savings to reactor owners are not environmental impacts because private costs are a subset of social costs and social costs equal the sum of private and public costs. While commenting on the focus on private costs, the commenter also raised the following issues: excessive precision in the cost estimates, net benefits, and environmental justice.

Response: *The commenter's concern that the analysis focuses on private costs is, in part, because the portion of the cost-benefit analysis that uses quantitative estimates focuses on* *economic costs, which the commenter classifies as private costs. In EIS Section 8.3.1, the NRC staff accounts for the societal costs and benefits by qualitatively considering the environmental impacts of the various resource areas from the Chapter 4 impact analysis. The NRC staff considers that these environmental impacts are primarily external or societal unless otherwise specified [e.g., EIS Section 4.12 on health addresses both public (external) and occupational (internal) impacts]. Environmental costs are addressed qualitatively, in accordance with NRC guidance, as addressed in Section 2.20 of this appendix.*

For the quantified cost estimates in EIS cost-benefit analyses, the NRC staff does not specify the nature of the costs (e.g., internal, external, or specific groups within either of these categories) and such an approach is appropriate based on NRC guidance in NUREG/BR-0058. The issue of financial responsibility is addressed in Section 2.20 of this appendix. The estimates in EIS Table 8.3-3 quantify the overall (i.e., private and public) economic costs for the proposed action based on specified activities (i.e., construction, operation, decommissioning, and SNF transportation to and from the CISF), and the estimates in EIS Table 8.4-1 quantify the overall (i.e., private and public) economic costs for the No-Action alternative based on specified activities (i.e., the operation of and SNF transportation from the current storage sites). The NRC staff did not exclude the costs for any of the specified activities because of their nature (e.g., private). The net benefit estimates in EIS Table 8.5-1 quantify the overall (i.e., private and public) cost comparison of the proposed CISF (EIS Table 8.3-3) to the No-Action alternative (EIS Table 8.4-1).

No changes were made to the EIS as a result of these comments. For additional information regarding the following topics, see the designated section of this appendix: excessive precision in cost estimates, see Section 2.20.7; net benefits, see Section 2.20.9.

Comments: (375-1-15) (376-1-5) (376-1-6) (376-1-18) (376-2-8) (376-3-5) (376-3-10) (376-3-16)

D.2.20.2 Cost Considerations—Ability to Pay for Accidents and SNF Transportation

The NRC staff received comments concerning the ability of various entities to pay for accidents and SNF transportation from the proposed CISF to a permanent disposal site. One commenter questioned the ability of the State of New Mexico or New Mexican communities to pay for accidents. Another commenter stated that the EIS needs to review the financial ability of the utilities, rail companies, Holtec, and the United States government to pay for a SNF transportation accident. One commenter stated there would be no financial ability to transport the SNF away from the proposed CISF, and the SNF would remain there. While commenting on the ability to pay, commenters also raised issues of accident risk and accident liability.

Response: *The purpose of the EIS is to evaluate reasonably foreseeable environmental impacts, not speculative events or worst-case scenarios. The very low risk of accidents due to construction, operation, and decommissioning of the facility is addressed in EIS Section 4.15 and will be verified in the NRC's safety analysis (i.e., no credible accidents with release of radiological material at the proposed CISF). EIS Section 8.3.2.1 notes that Holtec has proposed a license condition addressing liability and financial assurance arrangements with its customers that would be applicable to events occurring during CISF operations. Concerning SNF transportation accidents, EIS Section 4.3.1 describes that the NRC staff considers the conclusion of NUREG–2125 regarding the resiliency of the rail-steel cask to severe accident conditions (resulting in no release under severe accident conditions) applicable to the evaluation of potential CISF SNF transportation impacts under accident conditions. In addition, EIS*

Section 8.3.2.1 discusses the availability of liability coverage under the Price-Anderson Act for incidents of radiological release during SNF transportation.

No change has been made to the EIS in response to these comments. For additional information on related topics see Section 2.25 [Comments Concerning Accidents], Section 2.20.12 [Cost Considerations—Liability for Accidents], and Section 2.4.2 [Proposed Action—De Facto Disposal at the Proposed CISF].

Comments: (98-11-9) (169-8-4) (213-11)

D.2.20.3 Cost Considerations—Accident Costs and Impacts to Other Resources

Several commenters stated that the cost-benefit analysis fails to consider the economic cost to the State of New Mexico and region from an accident that could impact other resources such as oil and gas, minerals, agriculture, and cultural and historic sites. Other commenters stated that the EIS analysis must identify accidents and estimate associated costs. One commenter questioned whether there could be a credible accident. Another commenter questioned why the EIS did not estimate the cost of an SNF transportation accident specific to the proposed CISF. This same commenter stated that a transportation accident for the proposed CISF could be twice as much as a transportation accident for Yucca Mountain because the proposed CISF consists of two transportation campaigns whereas Yucca Mountain only had one. While commenting on accident costs and impacts to other resource areas, commenters also raised the concerns about quantifying environmental impacts, shifting the responsibility for storing SNF, and accident liability.

Response: *EIS Section 8.3.2.1 states that the consideration of the cost of accidents at the proposed CISF is informed by the NRC staff's safety review. Regarding the identification of credible accidents and associated costs, the very low risk of accidents due to construction, operation, and decommissioning of the facility is addressed in EIS Section 4.15 and will be verified in the NRC's safety analysis (i.e., no credible accidents with release of radiological material at the proposed CISF). Text in EIS Section 8.3.2.1 was revised to clarify that the decision not to include a project-specific cost estimate in the EIS was informed by consideration of the absence of credible accidents. Concerning SNF transportation accidents, EIS Section 4.3.1 describes that the NRC staff considers the conclusion of NUREG–2125 regarding the resiliency of the rail-steel cask to severe accident conditions (resulting in no release under severe accident conditions) applicable to the evaluation of potential CISF SNF transportation impacts under accident conditions. Therefore, based on these considerations, no severe accident costs are estimated in the EIS. The EIS cost-benefit analysis does not estimate the cost for any accidents or assess the economic cost to other resources from an accident because the available information is that there would be no credible accidents with release of radiological material at the proposed CISF or during SNF transportation. As described in EIS Section 8.3.2.1, the NRC staff noted that the Yucca Mountain EIS estimated the cost for a single severe transportation accident. The cost of a single severe transportation accident would be independent of the number of transportation campaigns (one campaign for the Yucca Mountain and two campaigns for the proposed Holtec CISF). As stated earlier, the Holtec EIS SNF transportation analysis assumes no radiological releases during accidents.*

The NRC staff has revised text in EIS Section 8.3.2.1 to clarify the EIS assumption of no releases for SNF transportation accidents and standardized the language in the EIS concerning the analysis of accidents at the proposed CISF. As described earlier in the response, EIS Section 8.3.2.1 was also revised to clarify that the EIS cost analysis concerning accidents at the *proposed CISF was informed by the consideration of the absence of credible accidents. For additional information on quantifying environmental impacts, see Section 2.20.15; shifting the responsibility for storing SNF, see Section 2.20.17; and accident liability, see Section 2.20.12 of this appendix.*

Comments: (45-5) (247-19) (247-22) (252-13) (266-10) (364-1-26) (372-14) (380-21)

D.2.20.4 Cost Considerations—Analysis Timeframe

The NRC staff received comments concerning estimating costs and the timeframe for analysis. One commenter questioned how the costs can be realistically estimated for removal and cleanup when the location of a permanent repository and the timeframe for interim storage are both unknown. Another commenter stated that there was no cost analysis in case of significant delays in opening a repository.

Response: *In the EIS, the NRC staff conducted a bounding cost analysis based on the proposed action of constructing and operating a CISF for an initial license term of 40 years.*

In EIS Section 2.2.1, the NRC staff specifies that the period analyzed in the EIS is the initial licensing period of 40 years. As described in EIS Section 2.2.1, using a licensing period of 40 years is appropriate, because any application for license renewal would require that the NRC conduct a safety and environmental review (EA or EIS). Therefore, the EIS cost-benefit analysis did not extend beyond the initial 40-year license period. See Section 2.6.4 of this appendix for additional information concerning the timeframe for the EIS analysis.

As described in EIS Section 8.3.2.1, costs or benefits experienced closer to the present have more value than those experienced farther into the future. This means delaying or extending activities such as removal of the SNF and decommissioning of the proposed CISF results in lower cost estimates. As described in EIS Section 8.2, estimated costs were discounted to reflect this time value of money. EIS Table 8.3-4 presents the assumed schedule for the proposed CISF, which includes SNF transport to a repository and CISF decommissioning. As described in EIS Section 8.3.2.1, from a discounting perspective, the estimated costs for the proposed CISF in EIS Tables 8.3-3 are bounding because these costs are based on a project schedule prior to any delays.

No changes were made to the EIS as a result of these comments.

Comments: (240-3-3) (319-13)

D.2.20.5 Cost Considerations—Assessment of Alternatives

One commenter discussed the methodology of the cost-benefit assessment included in the EIS and stated that the EIS analysis was insufficient because it does not include a genuine assessment of alternatives. Specifically, the commenter stated the cost-benefit analysis considers no alternatives because the No-Action alternative is not a true alternative, but rather an “analytical baseline.” The commenter further noted that full build-out is also not an alternative and the justification for including the full build-out in the EIS is specious. The commenter also stated that the EIS analysis of a second CISF fails because the analysis does not include the detailed costs and benefits of the second CISF for comparison to the proposed Holtec CISF and that a second CISF in the cost-benefit analysis should be a formal alternative.

The commenter suggested that additional alternatives could also be devised using various combinations of the Holtec CISF with a second CISF.

Response: *The scope of alternatives analyzed in the EIS is informed by NEPA's "rule of reason" and consideration of the purpose and need for the proposed action. The EIS cost-benefit analysis analyzed the two alternatives identified and described in EIS Section 2.2: the proposed action and the No-Action alternative. In EIS Section 2.3, the NRC staff identified alternatives that were eliminated from detailed consideration in the EIS as well as the basis for the elimination. As described in EIS Section 2.2.2, under the No-Action alternative, Holtec would not construct or operate the proposed CISF and SNF would remain at the existing sites. EIS Section 2.2.2 also states that the No-Action alternative is a NEPA requirement and serves as a baseline for comparison of environmental impacts to the proposed action. See Section 2.7 of this appendix for additional information concerning the selection of alternatives for the EIS analysis. Because the No-Action alternative is necessary and appropriate to evaluate, no changes were made to the EIS in response to this aspect of the comments.*

The NRC staff does not identify the expansion of the proposed project (i.e., Phases 2-20) or full build-out (i.e., Phases 1-20) as an alternative in EIS Section 2.2.2. As described in EIS Section 1.2.1, expansion of the proposed project is not part of the proposed action. As further explained in EIS Section 1.2.1, the NRC staff, as a matter of discretion, considered these expansion phases in its description of the affected environment and impacts determinations in the EIS, where appropriate, to conduct a bounding analysis for the proposed CISF project. Text in EIS Section 8.2 describes the basis for including the expansion phases in the cost-benefit analysis as well as the basis for considering only the proposed action (Phase 1) and full build-out (i.e., Phases 1-20) and not separately analyzing the subsequent license amendments (i.e., Phase 2-20). The NRC staff has revised text in EIS Section 8.2 to clarify these two points.

The NRC staff does not identify the potential second CISF as an alternative in EIS Section 2.2. Therefore, the EIS does not include a detailed description of the potential second CISF for comparison to the proposed action as an alternative. As stated in EIS Section 8.2, the cumulative impacts analysis identifies the potential second CISF as a reasonably foreseeable future action, and the cost-benefit analysis considers the potential second CISF as it pertains to the impacts (i.e., changes) to the costs and benefits associated with the proposed Holtec CISF. As described in EIS Section 8.3.2.1, a second CISF could delay the schedule for transporting SNF to the proposed Holtec CISF and impact whether the proposed Holtec CISF would reach full capacity. No changes were made to the EIS in response to this aspect of the comments.

Comments: (375-1-11) (376-1-1) (376-3-6)

D.2.20.6 Cost Considerations—Benefit Assessment

One commenter provided their view on how a cost-benefit assessment should be completed and stated that the EIS analysis is insufficient because it does not include a benefits assessment. Specifically, the commenter noted that a cost-benefit analysis without a benefits assessment is just a cost assessment, and that the EIS assessment does not include benefits reasonably attributed to the project (e.g., the proposed CISF could reduce environmental impacts, but the EIS analysis does not consider or account for such). The commenter also stated that the benefits assessment is necessary to allow costs and benefits to be properly compared, and that costs should be subtracted from benefits to determine whether the project offers net societal benefits.

Response: *Benefits are included in the EIS cost-benefit assessment, which quantitatively compares economic cost factors and qualitatively compares environmental impacts between the proposed CISF and the No-Action alternative.*

The net benefits assessment for the economic cost factors for the proposed action (Phase 1) is quantitively estimated in EIS Table 8.5-1. As described in EIS Section 8.5.2, in all cases considered in the EIS analysis, the No-Action alternative costs exceed the proposed action (Phase 1) costs (i.e., a net benefit for the proposed CISF). However, for full build-out (Phases 1-20) some cases resulted in a net benefit while other cases resulted in a net cost. As further described in EIS Section 8.5.2, the economic factor that most influenced the overall result of the net value (i.e., a benefit or cost) was the operational costs at the existing storage sites for the No-Action alternative (i.e., Scenarios 1 and 2).

Overall, the EIS qualitatively compares the environmental impacts of the proposed CISF and No-Action alternative to show relative societal benefits, including through qualitative comparisons of environmental impacts, in which lower costs or lower impacts would be considered a benefit.

The commenter does not provide additional factors to analyze that are not included in the EIS already, therefore no changes were made to the EIS in response to these comments. Additional topics related to the cost-benefit analysis can be found in other responses in this section of the appendix.

Comments: (375-1-12) (376-1-2) (376-3-7)

D.2.20.7 Cost Considerations—Compliance with Information Quality Standards

One commenter evaluated the methodology of the cost-benefit analysis in the EIS and stated that the EIS analysis does not comply with applicable information quality guidelines. More specifically, the EIS does not comply with the information quality standard of objectivity because it reports cost estimates with excess precision that do not acknowledge the uncertainty associated with these estimates. Additionally, the comments said that the EIS lacks transparency and does not comply with the information quality standard of reproducibility because of the following two reasons: the key tables in EIS Chapter 8 (i.e., Table 8.3-3, 8.4-1, and 8.5-2) cannot be reproduced from the details in EIS Appendix C, and the EIS does not include a detailed explanation for the selection and utilization of the two cost estimates for the CISF operations (i.e., Scenarios A and B). The commenter noted that the objectivity of the cost-benefit analysis cannot be assessed until the analysis adheres to the reproducibility standard because additional work would be required to secure the necessary background information to establish the reproducibility of other documents the EIS relies on, such as Holtec's Environmental Report and Safety Assessment Report and the materials supporting these Holtec documents. The commenter also stated that it is unclear which version of NUREG/BR–0058 the EIS relies on. While commenting on compliance with information quality standards, this commenter also raised the issue of quantifying environmental impacts.

Response: *The NRC staff acknowledges that reporting estimated costs in rounded figures rather than at the dollar level (i.e., with considerable precision) better reflects the uncertainty associated with these estimates. Accordingly, the cost estimates in EIS Tables 8.3-3, 8.4-1, 8.5-1, and 8.5.2 were revised to report the cost estimates in millions of dollars. In addition, text in EIS Section C.3 was supplemented to clarify why the cost estimates in these Chapter 8 tables are now reported in millions of dollars. In addition, footnotes were added to Appendix C*

Tables C-3 to C-12 (excluding C-9) explaining that cost estimates expressed at the dollar level in these Appendix C tables were expressed at the million-dollar level in EIS Chapter 8 tables.

Appendix C tables were expressed at the million-dollar level in EIS Chapter 8 tables.

The estimated costs in EIS Tables 8.3-3 (the proposed CISF), 8.4-1 (the No-Action alternative), and 8.5-2 (the net benefits) are transparent and can be reproduced from the details in EIS Appendix C. In EIS Section C.1, the NRC staff identifies the five activities incorporated into the proposed CISF cost estimates and the two activities incorporated into the No-Action alternative estimate. In EIS Table C-2, the NRC staff identifies estimated costs for these activities as well as the sources for these estimated costs. In EIS Section C.2, the NRC staff explains how the constant 2019 dollar values were generated for each of these costs using Equation 1. EIS Table C-1 contains the schedule identifying the years that each of these activities occurs. Concerning the proposed CISF, in EIS Section C.3 the NRC staff describes (i) that the proposed CISF costs are estimated for four cases, (ii) how the NRC staff generated the proposed CISF undiscounted total cost estimates (both by project year and overall) for each of the four cases (EIS Tables C-3 to C-6) by merging together the estimated costs and project schedule information, and (iii) how the NRC staff generated the discounted costs at both 3 percent (EIS Table C-7) and 7 percent (EIS Table C-8) for the four cases using Equation 2 in EIS Appendix C. Concerning the No-Action alternative estimated costs, in EIS Section C.4, the NRC staff describes (i) that the No-Action alternative costs are estimated for four cases, (ii) how the NRC staff generated the No-Action alternative operation costs for each project year for each case based on the number and types of reactors (i.e., active or decommissioned) associated with the SNF at the current storage sites (EIS Table C-9), (iii) how the NRC staff generated the No-Action alternative undiscounted cost estimates for each project year for each of the four cases (EIS Tables C-10 and C-11) by merging together the estimated costs and project schedule information, and iv) how the NRC staff generated the discounted costs at both 3 percent (EIS Table C-12) and 7 percent (EIS Table C-13) for the four cases using Equation 2 in Appendix C. As such, the EIS conforms with the information quality guidelines in NRC guidance. The NRC staff notes that the text was edited in EIS Sections C.3 and C.4 and footnotes were revised or added to EIS Tables 8.3-3, 8.4-1, and C-3 to C-13 to provide clarification between the detailed information in EIS Appendix C and the summary information in EIS Chapter 8 and does not result to any change to the cost-benefit analysis.

EIS Section 8.5.2 describes how the NRC staff calculated the net benefits. Unlike the proposed CISF and No-Action alternative cost estimates, EIS Appendix C contained no section providing detailed information specific to the net benefit calculation. As described in EIS Section 8.5.2 and the footnotes in EIS Tables 8.5-1 and 8.5.2, the NRC staff calculated the net benefits by subtracting the proposed CISF costs in EIS Table 8.3-3 from the associated No-Action alternative costs in EIS Table 8.4-1. The NRC staff notes that text was augmented in EIS Section 8.5.2, and footnotes were revised or added to EIS Tables 8.3-3, 8.4-1, 8.5-1, 8.5-2, and C-3 to C-13 to provide clarification between the detailed information in EIS Appendix C and the summary information in EIS Chapter 8 and does not result to any change to the cost-benefit analysis.

The NRC staff used two different estimated annual costs for the proposed CISF operations and maintenance: a lower estimate (i.e., Scenario A) based on the costs for this activity at currently decommissioned nuclear power plants and a higher estimate (i.e., Scenario B) based on the applicant's project-specific estimate. The NRC staff used two estimates because the applicant described two values for this activity, and there was a large differential (i.e., about six-fold or 600 percent) between these two values. Accordingly, text in EIS Section 8.3.2.1 was revised to *provide clarification why the EIS analysis used two different cost estimates for this activity. In EIS Appendix C, the NRC staff describes how these two values were used when estimating the costs. EIS Table C-2 specifies the values for these estimated annual CISF operation costs, identifies the sources for these values, and expresses these values in constant 2019 dollars. EIS Table C-1 contains the project schedule, which specifies when this activity occurs for both the proposed action (Phase 1) and full build-out (Phases 1-20). In EIS Tables C-3 (Phase 1 Scenario A), C-4, (Phase 1 Scenario B), C-5 (full build-out Scenario A), and C-6 (full build-out Scenario B), the NRC staff combined the estimated costs from EIS Table C-2 with the project schedule from EIS Table C-1 to generate the estimated annual CISF operation costs for each project year for the four cases. The EIS revisions described earlier in this response for enhancing the transparency between the detailed information in EIS Appendix C and the summary information in EIS Chapter 8 also enhances the transparency for how the NRC staff used these two CISF operations cost values when estimating the costs.*

In EIS Section 8.1, the NRC staff states that the EIS cost-benefit analysis is informed by the Environmental Review Guidance for Licensing Actions Associated with the Office of Nuclear Material Safety and Safeguards (NMSS) Programs (NUREG–1748). As described in Section 5.7 of NUREG–1748 (NRC, 2003), NUREG/BR–0058 is one of several documents that can provide guidance for preparing cost-benefit analyses. The NRC staff primarily used NUREG–1748 in developing the cost-benefit analysis in the EIS, and this guidance agrees with the guidance with NUREG/BR–0058. Although this EIS makes no specific reference to NUREG/BR–0058, the version currently in use by NRC is the draft final of Revision 5 (NRC, 2020c). No changes were made to the EIS in response to this aspect of the comments.

The NRC staff disagrees with the comments asserting that the EIS does not meet information quality guidelines and does not provide enough information to establish the reproducibility of documents referenced in the EIS, such as Holtec's Environmental Report and Safety Analysis Report and the materials supporting these Holtec documents. Regarding the information quality standards the commenter raised (transparency, utility, and objectivity), the EIS conforms with the information quality guidelines in NRC guidance, as described in this response. However, the NRC staff have edited the cost-benefit sections to further clarify the source of information and reduce the precision of the estimated values provided to align with the level of uncertainty associated with the cost and benefit analysis. The entire EIS has provided details on the sources of the information to assist with the recreation and validation of the NRC staff's analysis, and in doing so has provided an objective assessment of the resource areas included. Furthermore, in developing the EIS, the NRC staff analyze and evaluate the resource areas included in the EIS using publicly available documents to ensure transparency and that the public also has access to the information on which the NRC staff is basing their findings. In keeping with NRC formatting and publication guidelines, all information sources are included as full references at the end of the chapters with either weblinks or ADAMS accession numbers. Therefore, the NRC staff does not agree that the information used in the EIS is overly burdensome to locate. No changes were made to the EIS in response to this portion of the comments.

In summary, in response to these comments, changes were made to EIS Sections 8.3.2.1, 8.5.2, Appendix C.3 and C.4 and Tables 8.3-3, 8.4-1, 8.5-1, 8.5-2, and C-3 to C-13. For additional related information, see Section 2.20.15 of this appendix [Cost Considerations—Quantifying Environmental Impacts].

Comments: (375-1-17) (375-1-18) (376-1-7) (376-1-11) (376-1-16) (376-3-12) (376-3-14) (376-3-18) (376-3-19)

D.2.20.8 Cost Considerations—Estimating Costs for Emergency Preparedness

One commenter stated that the EIS did not include detailed cost estimates for emergency preparedness for the proposed CISF and the associated SNF transportation. While commenting on estimating costs for emergency preparedness, the commenter also raised the following issues: financial support for emergency preparedness costs, environmental risks of SNF transportation, and details about necessary training and equipment for first responders in case of an incident at the proposed CISF.

Response: *In EIS Sections 4.11.1.2 and 8.5.2, the NRC staff qualitatively addresses emergency preparedness costs. As described in EIS Section 8.1, the NRC staff did not quantify all cost factors, but instead focused on those factors of such magnitude or importance that their inclusion can inform the decision-making process (i.e., distinguish between the proposed action and No-Action alternative). As described in EIS Section 8.5.2, emergency preparedness for SNF transportation is a cost factor shared by both the proposed action and the No-Action alternative. As described in EIS Sections 4.11.1.2 and 8.5.2, States are recognized as responsible for protecting public health and safety during transportation accidents involving radioactive materials. As stated in EIS Section 4.11.1.2, significant additional costs to States would likely not be incurred related to unique or different training to respond to potential transportation accidents involving SNF as compared to existing radioactive materials commerce. In EIS Section 4.11.1.2, the NRC staff recognizes that some States, Tribes, or municipalities along transportation routes may incur additional costs for emergency preparedness and that those in the vicinity of the proposed CISF may also incur additional costs for emergency preparedness associated with the proposed CISF. The EIS cost-benefit analyses do not estimate the costs for emergency preparedness for two reasons. First, as described in EIS Section 8.5.2, this cost factor is common to both the proposed action and the No-Action alternative and does not provide a significant distinction between the two alternatives. Second, as described in EIS Section 4.11.1.2, the overall magnitude of this cost factor is not expected to be large.*

No changes were made to the EIS as a result of this comment. For additional information regarding emergency preparedness, see Section 2.27, and for transportation of SNF, see Section 2.9 of this appendix.

Comment: (204-1)

D.2.20.9 Cost Considerations—Estimating Net Benefits

One commenter discussed the cost-benefit methodology and stated that the EIS analysis does not correctly calculate the estimated net costs or benefits. More specifically, the commenter stated that the EIS fails to account for environmental impacts that are reasonably expected to occur in the analytical baseline (i.e., the No-Action alternative) but would be prevented if the proposed CISF were licensed. For example, the commenter stated that in the cost-benefit analysis the transport of SNF to the proposed CISF has no positive environmental impact at the reactor at which it resides. The commenter also noted that by not quantifying the environmental impacts, it is difficult to estimate net environmental impacts when comparing alternatives. Finally, the commenter noted that the cost-benefit assessment includes private costs in the analysis of net benefits, which confuses the meaning of the net benefit estimates.

Response: *In EIS Section 8.5.1, the NRC staff qualitatively compares the environmental impacts of the proposed CISF to the No-Action alternative. As described in EIS Section 8.5.1, if* *the proposed CISF were licensed, the environmental impacts would continue to occur at the nuclear power plants and ISFSIs with the exception of any sites that are fully decommissioned such that the NRC terminates its license and releases the property for other uses. In other words, the EIS does account for the environmental impacts that would be prevented at the current storage location if the SNF were transported to the proposed CISF and the origin site is decommissioned. In EIS Section 8.5.1, the NRC staff also compares the environmental impacts of the SNF transportation for the proposed action and the No-Action alternative. As described in EIS Section 8.5.1, the SNF transportation for the No-Action alternative would result in a net reduction in overall occupational and public exposures relative to the proposed action due to a single transportation campaign compared to moving the SNF twice under the proposed action (i.e., once from reactor to CISF and then from CISF to repository). Comments on quantifying the environmental cost and describing how the EIS qualitatively analyzes the environmental impacts are addressed in Section 2.20.15 of this appendix. Aspects of these comments regarding including private costs in the quantified estimates for the proposed CISF and No-Action alternative and the meaning of the resulting net benefit estimate are addressed in Section 2.20.9 of this appendix.*

No changes were made to the EIS as a result of these comments.

Comments: (375-1-16) (375-1-19) (375-1-21) (376-3-11) (376-3-15)

D.2.20.10 Cost Considerations—Financial Responsibilities for Facilities and Activities

The NRC staff received comments concerning who is responsible for paying for constructing the proposed CISF, the routine costs associated with storing the SNF at the CISF, and transporting the SNF, with some commenters stating that the EIS needs to disclose this information. One commenter stated that clarity on the funding source for a proposed CISF was an issue identified by the U.S. Nuclear Waste Technical Review Board (NWTRB, 2019). Other commenters expressed their opinions about who they thought would or should pay for these costs. One commenter stated that the EIS fails to conduct a financial analysis of costs for long-term private financing compared to DOE financing along with the associated consequences. Another commenter stated the EIS must establish whether the proposed CISF is being driven by the financial interests of the project proponent. Another commenter stated that the Federal government needs to indemnify the State of New Mexico against costs. While commenting on who would pay for routine costs for storing and transporting SNF, commenters also incorporated the topics of accident liability, financial assurance, emergency preparedness along the SNF transportation route, upgrades to the transportation infrastructure, SNF repackaging, and who has title of the SNF.

Response: *In EIS Section 8.3.2.1, the NRC staff discusses the costs of construction, operation, decommissioning, and certain spent fuel transportation costs. Issues relating to financing and title of the spent fuel are, generally, outside the scope of this EIS. In EIS Section 4.11.1.2, the NRC staff discusses funding sources for emergency preparedness. Certain financial considerations will be considered as part of the NRC staff's safety review: (i) the financial capabilities of Holtec to construct, operate, and decommission the proposed facility; (ii) Holtec's decommissioning funding assurance plan; and (iii) the license condition Holtec proposed addressing liability and financial assurance arrangements with its customers that would be applicable to events occurring during CISF operations. EIS Section 8.3.2.1 also notes the availability of accident liability insurance for incidents (including those caused by sabotage) involving the release of nuclear material during SNF transportation. Because the* *routes for transportation have not yet been established, the need for (and hypothetical cost of) infrastructure upgrades is speculative and beyond the scope of this EIS. Consideration of activities not identified as part of the proposed action (e.g., repackaging SNF) are also beyond the scope of the EIS. The comment citing an NWTRB report does not present concrete information regarding a need for additional information or analysis in the EIS. As discussed previously, the NRC will ensure that financial information with a nexus to public health and safety satisfies applicable requirements prior to issuing a license to Holtec. No changes were made to the EIS as a result of these comments. For additional information regarding accident liability, see Section 2.6.2 [Assumption – Legal Framework of the Proposed CISF]; Section 2.20.12 [Cost Considerations–Liability for Accidents]; and Section 2.37.6 [Out of Scope–Financial Assurance] of this appendix.*

Comments: (74-9) (98-38-8) (98-49-6) (99-41-8) (169-4-11) (169-8-7) (224-7) (240-2-14) (240-3-9) (307-1-12) (309-3) (311-5) (364-1-15)

D.2.20.11 Cost Considerations—General Comments

The NRC staff received comments either supporting or disagreeing with the EIS cost-benefit analysis or making general statements about the costs of the project. Some commenters discussed the cost effectiveness or relative costs of the proposed CISF and the No-Action alternative. One commenter stated that the financial benefits of the proposed CISF are outweighed by the negative impacts to public health and the environment. One commenter disagreed with how the EIS cost-benefit analysis was conducted. Other commenters thought the cost for storing SNF was not worth the benefit of the electricity produced by nuclear power. While providing general comments on costs and benefits, commenters also raised the following issues: SNF transportation risk, security, and transportation infrastructure improvements.

Response: *In the EIS, the NRC staff describes the costs and benefits of the proposed CISF (EIS Section 8.3) and the No-Action alternative (EIS Section 8.4), and then compares the proposed CISF to the No-Action alternative (EIS Section 8.5). As described in EIS Section 8.1, the analysis considers both environmental and economic costs and benefits. In EIS Section 8.2, the NRC staff describes that the EIS analysis was conducted from a societal perspective, included both the proposed action (Phase 1) and full build-out (Phases 1-20), and included SNF transportation. The EIS analysis of the proposed CISF included a qualitative assessment of the environmental impacts (EIS Section 8.3.1) and both a quantitative and qualitative assessment of economic cost factors (EIS Section 8.3.2). The EIS analysis of the No-Action alternative addressed the environmental impacts (EIS Section 8.4.1) and included a quantitative assessment of economic cost factors (EIS Section 8.4.2). Also, the EIS analysis comparing the proposed CISF to the No-Action alternative included a qualitative assessment of the environmental impacts (EIS Section 8.5.1) and both a quantitative and qualitative assessment of economic cost factors (EIS Section 8.5.2). Thus, the analysis is limited to a qualitative and quantitative analysis of the proposed action and potential future phases of the project compared to the No-Action alternative but does not attempt to quantify costs not directly associated with the proposed action or No-Action alternative (e.g., the costs of producing electricity with nuclear power) because these are beyond the scope of the EIS. For additional information on other cost considerations and on other cost-benefit topics, see other responses in this section.*

No changes were made to the EIS as a result of these comments. For additional information regarding the following topics, see the following sections of this appendix: Section 2.34 on security; Section 2.9 on SNF transportation risk; and Section 2.9.25 on transportation infrastructure.

Comments: (80-2) (111-2) (113-2) (169-9-3) (250-1) (277-4) (338-3) (375-1-2) (378-3)

D.2.20.12 Cost Considerations—Liability for Accidents

The NRC staff received comments about liability for accidents. Issues commenters raised include: who is liable and pays for accidents at the proposed CISF as well as along the SNF transportation route and how those individuals or groups would be indemnified or reimbursed. Other commenters expressed their opinion regarding who they thought would or should pay for these costs. Other commenters stated that the EIS did not provide the process for reimbursement. One commenter stated that the lack of a provision in the EIS for financial settlements is a shortcoming that vitiates the Holtec application. One commenter stated that the EIS misrepresents the availability of Federal Price-Anderson insurance as mitigation for transportation accidents and that the coverage amount is $12.7 billion rather than over $13 billion. While commenting on liability for accidents, commenters also raised concerns about environmental impacts of accidents, de facto permanent storage, transportation risk, feasibility of a permanent repository, the ethics of Holtec, who responds to accidents, financial responsibility for facilities and routine activities, legacy site costs, Yucca Mountain costs, and financial assurance.

Response: *In EIS Section 4.15, the NRC staff discusses the very low risk of accidents due to construction, operation, and decommissioning of the proposed facility based on the applicant's analysis of accidents, which will be verified in the NRC's safety analysis (i.e., no credible accidents with release of radiological material at the proposed CISF). Thus, the potential for financial liability from radiological accidents at the facility, if licensed, would also be very low. However, regarding financial provisions for potential liability because of accidents, EIS Section 8.3.2.1 notes that Holtec has proposed a license condition addressing liability and financial assurance arrangements with its customers that would be applicable to events occurring during CISF operations, and the NRC staff will consider this proposed condition in its safety review. The NRC's safety review also considers the financial capability of the applicant to construct, operate, and decommission the facility, with funding assurances required for decommissioning activities. Concerning SNF transportation accidents, EIS Section 4.3.1 describes that the NRC staff considers the conclusion of NUREG–2125 regarding the resiliency of the rail-steel cask to severe accident conditions (resulting in no release under severe accident conditions) applicable to the evaluation of proposed CISF SNF transportation impacts under accident conditions. In EIS Section 8.3.2.1, the NRC staff discusses the availability of liability coverage under the Price-Anderson Act for incidents of radiological release during SNF transportation. EIS Section 8.3.2.1 also states that, currently, the amount of coverage the act provides per incident is more than $13 billion, and that Congress enacted legislation that developed a method to promptly consider compensation claims of the public for liabilities that exceed this designated limit. The $13 billion figure in the EIS refers to the entire insurance pool under the Price-Anderson Act [i.e., both first tier (private insurance) and second tier (industry self-insurance)] rather than just the second tier.*

Text in EIS Section 8.3.2.1 was revised to clarify that NRC staff considers the conclusion of NUREG–2125 regarding the resiliency of the rail-steel cask to severe accident conditions (resulting in no release under severe accident conditions) applicable to the evaluation of *potential CISF SNF transportation impacts under accident conditions. For additional information on environmental impacts accidents, see Section 2.4.2 [Proposed Action—De Facto Disposal at the Proposed CISF]; Section 2.9 [Comments Concerning Transportation of SNF: Safety/Accidents]; Section 2.20.17 [Financial Responsibility for Facilities and Routine Activities]; Section 2.25 [Comments Concerning Accidents]; Section 2.27 [Comments Concerning Emergency Management]; Section 2.35.2 [General Opposition—Opposition Due to Concerns About Holtec]; and Section 2.37.14 [Out of Scope—Comments Regarding Yucca Mountain] of this appendix.*

Comments: (49-2) (55-5) (74-8) (96-5) (97-2) (98-23-8) (98-31-8) (98-50-6) (98-50-8) (99-30-4) (165-3) (169-9-11) (254-4) (290-5) (328-2-16) (372-15)

D.2.20.13 Cost Considerations—Monetizing Environmental Impacts

One commenter reviewed the various EIS resource areas and discussed the need to monetize (i.e., quantifying in terms of dollars) the environmental impacts for the proposed action and the No-Action alternative, and then include these monetized environmental impacts in the estimated net benefits. The commenter discussed information in the EIS and cost-benefit analysis in terms of how to monetize the environmental impacts. The commenter stated that the cost-benefit analysis did not include sufficient information to assess the monetization of dose exposure, injuries over the license term of the project, ecological impacts (specifically to wildlife), and lost wages due to occupational injury. The commenter further suggested that Design Event accidents (both normal and off-normal operations as described in EIS Section 4.15) are managed risks and therefore should be monetized to evaluate the cost and benefit. Specifically, the commenter stated that the EIS cost-benefit analysis should (i) quantify the risks for the Design Events for the proposed CISF, (ii) include the accident risks at nuclear power plants from which SNF would be received (i.e., generation site), and (iii) address whether the expected benefits of avoiding Design Events at the reactor sites (i.e., generation site) exceeds the expected costs of accidents at the proposed CISF.

Response: *In EIS Section 8.3.1 of the cost-benefit analysis, the NRC staff qualitatively rather than quantitatively addresses the environmental impacts for the various resource areas from the EIS Chapter 4 impact analysis. Chapter 4 of NUREG–0058, Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission-NUREG/BR–0058 (NRC, 2020c) contains guidance on how the NRC staff conducts cost-benefit analyses for NEPA reviews, such as this EIS. As described in Section 4.4 of NUREG/BR–0058, the evaluation should include a qualitative discussion of the environmental impacts. As such, the NRC staff determined that the level of analysis currently included in the EIS is sufficient to satisfy NRC's regulatory requirements and sufficient to assess the comparative costs and benefits of proposed project. The issue of quantifying environmental impacts and describing how the EIS qualitatively analyzes the environmental impacts is addressed in in Section 2.20.15 of this appendix [Cost Considerations—Quantifying Environmental Impacts].*

EIS Section 4.15 addresses the environmental impacts of postulated accidents involving the storage of spent fuel at the proposed CISF. As described in EIS Section 4.15, NRC regulations require that (i) the proposed CISF be designed to withstand the effects of natural phenomena and human-induced events without loss of capability to perform their safety functions and (ii) the applicant consider physical site characteristics that are necessary for safety analysis or that may have an impact on CISF design. As further described in EIS Section 4.15, the acceptability of the site and CISF design criteria are addressed as a part of the NRC staff's safety evaluation. In EIS Section 4.15, the NRC defines risk as the product of the probability and the *consequences of an accident, which means that a high-consequence, low-probability event could result in a small impact determination if the risk is sufficiently low. The NRC staff concludes in EIS Section 4.15 that the environmental impacts of accidents at the proposed CISF described in the application would be SMALL based on the very low risk of accidents due to construction, operation, and decommissioning of the facility. The applicant's accident assessment will be verified in the NRC's safety analysis (i.e., no credible accidents with release of radiological material at the proposed CISF). Thus, quantification of costs from accidents resulting in a release is not within the scope of the EIS.*

The accident risk at power plants is included in the evaluation of reactor license; therefore, those activities are beyond the scope of the EIS and are instead covered in site-specific environmental and safety reviews. The issue of including environmental impacts at generation sites is addressed in Section 2.37 of this appendix.

No changes were made to the EIS as a result of these comments. For additional information regarding compliance with the information quality standards, see Section 2.20.7 of this appendix [Cost Considerations—Compliance with Information Quality Standards].

Comments: (376-2-1) (376-2-2) (376-2-7) (376-2-9) (376-2-10) (376-2-11) (376-2-12) (376-2-13) (376-2-16) (376-3-2) (376-3-3) (376-3-4)

D.2.20.14 Cost Considerations—Private Operation

The NRC staff received comments concerning a private corporation managing the CISF and associated liability. One commenter stated that Holtec, a private company, assumed that the Federal government would be responsible for liability and risk, and therefore would have incentive to cut corners on safety and environmental protection to save money and increase profits. Another commenter stated that the EIS must analyze the impacts of a for-profit company managing the proposed CISF. While commenting on private operation, the commenters also raised issues of financial assurance and DOE liability for SNF (i.e., ownership of the SNF).

Response: *The EIS assesses the potential environmental impacts of construction, operation, and decommissioning of the proposed CISF. The comments raise speculative questions about compliance with NRC regulations and matters that are considered in the NRC staff's safety review, but these issues are not within the scope of the environmental review. If the NRC grants a license for the proposed CISF, Holtec, as the operator, must abide by all applicable NRC regulations as well as any applicable State or local regulations to ensure environmental and safety protections, regardless of private ownership. Ensuring that there is adequate financial assurance in accordance with NRC regulations is part of the NRC staff's safety review. For additional information regarding the following topics, see the designated sections of this appendix: Section 2.6.2 [Assumptions—Legal Framework of the Proposed CISF] and Section 2.37.6 [Out of Scope—Financial Assurance]. No changes were made to the EIS as a result of these comments.*

Comments: (223-7) (364-1-13)

D.2.20.15 Cost Considerations—Quantifying Environmental Impacts

One commenter suggested that the EIS analysis is insufficient because it lacks quantitative and monetized estimates of environmental impacts, even in cases where quantification and monetization may be straightforward (e.g., the key environmental impacts of human health and safety risks). More specifically, the commenter stated that the environmental impacts are not quantitative in the EIS and therefore cannot be summed to produce an aggregate cost estimate or calculate a net benefit estimate, emphasizing that this methodology not quantifying the environmental impacts effectively ignores environmental impacts and offers limited value. Another commenter stated that the EIS cost-benefit analysis does not discuss nonfatal cancer risks. The same commenter cited SECY-20-0074 Valuing Nonfatal Cancer Risks in Cost-Benefit Analysis (NRC, 2020d) and stated that this policy statement makes it clear that cost-benefit analysis for nonfatal cancer risk applies to environmental analyses.

Response: *The primary purpose of the cost-benefit analysis is to determine whether the net benefits of the proposed action exceed those of the No-Action alternative. Not all costs and benefits are subject to quantitative assessment; however, qualitative assessment in certain areas facilitates the NRC staff's ability to conduct a reasonable balancing to inform the "hard look" required by NEPA. The Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission-NUREG/BR–0058, Chapter 4, contains guidance on how the NRC staff conducts cost-benefit analyses for NEPA reviews such as this EIS (NRC, 2020c). As described in Section 4.4 of NUREG/BR–0058, the evaluation should include a qualitative discussion of the environmental impacts. As such, the NRC staff determined that the level of analysis currently included in the EIS is sufficient to satisfy NRC's regulations implementing NEPA and sufficient to assess the comparative costs and benefits of the proposed project. Specifically, in EIS Section 8.3, the NRC staff qualitatively describes the environmental impacts of the proposed CISF at a high level for various resource areas, including public and occupational health. In EIS Section 8.4.1, the NRC staff addresses the environmental impacts of the No-Action alternative. In EIS Section 8.5.1, the NRC staff qualitatively compares the environmental impacts of the proposed action and No-Action alternative.*

The draft EIS contains public and occupational health analyses and addresses the risk of developing both fatal and nonfatal cancers. The SECY paper the commenter referenced is currently under consideration by the Commission, has not been approved, and does not constitute guidance on monetization of nonfatal cancers in NEPA documents.

In response to these comments, text in EIS Section 8.3.1 was revised to add a reference to EIS Section 3.12, 4.3.1.2.2, and 4.13 to clarify that the detailed analyses of these environmental impacts (e.g., nonfatal cancer risks impact) is in these sections.

Comments: (237-4-17) (375-1-14) (375-1-20) (376-1-4) (376-1-15) (376-3-9)

D.2.20.16 Cost Considerations—Second CISF

The NRC staff received a comment stating that the first mention of a potential second CISF occurs in the Chapter 8 cost-benefit analysis, and information about this second CISF (e.g., what kind of CISF, the capacity of the CISF, when the CISF would begin accepting waste) needs to be indicated.

Response: *The initial discussion of a potential second CISF occurs in draft EIS Section 5.1.1.3, where it is identified as one of the reasonably foreseeable future actions for the cumulative impacts analysis. Between publication of the draft and final EIS the second CISF, the ISP CISF, discussed in EIS Section 5.1.1.3 was licensed and the text in that section was updated. This EIS section provides details concerning the second CISF, including the location as well as the types and amounts of waste to be stored. The same section was also updated to* *including the current status of the ISP CISF. As further described in EIS Section 5.1.1.3, information about this reasonably foreseeable future action is included where appropriate to support the Holtec EIS analysis. The NRC staff considered the necessary information related to the impacts of a potential second CISF in its cost analysis as well.*

Text in EIS Section 5.1.1.3 was updated to reflect the status of the ISP CISF but no specific changes were made as a result of this comment.

Comment: (252-12)

D.2.20.17 Cost Considerations—Shifting the Responsibility for Storing SNF

The NRC staff received comments concerning the shift in responsibility (e.g., costs, liability, or risk) from private entities to the Federal government or taxpayers that is associated with storing SNF at the proposed CISF. One commenter stated that the transfer of title, liability, cost, and risk from companies that generated the SNF must be analyzed in the EIS. Some commenters expressed dissatisfaction that the responsibility would shift from the utilities to the government and taxpayers while a few people or companies profit from it. Other commenters stated that the responsibility should be with Holtec or the utilities that generated the SNF. Several commenters characterized the proposed CISF as a public subsidy. Other commenters expressed concern that the proposed CISF would expedite this shift in responsibility prior to the availability of a geologic repository. One commenter stated that there are large costs associated with this shift in responsibility. While commenting on the shift in responsibilities, commenters also raised the following issues: accident liability, de facto permanent storage, legality of the proposed CISF, ownership of the SNF, and environmental justice.

Response: *The NRC has previously licensed a consolidated interim spent fuel storage installation, and NRC regulations continue to allow for licensing private away-from-reactor interim spent fuel installations under 10 CFR Part 72. The NRC allows licensed private transportation of spent fuel. The policies underlying the statutory framework authorizing the NRC to review CISF applications and policies permitting the transportation of SNF are outside the scope of this EIS. In EIS Section 8.3.2, the NRC staff analyzes economic costs and benefits of the proposed CISF and in EIS Sections 4.3 and 5.3, the NRC staff analyzes direct, indirect, and cumulative transportation impacts. In EIS Section 4.15, the NRC staff addresses the very low risk of accidents due to construction, operation, and decommissioning of the facility, which will be verified in the NRC's safety analysis (i.e., no credible accidents with release of radiological material at the proposed CISF). Concerning SNF transportation accidents, EIS Section 4.3.1 describes that the NRC staff considers the conclusion of NUREG–2125 regarding the resiliency of the rail-steel cask to severe accident conditions (resulting in no release under severe accident conditions) applicable to the evaluation of potential CISF SNF transportation impacts under accident conditions. EIS Section 4.11, the NRC staff discusses funding for emergency response. The issue of who has title of the SNF as well as the associated liabilities, costs, and risks, is addressed in Section 2.6.2 of this appendix.*

No changes were made to the EIS as a result of these comments.

For additional information on accident liability, see Section 2.4.2 [Proposed Action—De Facto Disposal at the Proposed CISF]; Section 2.6.2 [Assumptions—Legal Framework of the Proposed CISF]; Section 2.1.8 [NEPA Process: General—Scoping Process]; Section 2.20.12 [Cost Considerations—Liability for Accidents]..

Comments: (4-2) (14-2) (98-30-16) (98-51-6) (99-12-1) (99-35-7) (103-9) (111-4) (113-5) (136-6) (223-6) (223-11) (277-2) (303-5) (357-4) (364-1-12) (364-1-16)

D.2.20.18 Cost Considerations—SNF Transportation Costs

The NRC staff received a comment stating that the SNF transportation cost estimate in the EIS analysis is unsubstantiated and underestimated. While commenting on the SNF transportation costs, the commenter also stated that Holtec's application documents indicate that DOE will ship the fuel and therefore Holtec should use DOE's estimates.

Response: *The NRC staff disagrees that the SNF transportation cost estimate of $26,000 per metric ton of uranium is unsubstantiated. The NRC staff evaluated cost estimates in Revision 1 of Holtec's environmental report (Holtec, 2017). The NRC staff noted, as did the commenter, that the SNF transportation cost estimate attributed to a report titled Spent Nuclear Fuel Management: Outreach Needed to Help Gain Public Acceptance for Federal Activities that Address Liability (GAO, 2014) could not be found in that document. The NRC staff used the Request for Additional Information process (RAI ER- CB-1 in NRC, 2018c) to ask Holtec for the correct reference for this estimate. The Holtec ER Revision 8 (Holtec, 2020b) identified the correct reference for this value as a report titled Nuclear Waste Management: Key Attributes, Challenges, and Costs for the Yucca Mountain Repository and Two Potential Alternatives (GAO, 2009).*

The commenter considers that the EIS underestimates the cost for SNF transportation based on a $650,000 per metric ton of SNF estimate from a DOE report regarding costs for a geologic repository at Yucca Mountain (DOE, 2008d). However, this DOE cost estimate is for total program costs rather than just SNF transportation. As described in the DOE report, total program costs incorporated into DOE's estimate includes (i) the construction, operation, and closure of the geologic repository itself; (ii) the construction of a major rail infrastructure project within the State of Nevada to provide access to the geologic repository; and (iii) other costs unrelated to SNF transportation. The NRC considers that the $650,000 per metric ton of SNF value from the DOE report would overestimate the SNF transportation costs because this value includes significant costs not associated with SNF transportation and not applicable to the proposed CISF.

No changes were made to the EIS as a result of this comment.

For additional information concerning ownership of the SNF, see Section 2.6.2 of this appendix, and for who pays for SNF transportation, see Section 2.9 of this appendix.

Comment: (286-13)

D.2.20.19 Cost Considerations—Surety for the State of New Mexico

The NRC staff received comments concerning surety for the State of New Mexico. The NMED, as well as one other commenter, stated that Holtec's license application did not include any surety or warranty proposal to the State of New Mexico to ensure that decommissioning and reclamation will be funded, potentially to the fullest extent. The commenters further stated that this could leave the State of New Mexico responsible to fund and direct any remaining decommissioning and reclamation needed to address the environmental and health effects of the proposed CISF.

Response: *As described in EIS Section 8.2, the NRC staff's evaluation of Holtec's compliance with regulations addressing financial qualifications and decommissioning funding assurance are part of the NRC's safety review and are not within the scope of the EIS. As stated in EIS Section 8.3.2.1, Holtec has proposed a license condition addressing liability and financial assurance arrangements with its customers that would be applicable to events occurring during CISF operations, which the NRC staff would consider in its safety review. The NRC staff note that Holtec's license application for the proposed CISF, as well as financial qualifications and decommissioning funding assurance, are addressed at the Federal government level by the NRC rather than at the State government level by New Mexico. Section 2.37.6 of this appendix discusses how Holtec's financial qualifications and decommissioning funding assurance are addressed in NRC's license application review.*

No changes were made to the EIS as a result of these comments.

Comments: (322-18) (328-3-16)

D.2.20.20 Cost Considerations—Transfers as Benefits

One commenter stated that the EIS analysis incorrectly characterizes transfers as benefits. More specifically, the commenter stated that the only purported benefit listed in EIS Table 8.3-2 is positive revenue effects on local government finances, and this should be classified as a transfer, rather than benefit. Also, the commenter noted that if tax receipts by local governments are counted as a benefit, then tax payments must be counted as a cost.

Response: *As described in EIS Section 8.3.1, the environmental benefit summarized in EIS Table 8.3-2 is based on the EIS Chapter 4 impact analysis. In EIS Section 4.11.1.1, the NRC staff uses an economic model called RIMS II from the Economic and Statistics Division of the U.S. Department of Commerce Bureau of Economic Analysis to assess the magnitude of the proposed CISF socioeconomic impacts. As further described in EIS Section 4.11.1.1, this model provides a net or aggregate assessment of the economic impact within the region. Accordingly, text in EIS Table 8.3-2 was revised to clarify that the socioeconomic impact analysis summarized in this table was based on a net or aggregate assessment of the economic impact rather than just a revenue stream to the local government. However, no substantive changes were made to the EIS in response to these comments.*

Comments: (375-1-13) (376-1-3) (376-3-8)

D.2.20.21 Cost Considerations—Uncertainty and Sensitivity Analysis

One commenter discussed the methodology of the cost-benefit assessment and stated that the EIS was insufficient because the EIS does not include a disclosure of uncertainties in the estimates, has no sensitivity analysis, and does not provide the public sufficient information to conduct its own sensitivity analysis. The commenter also stated that excess precision in the estimated costs indirectly highlights the problem of uncertainty.

Response: *The term "uncertainty" can be interpreted in a variety of ways, sometimes referring to variances or margin of error in the data used in various modeling scenarios, and sometimes referring to the variance or error inherent in the models themselves. In the case of the cost-benefit analysis, the NRC staff conducted relatively straightforward calculations that are described in EIS Chapter 8 and Appendix C. The NRC staff accounted for uncertainty in the cost-benefit analysis by incorporation of different scenarios, as described next. In each case,* *the NRC staff chose scenarios that represented plausible upper and lower estimates to provide an adequate range of reasonable results. First, the NRC staff addresses uncertainty by using two different estimated annual costs for operations and maintenance values rather than a single value for both the proposed CISF as well as the No-Action alternative operations. As described in EIS Section 8.3.2.1, the proposed CISF operation cost used a lower estimate of $4,709,983 (i.e., Scenario A) and a higher estimate of $27,892,625 (i.e., Scenario B). In EIS Section 8.3.2.1, the NRC staff discusses the basis for these two cost estimates, and this EIS text in that section was revised in response to other comments (i.e., comments regarding Compliance with Information Quality Standards). As described in EIS Section 8.4.2.1, the No-Action alternative operation cost used a lower estimate of $1,117,422 (i.e., Scenario 1) and a higher estimate of $6,984,013 (i.e., Scenario 2). In EIS Section 8.4.2.1, the NRC staff discusses the basis for these two cost estimates.*

Second, the NRC staff also addressed uncertainty in the cost-benefit analysis by using two different discounting rates when estimating the costs. As described in EIS Section 8.2, the costs were discounted so that costs incurred over the 40-year license term can be compared to today's cost (i.e., present values) at a single point in time. Even relatively small differences in the discount rate can affect the cost estimate results. In EIS Section 8.2, the NRC staff discusses the basis for using the three and seven percent discount rates.

Third, the NRC staff addresses the uncertainty associated with utilization (or the amount of SNF stored at the proposed CISF) by estimating the costs for both the proposed action (Phase 1) and full build-out (Phases 1-20). As described in EIS Section 8.2, the analysis considered both the proposed action (Phase 1) and full build-out (Phases 1-20). In EIS Section 2.2.1, the NRC staff describes the amount of SNF associated with these levels of utilization. The proposed action consists of storing up to 8,680 MTUs [9,868 short tons]. Holtec anticipates subsequently requesting amendments to the license to store an additional 5,000 MTUs [5,512 short tons] for each of 19 expansion phases of the proposed CISF. As described in EIS Section 8.3.2.1, the proposed action (Phase 1) cost estimate in EIS Table 8.3-3 bounds the estimated costs for any subsequent phases and the full build-out (Phases 1-20) cost estimate in EIS Table 8.3-3 bounds the estimated costs if subsequent phases are delayed or not built.

Fourth, the NRC staff addresses uncertainty by considering the range of possible outcomes in the net benefits assessment. In EIS Table 8.5.1, the NRC staff provides the range of possible outcomes for the net benefits based on varying the input values for the four cost factors identified in the preceding text, specifically, the proposed CISF operation costs, the No-Action alternative operation costs, the discount rate, and the CISF utilization. In EIS Section 8.5.2, while not explicitly stated, the NRC staff evaluates the relevant aspects for the range of possible outcomes.

Fifth, the NRC staff addresses uncertainty associated with schedule delays. As described in EIS Section 8.3.2.1, costs or benefits experienced closer to the present have more value than those experienced farther into the future, which means delaying or extending an activity results in lower cost estimates. EIS Table 8.3-4 presents the assumed schedule for the proposed CISF. As described in EIS Section 8.3.2.1, from a discounting perspective, the estimated costs in EIS Table 8.3-3 are bounding because these costs are based on a project schedule prior to any delays.

Finally, the EIS addresses uncertainty associated with a potential second CISF by considering how this could impact the proposed Holtec CISF schedule and utilization. As described in EIS Section 8.2, consideration of a second CISF in this EIS was limited to the potential impacts on *the costs and benefits of the proposed Holtec CISF. In EIS Section 8.3.2.1, the NRC staff identifies two possible impacts. A second CISF could delay the schedule for transporting SNF to the proposed Holtec CISF because two CISF sites would be available to receive and store SNF. A second CISF could impact the utilization of the proposed Holtec CISF because the demand for storage capacity could decrease or no longer exist at some point in the future (e.g., due to the storage capacity provided by two CISFs). As described in EIS Section 8.3.2.1, the cost estimate in EIS Table 8.3-3 bounds the estimated costs if a second CISF impacts the schedule or utilization of the proposed Holtec CISF. No changes were made to the EIS in response to the uncertainty aspect of the comment.*

The NRC addresses and uses sensitivity analyses in several ways in the EIS. As described in EIS Chapter 8, the cost estimates for the proposed action (EIS Table 8.3-3), the No-Action alternative (EIS Table 8.4.1), and the net benefits or comparison of these two alternatives (EIS Table 8.5.1) use two different values for operations costs at the proposed CISF (i.e., Scenario A and B), two different values for the operations cost at the existing reactors and ISFSIs for the No-Action alternative (i.e., Scenario 1 and 2); two different discount rates (3 and 7 percent as well as the undiscounted estimates); and two CISF utilization levels [the proposed action (Phase 1) and full build-out (Phases 1-20)]. The NRC staff discusses relevant aspects of how these various cost factors influence the cost estimates for the proposed action (EIS Section 8.3.2.1), the No-Action alternative (EIS Section 8.4.2.1), and the net benefits (EIS Section 8.5.2).

Additionally, as described in EIS Section 8.3.2.1, cost estimates for the proposed CISF consisted of five cost factors (i.e., construction, SNF transport to the CISF, operation, SNF transport from the CISF, and decommissioning). As described in EIS Section 8.4.2.1, the cost estimate for the No-Action Alternative consisted of two cost factors (operation and SNF transport from the sites). As noted previously in this response, the estimated CISF operations used two values ($4,709,983 and $27,892,625) and the estimated No-Action alternative operations used two values ($1,117,422 and $6,984,013). For both cost factors, the difference between the low and high values is about a factor of six (i.e., the high estimate is about 600 percent larger than the low estimate). The NRC staff decided not to use two values for the other cost factors (e.g., plus and minus 10 percent of an estimate) because of the large differential (about 600 percent) associated with the high and low estimates for both the proposed CISF and No-Action alternative operational costs. In addition, and as described in EIS Section 8.2, the most relevant issue for the SNF transportation costs is that the proposed CISF requires two transportation campaigns (i.e., to and from the CISF) whereas the No-Action alternative only requires one campaign (i.e., from the sites). No changes were made to the EIS in response to the sensitivity analysis aspect of the comment.

The issue of transparency concerning the EIS cost estimates is raised and addressed in EIS Section 2.20.7 of this appendix [Cost Considerations—Compliance with Information Quality Standards]. As described in that comment response, the EIS was revised to provide clarification and does not result in any change to the cost-benefit analysis. Summarizing key elements of the response to the transparency comment, the EIS provides the following information concerning the EIS cost estimates: the cost factors, the estimated costs for each of these cost factors, the schedule identifying the years that each of these cost factors occurs, the discount rates used in the analysis, the equation for calculating the discounted costs, and the detailed tables for the proposed CISF and No-Action alternative in EIS Appendix C that show (i) the estimated cost for each cost factor for each project year, and (ii) the various cost estimate totals that appear in EIS Tables 8.3-3, 8.4-1, and 8.5-2. The NRC staff considers that the information in EIS Chapter 8 and Appendix C provides the public with adequate transparency *concerning how NRC estimated the costs, incorporated consideration of uncertainty, and used sensitivity analyses. The NRC staff also considers that this information provides an adequate example or template for the public to confirm or conduct their own sensitivity analysis with different schedules or estimated cost for the various cost factors. No changes were made to the EIS in response to this aspect of the comment.*

The issue of excess precision in the cost estimates is raised and addressed in Section 2.20.7 of this appendix [Cost Considerations—Compliance with Information Quality Standards]. *In response to comments in Section 2.20.7 of this appendix, the level of precision (i.e., the number of significant figures) for cost estimates in EIS Tables 8.3-3, 8.4-1, 8.5-1, and 8.5-2 was reduced.*

Comments: (376-1-8) (376-3-13)

D.2.20.22 Cost Considerations—General Estimating Costs

The NRC staff received comments regarding estimated costs for storage, transportation, and disposal of SNF. Comments included concerns about the cost of on-site storage compared to transporting SNF, that storing SNF is an ongoing rather than a one-time occurrence, the cost of repackaging fuel, that transporting the SNF twice would incur additional costs, and the cost comparison between the proposed CISF and the No-Action alternative. One commenter stated that the No-Action alternative analysis did not include the cost for additional storage at reactor sites for SNF that cannot be transported to the proposed CISF. One commenter questioned the validity of the EIS analysis because it relied on an analysis Holtec conducted.

Response: *As described in EIS Section 8.1, the NRC's analysis considers environmental and economic costs and benefits. In the EIS, the NRC staff analyzes the costs and benefits of the proposed CISF (Section 8.3), the No-Action alternative (Section 8.4), and compares the proposed CISF to the No-Action alternative (Section 8.5). Some of these cost-related comments were general in nature and noted the scale of the potential costs or raised objections to potentially high costs. The purpose of the EIS cost-benefit analysis is to focus on the reasonably foreseeable potential costs and benefits of such magnitude or importance that their inclusion in the analysis can inform the decision-making process (e.g., provide a basis for comparing the proposed action and alternatives), not to make a value judgment on the proposed project based on those estimated costs and benefits.*

The cost for additional SNF storage capacity at existing reactors was excluded from the No-Action alternative cost estimate because the NRC staff considers this a non-factor for the proposed action (Phase 1) and not a major factor for full build-out (Phases 1-20). As described in EIS Section 8.4.2.1, the estimated costs for the No-Action alternative are based on the amount of SNF that would be stored at the proposed CISF, which is 500 canisters for the proposed action (Phase 1) and 10,000 canisters for full build-out (Phases 1-20). Based on the amount of SNF currently in the U.S. inventory already being stored at ISFSIs, the NRC staff considers that additional storage capacity at existing reactors would not be needed for the 500 canisters associated with the proposed action (Phase 1) but could be needed for the 10,000 canisters associated with full build-out (Phases 1-20). However, the cost of additional SNF storage capacity at existing reactors would be at most about 1 percent of the No-Action alternative costs as identified in EIS Table 8.4.1. The purpose of the EIS analysis is not to exhaustively identify and quantify all the potential costs and benefits, but instead to focus on those of such magnitude or importance that their inclusion in the analysis can inform the decision-making process.

Costs of repackaging are not addressed in the cost-benefit analysis because the applicant has not proposed to repackage SNF and it is not one of the activities nor is a repackaging facility included as part of the proposed action (Phase 1) described in EIS Section 2.2.1. Thus, repackaging SNF and costs of repackaging are considered out of scope of the EIS. Additional information about EIS assumptions regarding repackaging can be found in EIS Section 2.26 of this appendix.

Regarding the concerns about the NRC's reliance on Holtec's estimates, the NRC staff uses information Holtec provided and considers the EIS cost-benefit analysis valid. As described in NRC regulations, Holtec provided an environmental report containing data to aid the NRC staff in developing an independent analysis [10 CFR 51.45(c)] and the NRC staff independently evaluated this information Holtec provided (10 CFR 51.41). In addition, the NRC staff supplemented the information Holtec provided in the environmental report. For example, the NRC generated cost estimates using two different values for the CISF operation costs, whereas the analysis in the Holtec environmental report only used one value. Furthermore, although the EIS identifies the Holtec ER as the source for the No-Action alternative SNF storage costs used in the analysis (EIS Table C-2), Holtec did not generate these estimates. As described in ER Section 9.2.1, the No-Action alternative cost estimates in the ER came from a 2012 Blue Ribbon Commission Report to the Secretary of the U.S. Department of Energy.

Additional information on the uncertainty and sensitivity of the cost-benefit analysis can be found in Section 2.20.21 of this appendix.

No changes were made to the EIS as a result of these comments.

Comments: (64-2) (74-10) (98-30-11) (99-20-3) (111-5) (113-6) (169-4-10) (223-2) (240-2-13) (266-9) (266-15) (319-19) (359-6) (364-1-14)

D.2.21 Comments Concerning Nonradiological Health

D.2.21.1 Nonradiological Health

The NRC staff received comments that provided information about the existing health characteristics of the region surrounding the proposed CISF or at locations the commenters believed the proposed project would affect. Commenters described their understanding and provided information about health characteristics of the region regarding specific ailments such as cancer, birth defects, lung disease, and kidney disease. Some commenters suggested the rates of cancer were elevated in southern New Mexico and provided suggestions for data sources for the NRC to consider in developing the EIS.

Response: *EIS Section 4.13 includes an evaluation of potential radiological and nonradiological impacts of the proposed project on public health. EIS Section 3.12 includes a description of the affected environment that describes the general health conditions in the areas surrounding the proposed CISF site. This description includes available information from sources such as public health summaries and related State and Federal health agencies' statistics on health condition. The EIS is based on available information to characterize the baseline health conditions applicable to evaluating the proposed project. However, no new original public health research or detailed public health assessment studies were conducted for the EIS by the NRC staff. In describing the characteristics of the affected environment, EIS Section 3.12 summarizes nearby nuclear, industrial, and resource extraction activities, as well as known contaminated sites that exist within the geographic scope of influence of the proposed* *project and considers the potential for cumulative effects from these activities, as applicable. If licensed, the proposed project would be required to adhere to the regulatory requirements the NRC set, which are protective of human health. The safety review of the application documented in a Safety Evaluation Report will evaluate the proposed project to meet NRC requirements. Transportation accidents are discussed in more detail in Section 2.9.2 of this appendix.*

No changes were made to the EIS as a result of these comments.

Comments: (41-4) (362-4) (402-2)

D.2.22 Comments Concerning Radiological Health

D.2.22.1 Radiological Health—Background Radiation

The NRC staff received comments from a member of the public and from NMED that focused on the comparison of calculated transportation doses with naturally occurring background radiation. The commenters suggested that the NRC verify that the proposed preoperational sampling plan is designed to quantify natural background concentrations.

Response: *EIS Section 7.2 describes the proposed radiological environmental monitoring program (REMP) that includes the collection of data during preoperational years to establish baseline radiological conditions at the proposed project area. The proposed REMP would provide information to the NRC necessary to demonstrate compliance with NRC safety regulations. Therefore, the NRC detailed technical review of the REMP and related operating procedures that address, for example, sampling, analysis, and reporting falls within the domain of the NRC safety review and is beyond the scope of the EIS.*

No changes were made to the EIS as a result of these comments.

Comments: (322-15) (328-3-12)

D.2.22.2 Radiological Health—Radiological Impact Analysis Approach

The NRC staff received comments regarding its evaluation of radiation exposure and cancer risk in the EIS. Several commenters were concerned about cancer risks from low-dose radiation, such as when a transportation shipment of SNF passes through a community. Another commenter requested that the NRC impact analysis address cancer risks in real people, including women and children, instead of using generic technical terms like reference man. Several commenters expressed concerns about radiation exposure to animals and biota of the surrounding biosphere. Some commenters supported (i) the EIS conclusions that doses from the proposed CISF would be low in relation to regulatory limits and normal background dose and (ii) scientific studies suggesting low doses may be beneficial. One commenter requested that background radiation and public radiological health be clarified and discussed quantitatively in the EIS Executive Summary. Commenters also had concerns about radiological monitoring and questioned whether NRC could enforce the requirement for radiological monitoring. One commenter requested additional information on a citation, and another questioned the scientific basis of the NRC analysis.

Response: *The NRC's mission is to license and regulate the Nation's civilian use of radioactive materials to provide reasonable assurance of adequate protection of public health and safety* *and to promote the common defense and security and to protect the environment. The NRC's regulatory limits for radiological protection are set to protect workers and the public from the harmful health effects of radiation on humans. The limits are based on the recommendations of standards-setting organizations. Radiation standards reflect extensive scientific study by national and international organizations (International Commission on Radiological Protection [ICRP], National Council on Radiation Protection and Measurements, Health Physics Society, and the National Academy of Sciences) and are conservative to ensure that the public and workers at nuclear facilities are protected. The international community and the Federal agencies (including the NRC) follow ICRP's current guidelines that the overall annual dose to members of the public from all sources should not exceed 1 mSv [100 mrem], to be protective of all individuals and the environment. These guidelines also hold that exposures from a single source should be limited to a fraction of this overall dose. The purpose of the public dose limit is to limit the lifetime risk from radiation to a member of the general public. The conversion factor used to equate dose into risk is based on data from various populations exposed to very high doses of radiation such as the atomic bomb survivors, and these populations contained individuals of all ages. Therefore, even though the studies use the term reference man, the variation of the sensitivity to radiation given age and gender is built into the standards, which are based on a lifetime exposure. A lifetime exposure includes all stages of life, from birth to old age. For ease of implementation, the radiation standards, which are developed to minimize the lifetime risk, limit the annual exposure that an individual may receive.*

EIS Section 4.3.1.2.2 describes in detail radiological impacts to workers and the public from incident-free transportation of SNF, general transportation, transportation accidents, and defueling the proposed facility. In addition, this section describes assumptions and analysis in the EIS in terms of the SNF considered (including MOX and high-burn-up fuels) and the cancer risk associated with a hypothetical maximally exposed individual. EIS Section 4.13 also includes information on impacts to public and occupational health from the proposed facility. The specific citation requested for the ICRP reference in EIS Section 4.3.2.2.5 can be found in both the text in Section 4.3.1.2.2 as well as the full reference at the end of that chapter. EIS Section 4.1.6.2 describes in detail radiation exposure to animals and biota of the surrounding biosphere.

Health effects from exposure to radiation are dependent on the dose (i.e., type and amount) of radiation received and may range from having no effect to being fatal. Although radiation may cause cancers at high doses, currently there is inconclusive data that establishes the occurrence of cancer following exposure to low doses below about 0.1 Sv [10 rem]. However, radiation protection experts conservatively assume that any amount of radiation may pose some risk of causing cancer or a severe hereditary effect and that the risk is higher for higher radiation exposures. Therefore, a linear, no-threshold dose response relationship is used to describe the relationship between radiation dose and adverse impacts such as incidents of cancer. The linear, no-threshold model assumes any increase in dose, no matter how small, results in an incremental increase in health risk. The NRC uses this model for estimating health risks from radiation exposure, recognizing that the model probably overestimates risks from low doses below about 0.1 Sv [10 rem]. Based on this model, the NRC conservatively establishes radiation dose limits, in 10 CFR Part 20 and 10 CFR Part 72, to ensure adequate protection of workers and members of the public. The NRC's regulatory limits incorporate conservative assumptions and are considered protective of adults, children, men, and women. These radiation dose limits are used when evaluating safety and environmental impacts from facilities, such as the proposed CISF evaluated in the EIS and in the NRC's parallel safety review. More information on these topics may be found at https://www.nrc.gov/about-nrc/radiation.html and https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/bio-effects-radiation.html.

Once facilities are constructed and/or in operation, the NRC provides oversight of all licensed commercial nuclear facilities to ensure that the dose to members of the public is within the established limits. Additionally, radiation-monitoring programs and the associated radiation dose limits to ensure adequate protection of workers and members of the public are required by the regulations found in 10 CFR Part 20 and 10 CFR Part 72 and are thus enforceable.

The NRC staff have revised text in the Executive Summary and EIS Sections 3.12.3 and 4.13.1.1 in response to comments concerning background radiation and to further clarify the public and occupational health impacts.

Comments: (34-7) (34-8) (66-2) (98-35-1) (98-35-2) (98-35-3) (98-35-4) (98-35-5) (98-35-6) (98-35-8) (98-39-2) (98-39-3) (98-44-3) (116-8) (125-1) (128-4) (136-3) (154-4) (157-1-4) (167-13-11) (168-24-3) (169-3-1) (169-8-9) (169-11-3) (170-9-1) (170-18-3) (237-4-15) (251-16) (259-2) (275-1) (293-2) (304-1) (323-2-8) (323-2-10) (375-2-12) (375-2-13) (379-1) (381-21)

D.2.22.3 Radiological Health—Radiological Safety of Workers

The NRC staff received comments expressing radiological safety concerns for workers. Commenters questioned the protection provided by regulatory dose limits for workers. Comments also were received that stated the dose estimates related to workers are underestimated, inadequate, would be exceeded by handling of damaged fuel, and are not accurately predicted by modeling or measurement. One commenter stated that monitoring would be insufficient to protect workers.

Response: *The EIS evaluated the potential health and safety impacts to workers, including consideration of both radiological and nonradiological hazards. This includes consideration of dose (i.e., type and amount of radiation exposure) estimates for proposed operations and activities, including credible accident scenarios, but also considers historic experience with similar operations. The EIS also considers available nonradiological safety information related to similar activities or industries (e.g., Occupational Safety and Health Administration reports).*

The NRC has established a conservative limit of 0.05 Sv per year (Sv/yr) {[5 rem] per year (rem/yr)} in 10 CFR Part 20 for radiation doses to workers, such as operating personnel at the proposed CISF. To track the occupational exposure at NRC-licensed facilities, the occupational exposure data are maintained in the NRC's Radiation Exposure Information and Reporting Systems (REIRS), and the yearly occupational exposure for the personnel at licensed facilities is maintained below the radiation dose limits in 10 CFR Part 20. Licensees also are required by 10 CFR Part 20 under any operations, to the extent practical, to use procedures and engineering controls based upon sound radiation-protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA).

Concerns about repackaging damaged casks, canisters, or fuel, and how casks or canisters that do not meet proposed storage facility acceptance criteria would be handled are specifically addressed in the NRC's safety review conducted in parallel to the EIS. More importantly, regardless of activity associated with operations at the proposed CISF, radiation doses would still be required to be no greater than the NRC limit established in 10 CFR Part 20. Additionally, if a license is issued, the NRC inspection and enforcement program would ensure that the licensee maintains the terms and conditions of the license.

Two commenters referenced an industry presentation on cask-handling operations in which a 0.04 Sv [4 rem] dose was received compared to the 0.05 Sv/yr [5 rem/yr] limit for workers. The dose received was actually 0.04 mSv [4 mrem or 0.004 rem]. The presentation can be found at https://www.nrc.gov/docs/ML1925/ML19255F603.pdf.

No changes were made in the EIS as a result of these comments.

Comments: (126-2) (157-1-8) (157-2-16) (157-4-6) (191-4) (305-4) (309-1) (321-3) (323-2-4) (323-2-7) (405-4) (406-4)

D.2.23 Comments Concerning Waste Management

D.2.23.1 Waste Management—Estimates for Nonhazardous Waste and Disposal Capacity

The NRC staff received comments regarding the volume of nonhazardous waste that would be generated as compared to annual throughput and expected lifetime capacity of local landfills. Two comments indicated concern that deconstruction of the facility will generate a lot of waste, and landfills would already be closed. The other commenter provided a question about the estimates for total waste disposed at Sandpoint Landfill for the construction stage of Phases 2-20.

Response: *EIS Table 2.2-3 provides estimated quantities of nonhazardous waste generated during all phases of the proposed CISF, including decommissioning and reclamation. EIS Section 4.14 describes the potential environmental impact to waste management resources as a result of nonhazardous waste generated for the proposed CISF project. Regarding estimates of waste generated for construction stages of Phases 2-20, the total nonhazardous solid waste that the proposed CISF project would generate over the project schedule is estimated to represent approximately 3.3 percent of the remaining capacity at the Sandpoint Landfill. The remaining capacity of the Sandpoint Landfill was estimated based on multiplying the annual volume of waste disposed at this landfill by the projected lifespan of this landfill, which was obtained from the Permitting Section of Solid Waste Bureau of NMED. As discussed in EIS Section 3.13, both the Sandpoint and Lea County landfills are anticipated to close prior to decommissioning and reclamation of the proposed action (Phase 1) (NMENV, 2019). The NRC staff anticipates that the State of New Mexico would put in place additional landfill facilities as part of the normal urban development needs of the area. Therefore, the NRC staff assumes that the nonhazardous waste would be disposed according to all applicable regulations, and future capacity would be available. The NRC staff added text to EIS Section 4.14 to clarify that the capacity estimates for disposal of nonhazardous waste were based on comparing total volume of nonhazardous waste generated for the construction stage of Phases 2-20 to estimated remaining available capacity of the Sandpoint Landfill*.

Comments: (157-4-8) (376-3-1) (380-12)

D.2.23.2 Waste Management—Inadequate Discussion of Waste Streams

The NRC received comments from NMED concerning the generation and handling of various waste streams. Specifically, NMED noted that oil and grease would be classified as special waste and that sanitary waste would be subject to regulations under NMAC 20.6.2. NMED, in general, expressed concern about mishandled waste streams from the proposed project. NMED also stated that the EIS did not provide information on the drain system for the

Cask Transfer Building. NMED also noted that the EIS did not provide sufficient detail regarding sanitary waste and mixed waste streams.

Response: *Leaks and spills of oils and lubricants from construction equipment and stormwater runoff from impervious surfaces of the proposed CISF, including the Cask Transfer Building, would be managed under applicable Federal and State of New Mexico guidelines. As stated in the EIS, Holtec has committed to implementing a SPCC Plan to minimize the impacts of potential contamination as a result of potential oil, gas, and solvent leaks. Additionally, while the NPDES permit does not specifically regulate oil and grease, the NRC staff anticipates that the standard uses of these types of materials for equipment would not result in significant discharges of these types of waste, and the discharge requirements of the NPDES permit coupled with the SPCC Plan and SWPPP would mitigate impacts to surface and ground waters.*

Regarding sanitary waste, as described in EIS Section 2.2.1.6, sanitary waste would be collected onsite using sewage collection tanks and underground digestion tanks and then disposed at an existing offsite treatment facility. As also discussed in EIS Section 2.2.1.6, the sanitary waste management systems used for temporary collection of sanitary waste would be designed and operated in accordance with all applicable NMED and Federal standards and requirements. For clarity, the NRC staff has added text to EIS Sections 2.2.1.6, 3.13.1, and 4.14 to include citations to NMAC 20.6.2. NMAC Title 20 "Environmental Protection" Section 6.2, which regulates ground and surface water protection, including as related to waste management.

Regarding the comment on mixed waste, per EIS 2.2.1.6, for the proposed CISF, mixed waste would not be expected to be generated based on the proposed activities; however, if any mixed waste were generated, it would be handled and stored in accordance with a 10 CFR Part 20 radiation protection plan and all applicable Federal and State of New Mexico requirements and would be sent to an existing licensed facility for disposal.

As stated in EIS Section 2.2.1.6, for the proposed CISF, hazardous waste produced would primarily occur from the potential use of small quantities of chemicals or other solvents. These activities would be performed using proper handling procedures that would prevent releases of hazardous materials into the environment. The NRC staff anticipates that Holtec would abide by all Federal and State regulatory requirements.

The drainage design of the Cask Transfer Building will be evaluated by the safety review associated with this licensing action to ensure that effluent concentration and dose limitation requirements would be met for any minor liquid waste streams; for example, melted snow accumulated on arriving transportation casks (Holtec, 2020a). Importantly, however, no significant effluent streams are expected, and all waste streams are already evaluated throughout EIS Section 4.14. Therefore, the specific drainage design of the Cask Transfer Building is not within the scope of the environmental review. In the event of any effluent from the cask transfer building, it would be managed in accordance with applicable NRC regulations as well as the SWPPP and SPCC Plan.

Although the EIS includes a description of the various waste streams that would be expected to be generated to disclose potential environmental impacts, the enforcement of State requirements and permit conditions falls within the purview of the State and is outside the NRC's regulatory authority. Thus, while the NRC staff has identified applicable State requirements within the EIS, responsibility for issuance of and compliance with the permits falls within the State's jurisdiction. In developing an analysis of reasonably foreseeable *environmental impacts, the NRC staff assumes that the State will require compliance with its laws and regulations.*

Comments: (310-21) (310-22) (310-23) (310-28) (328-3-3) (328-3-4)

D.2.23.3 Waste Management—Mitigation Measures for Disposal Capacity

The NRC staff received a comment inquiring about the mitigation measures that would be in place should disposal facilities not be ready to receive waste.

Response: *As noted in the EIS (Section 4.14.1.3), both the Sandpoint and Lea County landfills are anticipated to close prior to the decommissioning and reclamation stage (NMENV, 2019). However, because these landfills serve general community needs for disposal of non-hazardous waste, the NRC staff anticipates that the State of New Mexico would put in place additional landfill facilities as part of the normal urban development needs of the area. Thus, the NRC staff assumed that the volume of nonhazardous waste would be disposed according to all applicable regulations and future capacity would remain available. Holtec committed to one mitigation measure regarding disposal capacity: all waste will be stored in designated locations of the facility until administrative limits are reached, at which time waste would be shipped offsite to the appropriate licensed treatment, storage, and/or disposal facility (EIS Table 6.3-1). Additional limited measures are recommended by the NRC in Table 6.3-2 (e.g., limiting waste generation). No additional mitigations were specified by either Holtec or the NRC staff. However, because of the large volume of nonhazardous waste that would be generated if all 20 phases of the project were licensed and constructed, the NRC staff concluded in the EIS that the potential impact to landfill facilities could be MODERATE until additional landfill disposal space is available.*

No changes were made to the EIS as a result of this comment.

Comment: (252-7)

D.2.23.4 Waste Management—Discussion of LLRW in Executive Summary

The NRC staff received a comment requesting that estimates for low-level radioactive waste (LLRW) for the operational activities of the proposed CISF be provided in the EIS Executive Summary, consistent with the other types of waste discussed.

Response: *For consistency with the other types of waste discussed, the Executive Summary of the EIS was updated with information from EIS Section 4.14.1.2 to provide the estimated quantities of LLRW generated during the operations stage of the proposed Holtec CISF.*

Comment: (34-9)

D.2.23.5 Waste Management—LLRW Estimates and Responsibility for Radiological Contamination

The NRC staff received comments regarding the estimates for LLRW in the EIS and responsibility for cleanup during decommissioning. Some commenters indicated that the EIS underestimates volumes of LLRW that the proposed project would generate, including as part of decommissioning. Another commenter requested additional information about the nature and types of LLRW that would be generated. Commenters expressed concern that repacking canisters due to either damage upon arrival or in preparation for transport to a permanent repository would generate additional LLRW that is not accounted for in the EIS.

Response: *The EIS includes an analysis of the potential impacts to waste management resources from the proposed Holtec CISF. This analysis includes estimates of LLRW generated based on the characteristics of the activities associated with each stage and phase of the proposed CISF, including construction, operations, and decommissioning and reclamation. As discussed in EIS Section 2.2.1.6, typical LLRW produced for the proposed CISF would include contamination survey rags, anti-contamination garments, and other health physics materials. EIS Section 2.2.1.6 also includes estimates for LLRW the proposed project produces, the applicant's proposed waste management activities, and the applicable regulations that address handling, storage, and disposal of these wastes. Regarding the comments about the amounts of LLRW generated during decommissioning, as discussed in EIS Section 4.13.1.3, activities that would produce LLRW during decommissioning are expected to be limited and have minor associated waste volumes because the decommissioning stage only includes activities associated with the clean-up of potentially contaminated surfaces of the facilities. As described in EIS Section 2.2.1.6, LLRW produced as a result of radiological decommissioning would consist of contamination survey rags, anti-contamination garments, and other health physics materials used to perform the final radiation survey of the site. The movement of fuel from the proposed CISF to a permanent repository is part of the operations stage. The applicant has not proposed a dry transfer facility for repackaging canisters, and no on-site repackaging is currently planned. Therefore, one was not included in the analysis in the EIS. Additionally, the arrival of damaged fuel would be evaluated upon receipt at the proposed facility and could potentially be returned to the generation site. Because providing reasonable assurance of compliance with radiological protection standards and associated acceptance criteria is a prerequisite to licensing and will be addressed in the safety review, any procedures for dispositioning damaged fuel upon arrival will ensure that all radiological dose standards would be met. For additional information on safety and repackaging, see Section 2.26 of this appendix.*

Regarding the comments questioning responsibility for radiological decontamination, Holtec would be responsible for site and materials decontamination associated with the proposed CISF, including residual contamination (if any) from normal operations, in accordance with NRC regulations. EIS Section 4.15 notes that Holtec has incorporated safety features into the design, construction, and operation of the proposed CISF project as a first line of defense to prevent the release of radioactive materials. Furthermore, Holtec could only use storage and transportation casks that have undergone NRC review and design certifications. Should a release of radioactive material occur during operations of the proposed CISF, Holtec would assume responsibility for its cleanup following all previously established reporting and notification procedures, including subsequent documentation of compliance with NRC dose regulations. No changes were made to the EIS as a result of these comments.

Comments: (109-4) (157-4-7) (170-25-3) (170-25-5) (372-16) (372-20) (375-1-8) (375-2-4) (378-2) (379-16) (379-22) (379-23) (380-1) (380-2) (380-7) (380-9) (380-10)

D.2.24 Comments Concerning Cumulative Impacts

D.2.24.1 Cumulative Impacts

The NRC staff received several comments expressing concerns about the adequacy of the cumulative impact analysis. Comments included topics such as the history of New Mexico and the nuclear industry; overlapping radiological impacts from legacy, operating, or proposed nuclear facilities (e.g., WIPP, Urenco, and the ISP CISF); and general opposition to the project and its cumulative impact to the region. Many commenters stated that New Mexico, in particular southeastern New Mexico, has suffered too much from past mining and energy activities and existing nuclear facilities, such as WCS, WIPP, and Urenco. The NRC staff received comments on the combined impact of a radiological release from WIPP and the proposed CISF. A few commenters stated that the cumulative impact analysis is incomplete because it does not include the potential for a second CISF. Some commenters stated that the EIS should include the cumulative effects from all nuclear projects in New Mexico and that not doing so was a violation of NEPA. Commenters expressed general concern that they do not want their state and communities to continue to be burdened with more nuclear waste. Particular concerns included safety of the proposed CISF and health-related issues from past nuclear activities in the State. Some commenters were concerned about the overlapping impact of the proposed CISF with nearby energy and mineral activities. A commenter was concerned about the combination of the regional karst geology and the consolidated interim storage of SNF noting its proximity to Carlsbad Caverns and the presence of a sinkhole in Carlsbad. Two commenters stated that the cumulative impact analysis should also evaluate the impact of new rail and electrical lines. One commenter requested clarification about the impacts noted in tables in EIS Chapter 5.

Response: *The EIS contains a cumulative impacts analysis of other past, present, and reasonably foreseeable future actions in the vicinity of the proposed project, including, where appropriate, the presence of other industrial facilities in the region. An assessment of cumulative impacts is required under NEPA. The cumulative impacts analysis considers historic, current, and future trends in mining and energy-related activities, and other infrastructure and industry projects in southeastern New Mexico in combination with the impacts of the proposed CISF. Projects and facilities that are not yet reasonably foreseeable (i.e., speculative) are outside the scope of this EIS.*

The public and occupational health analysis in EIS Section 5.13 considers existing background pollutant concentrations and cumulative effects on members of the public due to the presence of radioactive materials from past, present, and reasonably foreseeable future facilities. Also included in EIS Section 5.7 and 5.13 are evaluations of the potential health impacts from the proposed CISF and other known sources of pollution and radiation. Furthermore, the EIS analysis evaluates the potential radiological impacts of normal operations, routes of exposure to radiation that would contribute significantly to dose estimates, and credible accidents within its cumulative analysis and within EIS Sections 4.3 and 4.13.

EIS Section 5.1.1 details the facilities and activities within the 80 km [50 mi] geographic scope of analysis for the proposed project. Only past, present, and reasonably foreseeable future actions within this geographic scope were evaluated as part of the cumulative impact analysis. However, for each resource area the NRC staff determined when a smaller geographic scope was appropriate because for distances beyond those identified in each resource section impacts would not be anticipated to influence or be influenced by the proposed CISF project. Projects, activities, and legacy issues outside of the 80 km [50 mi] geographic scope of analysis are also outside of the scope of the EIS because they are unlikely to be impacted by the proposed project. Inclusion of relevant projects and activities within the geographic scope that could have adverse effects and evaluating those within the EIS cumulative impacts analysis fulfills NRC's NEPA obligation. Additional comments on legacy sites can be found in Section 2.37.7 of this appendix.

With regard to the safety of other nearby facilities, the NRC safety review will confirm there are no credible accident scenarios with release of radiological material at the proposed CISF. To grant a license, the NRC must find there is reasonable assurance of adequate protection of public health and safety. Additionally, the socioeconomic impacts, including the robustness of the energy and agricultural sectors in the region of the proposed project are assessed in EIS Sections 4.11 and 5.11. However, the cost of accidents is discussed in EIS Section 8.3.2 and Section 2.20 of this appendix. Additional information about safety can be found in Section 2.26 of this appendix and accidents are further discussed in EIS Section 4.15 and Section 2.25 of this appendix.

Regarding the concerns about cumulative geologic impacts, descriptions of the regional and site-specific geologic conditions can be found in EIS Section 3.4, an evaluation of impacts from the proposed CISF is in EIS Section 4.4, and cumulative impacts are described in EIS Section 5.4. The NRC staff disagree that the proposed project would impact Carlsbad Caverns because, contrary to the comment, the caverns are 75.0 km [46.6 mi] to the southwest of the proposed project area, not 24 km [15 mi]. EIS Section 3.4.5 and 4.4.1.2 discuss the regional subsidence and sinkholes, including the one located in Carlsbad. As described in EIS Section 3.4.5, sinkholes and karst features are common features of the lower Pecos region of west Texas and southeastern New Mexico. A number of these features are of anthropogenic (man-made) origin and are associated with improperly cased abandoned oil and water wells, or with solution mining of salt beds in the shallow subsurface. As stated in EIS Section 4.4.1.2, the subsurface geologic conditions at the proposed project area are not conducive to karst development. Therefore, because of the subsurface geologic conditions present at the site and because the proposed CISF project operations do not produce any liquid effluent that could facilitate dissolution, the NRC staff does not anticipate that the proposed CISF would lead to the development of sinkholes or subsidence.

Currently, there are numerous power transmission and distribution lines within the region, and the proposed facility would therefore be serviced by already existing electrical lines running along the southern border of the proposed project area. It is unlikely that additional electrical lines would be needed to provide power to the proposed facility. However, should any additional lines be needed to tie into the already existing electrical infrastructure, they would be constructed on private land and would not be expected to impact or be impacted by the proposed action and therefore this is not analyzed further. The NRC staff evaluated construction of a rail spur to access the proposed CISF site as part of each resource area in the EIS. However, construction of additional infrastructure, including national rail lines and infrastructure at SNF origin sites that would transport SNF to the proposed CISF, is beyond the scope of the EIS because exact transportation routes have not yet been established and decommissioning transportation modes at origin sites would be evaluated as part of site-specific reviews.

The NRC staff acknowledge the comments requesting clarification about the impact determinations in Chapter 5 Tables and Sections. Edits to EIS Section 5.12.1 were made to correct the discrepancy between the impact determination in EIS Table 5.1-1 and EIS Section 5.12.1. The impact to historic and cultural resources is SMALL as stated in EIS Table 5.1-1, and EIS Section 4.9.

Comments: (20-2) (51-2) (54-4) (73-4) (74-12) (84-1) (90-10) (90-11) (91-5) (98-3-3) (98-4-1) (98-17-4) (98-17-5) (98-17-6) (98-21-4) (98-24-3) (98-26-4) (98-28-1) (98-29-6) (98-31-11) (98-50-4) (98-50-9) (99-21-4) (99-21-6) (105-7) (116-10) (116-11) (117-4) (117-5) (149-1) (151-6) (151-10) (157-2-15) (157-4-5) (167-1-7) (167-4-9) (170-10-6) (172-6) (196-5) (224-25)

(226-3) (252-1) (252-5) (266-12) (269-4) (280-11) (308-5) (324-2-3) (337-6) (349-4) (358-1) (359-5) (360-3) (364-1-23) (364-1-24) (364-1-27) (368-2) (376-1-17) (382-24) (413-2)

D.2.25 Comments Concerning Accidents

D.2.25.1 Accidents—Concerns About Accidents

The NRC staff received a large number of comments expressing concerns about various accident scenarios and their potential consequences. Commenters expressed concerns about accidents during all CISF project phases, alluding to past incidents at foreign and domestic nuclear power plants (e.g., Chernobyl, Fukushima, Three Mile Island) and other sites (e.g., WIPP, Los Alamos). Some commenters suggested that the EIS evaluate beyond-design-basis and worst-case accidents. Commenters expressed different opinions about the likelihood, severity, and potential consequences of accidents at the proposed CISF.

Some commenters described concerns regarding various potential accident initiators, including extreme weather events (e.g., tornadoes, high temperatures, lightning, flooding) and other natural events, such as wildfires, land subsidence, and sinkholes. Additional events such as explosions, criticality, sabotage, aircraft crashes including fuel fire, and decommissioning accidents were also mentioned with one commenter questioning who would be responsible for radiological cleanup in the event of a spill, leak, or accident. Some commenters questioned the capabilities of the storage casks to perform safety functions such as cooling and containment throughout the period of operations without an accident. Some commenters wanted to know about the ROI for the impacts of accidents and the types of models that would be used to evaluate accidents.

Concerns expressed about the consequences of accidents included the dispersion and distribution of radioactive materials, the size of the affected area, and the potential economic impacts on local businesses (oil and gas development, potash mining, investment, agriculture, ranching, property values, tourism, pharmaceutical production, retirement), the State budget, natural resources (including soil, air, water supply, and wildlife), and potential impacts of accidents on responders, workers, and the public, including the potential for genetic effects. Additional concerns were expressed about accident mitigation, including suggestions about additional design features (e.g., domes) to protect against aircraft crash and similar hazards. Other mitigation concerns were focused on prompt reporting of accidents to the public, the availability of workers to respond to accidents, monitoring casks, repair, replacement, and who would be responsible for decontamination and decommissioning.

NMED stated that the EIS explains that the applicant evaluated accidents and concluded that the proposed CISF would not exceed applicable 10 CFR 72.106 dose limits to individuals at or beyond the controlled area boundary, and that the EIS does not explain, or is contradictory about, how each of the accident categories might impact environmental media including air, surface water, groundwater, and soil, and does not explain possible impacts both inside and outside the controlled area boundary.

Response: *The NRC regulations and associated safety review guidance specify that the proposed CISF be designed to withstand various credible accidents, including natural external events. However, most of the issues raised in these comments are outside of the scope of the NRC's environmental review. The evaluation of credible accidents is addressed in NRC's safety review and documented in the SER. The NRC SER will include an evaluation and determination of (a) the adequacy of the design to withstand credible accidents, (b) the potential* *for a release of radioactive material to occur as a result of any such accident, and (c) the significance of any such release in terms of calculated accident doses compared to regulatory requirements to ensure public health and safety found in 10 CFR 72.106. The very low risk of accidents due to construction, operation, and decommissioning of the proposed facility is addressed in EIS Section 4.15 and will be verified in the NRC's safety analysis (i.e., no credible accidents with release of radiological material at the proposed CISF). The NRC staff will verify that the analyses of normal, off-normal, accident, and severe accident events satisfy the NRC's safety requirements, which in turn will confirm that the potential impacts to environmental resource areas for postulated accidents would be SMALL. The NRC would only issue a license to construct and operate the facility if safety and security requirements are met. In conjunction with the safety analysis documented in the NRC's SER, the EIS analyzes the potential environmental impacts resulting from credible accidents at the proposed CISF. NEPA does not require analysis of worst-case scenarios. Regarding the responsible party for radiological clean-up during normal operations, the NRC staff does not anticipate a radiological leak because the SNF canisters do not contain any material in liquid form and are sealed. However, for either nonradiological or radiological clean-up or decontamination, Holtec would be responsible for all clean-up activities, and in the case of radiological material, Holtec would be required to decontaminate all areas or media to meet NRC standards. Comments about emergency response and emergency management are described in Section 2.27 [Comments Concerning Emergency Management]. Comments about transportation accidents are addressed in Section 2.9.2 [Transportation* of SNF—Accidents*]. Comments about security and terrorism are addressed in Section 2.34 [Comments Concerning Security and Terrorism]. Comments about safety are addressed in Section 2.26 [Comments Concerning Safety]. Additional information on Socioeconomic impacts is described in EIS Section 4.11 and Section 2.17 of this appendix.*

No changes were made to the EIS as a result of these comments.

Comments: (12-3) (74-7) (77-6) (79-3) (98-18-3) (98-23-7) (98-24-10) (98-30-6) (98-38-6) (98-44-1) (98-44-4) (98-58-8) (99-22-1) (99-27-6) (99-27-11) (100-2) (100-3) (114-1) (150-7) (155-3) (157-2-14) (157-3-11) (157-3-12) (167-4-5) (167-9-2) (167-9-3) (167-10-2) (168-5-2) (168-26-3) (169-8-2) (170-8-4) (170-19-3) (170-20-9) (215-2) (215-6) (224-31) (231-9) (266-5) (277-3) (280-4) (287-8) (289-8) (293-4) (305-5) (307-1-2) (315-4) (328-2-11) (335-7) (343-5) (344-1) (344-6) (351-7) (354-5) (357-8) (372-12) (375-2-14) (379-20) (383-3) (390-5)

D.2.26 Comments Concerning Safety

D.2.26.1 Safety—Canister Design

The NRC staff received many comments expressing concerns about the safety of the canister design for storing SNF at the proposed CISF. These concerns included comments about cask and canister designs; cask testing; degradation and aging management; and practical operational details.

Canister design concerns expressed in the comments addressed a variety of topics, including the thickness of canisters and casks, valve and basket performance, effectiveness of shims, stress corrosion cracking, high-burn-up fuels with associated embrittlement, oxide and hydride buildup, criticality, water intrusion, and the design life of casks and canisters relative to the proposed license term. Commenters requested full-scale testing of casks and canisters. Other comments expressed concerns about long-term quality assurance and inspection, loss of institutional controls, and the viability of canisters and fuel for post-storage transportation, including whether repackaging would be needed for transportation to final disposal.

Additional concerns in the comments included the ability to monitor, retrieve, and repair welded SNF canisters at the proposed CISF. Some commenters expressed concerns about technical challenges regarding monitoring for cracks in canisters during storage while others recommended the containment should be monitored for hydrogen to prevent potential accidents. Concerns were expressed about how damaged casks, canisters, or fuel would be handled upon arrival and how casks or canisters that did not meet proposed storage facility acceptance criteria would be safely returned to the sender. Some commenters wanted to know how a compromised cask would be removed from service. In addition to the specific concerns about canister and cask safety, some commenters included questions about the transportation accident probability and consequences, whether the rail infrastructure can handle the weight of shipped casks, and miscellaneous site-specific issues. Some commenters stated that there were optimistic assumptions regarding the performance of safety systems and whether residual external contamination would exist on transportation casks.

Response: *The EIS evaluates the potential environmental impacts that could result from construction, operation, decommissioning, and reclamation of the proposed CISF. In parallel with this environmental review of the proposed CISF, the NRC is conducting a separate safety review. The safety review of the Holtec application evaluates whether the application complies with applicable requirements, including 10 CFR Part 72, which addresses facility design and operations, receipt inspections, quality assurance, records, and reports as well as 10 CFR Part 20, which addresses standards for protection against radiation. The safety review will address how casks or canisters that do not meet proposed storage facility acceptance criteria would be handled, inspections, aging management programs, maintenance, and design events, including normal, off-normal, and accidental events. As such, these concerns are outside the scope of the EIS.*

If NRC grants a license to Holtec for the proposed CISF, the NRC inspection and enforcement program ensures that the licensee maintains the terms and conditions of the license. In addition, the NRC conducts a safety review for the certification process of every transportation and storage canister and cask system design prior to issuing a certificate of compliance for use. Concerns about the NRC's safety programs and the certification of canisters and cask systems for storage and transportation are thus outside the scope of the EIS. While the NRC environmental review will not duplicate NRC's detailed safety evaluations, the EIS impact analyses consider the potential impacts to workers, the public, and the environment from the proposed CISF, specifically in EIS Section 4.13, Public and Occupational Health. Comments about transportation safety and accidents are described in Section 2.9.2 [Transportation of SNF—Accidents] of this appendix and transportation infrastructure in Section 2.9.25 [Transportation of SNF—Infrastructure] of this appendix. Comments about dry transfer storage and institutional controls are described in Section 2.6 [Comments Concerning Assumptions] of this appendix. No changes were made to the EIS as a result of these comments.

Comments: (2-1) (2-2) (2-3) (47-1) (47-5) (54-7) (54-13) (55-4) (57-2) (68-4) (74-2) (77-3) (90-9) (93-11) (93-12) (93-14) (98-15-5) (98-28-2) (98-30-3) (98-30-4) (98-30-5) (98-30-10) (98-31-3) (98-36-5) (98-37-5) (98-43-2) (98-43-4) (98-43-6) (98-49-8) (98-50-11) (98-51-10) (98-58-2) (99-16-3) (99-16-6) (99-16-7) (99-17-7) (99-20-6) (99-22-2) (99-22-4) (99-22-5) (99-22-6) (99-24-1) (99-24-3) (99-27-5) (99-27-8) (99-29-9) (99-35-9) (100-6) (102-3) (102-4) (102-5) (102-7) (116-9) (119-2) (135-10) (138-1) (146-4) (157-1-7) (157-1-15) (157-1-16) (157-2-21) (157-3-9) (157-3-10) (167-5-5) (167-6-5) (167-10-3) (167-13-7) (168-3-6) (168-5-3)

(168-5-4) (168-16-9) (168-20-6) (168-20-7) (168-26-1) (169-11-4) (169-11-7) (169-19-1) (170-4-2) (170-6-1) (170-6-2) (170-6-3) (170-12-9) (170-17-2) (170-19-4) (170-19-6) (170-23-1) (170-23-2) (170-24-2) (170-26-1) (191-5) (215-7) (221-6) (221-7) (227-2) (231-10) (237-1-18) (237-1-19) (237-2-2) (237-2-5) (237-2-17) (240-2-11) (240-3-12) (240-3-19) (251-6) (251-14) (252-6) (252-10) (280-6) (280-8) (286-15) (286-17) (290-7) (299-7) (307-1-8) (307-1-17) (307-2-5) (319-3) (319-4) (319-5) (319-7) (319-15) (319-20) (319-21) (323-1-6) (323-1-11) (323-1-14) (323-1-16) (323-1-17) (323-1-18) (323-1-19) (323-2-9) (324-1-3) (324-1-5) (324-1-16) (324-1-17) (324-2-12) (324-2-16) (328-2-18) (335-6) (335-9) (354-2) (354-3) (357-5) (359-7) (359-10) (364-1-22) (372-7) (372-11) (373-7) (373-13) (380-13) (380-14) (394-3) (394-4) (413-1) (428-3)

D.2.26.2 Safety—Cask System Design

The NRC staff received comments regarding the safety of the overall CISF design, transportation casks, and the cask system design that would be used to store SNF at the proposed CISF. Some commenters expressed concerns with specific design features and their ability to protect against initiating events, while others expressed confidence in their ability to ensure safe functioning of all cask systems. Design features of interest to commenters included the thickness of casks and canisters, the subsurface placement of casks, vents, the form of the waste (e.g., solid versus liquid), welded and sealed canister design, design life, service life, and license term. Initiating events and processes described by commenters included the potential for cracks and loss of containment, the potential for hydrogen generation, onsite security, electrical backup systems, the possibility of infilling of casks or canisters with water, the effects of environmental temperature, radiation degradation of materials, and of potential corrosion initiators such as potash dust.

Additional concerns were expressed about criticality, as well as various natural events or conditions such as climate change, earthquakes, flash flooding, lightning strikes, biological intrusion, soil conditions, and fire. Commenters also expressed concerns about the rigor and real-world applicability of testing during the certification reviews of cask systems, including transportation casks. One commenter incorrectly identified the proposed CISF as an above-ground storage system while another questioned if it was designed for permanent storage. One commenter questioned statements in the EIS indicating that the HI-STORM UMAX system had universal capability to store all types of SNF canisters.

Response: *The EIS evaluates the potential environmental impacts that could result from construction, operation, decommissioning, and reclamation of the proposed CISF. In parallel with this environmental review of the proposed CISF, the NRC staff is conducting a separate safety review that will be documented in an SER. The safety review of the Holtec application evaluates whether the application complies with applicable requirements, including 10 CFR Part 72, which addresses facility design, quality assurance, records, and reports. The safety analysis ensures that the proposed CISF would be designed to account for climate change, flood events, security, and electrical redundancy, as well as a number of other topics. After a SER is published, a license could be issued, at which point the NRC inspection and enforcement program would ensure that the licensee maintains the terms and conditions of the license. In addition, independent from the Holtec CISF application, the NRC conducts a safety review for the certification process of every transportation and storage canister and cask system design prior to issuing a certificate of compliance for use. Concerns about the NRC's safety programs, the safety evaluation being conducted as part of this licensing action, and the certification of canisters and cask systems for storage and transportation are thus outside the scope of the EIS. While the NRC environmental review will not duplicate NRC's detailed safety* *evaluations, the EIS impact analyses consider the potential impacts to workers, the public, and the environment from the proposed CISF. In addition, the impacts of external events on the safe storage of SNF at the proposed CISF will also be evaluated as part of the NRC staff's safety review, and the results will be documented in the SER.*

Regarding the ability of the HI-STORM UMAX system to accept all SNF, Holtec is proposing to use HI-TRAC transfer casks and canisters that are compatible with the HI-STORM UMAX system. A license, if issued, would require Holtec to use approved HI-STORM UMAX casks and canisters at the CISF. If Holtec wished to change the types of casks and canisters accepted at the proposed facility, Holtec would be required to apply for a license amendment, which would include a separate safety review. Therefore, the text in EIS Section 2.2.1.2 has been revised to clarify the multi-purpose canisters for which the HI-STORM UMAX system is approved to store in accordance with its Certificate of Compliance. The EIS considers the potential environmental impacts of storage and transportation of SNF, and additional details can be found in EIS Section 3.3, 4.3, and 5.3. Additional details regarding NRC certifications are described in the response to comments about canister design in Section 2.26.1 of this appendix. Specific information on the Certificates of Compliance for storage and transportation canisters and casks can be found on the NRC webpage. Comments about accidents are described in Section 2.25 [Comments Concerning Accidents].

Comments: (47-3) (74-5) (90-14) (98-3-6) (98-9-3) (98-19-2) (98-36-9) (98-45-10) (98-49-2) (99-25-5) (99-29-10) (99-31-10) (110-4) (110-5) (146-12) (157-1-13) (168-2-6) (168-3-4) (168-3-10) (168-20-9) (170-10-9) (170-21-3) (231-3) (237-2-1) (237-2-3) (237-2-4) (258-6) (278-2) (278-4) (278-5) (278-6) (299-6) (300-4) (307-1-19) (307-1-20) (319-10) (319-18) (322-11) (329-3) (364-1-7) (364-2-6) (375-1-23) (377-1) (378-7) (379-24) (383-2) (383-5) (383-8) (405-7) (406-7)

D.2.26.3 Safety—General Safety Concerns and Comments

The NRC staff received a number of comments regarding the safety of storing SNF and the proposed CISF. The topics included the general facility safety during operations, safety of canisters and casks for the timeframe of the proposed license, degradation of the canisters and casks due to salt corrosion or exposure to groundwater, the potential for leaks, insufficient cladding, system monitoring, need for redundant electrical systems, the adequacy of safety regulations and policies, and safety status of the canisters and casks prior to transport to a permanent repository. Some commenters were supportive of the subsurface system design, including the safety of the canisters and casks.

Response: *The safety of storage of SNF at the proposed CISF is considered in the NRC's safety review and is not within the scope of the environmental review. The results of the NRC's safety review can be found in SER and are incorporated as appropriate into the EIS. The NRC will consider the environmental impacts identified in the EIS and the regulatory compliance determinations in the SER when determining whether to grant a license to Holtec for the proposed CISF. If a license is granted, the NRC inspection and enforcement program ensures that the licensee maintains the terms and conditions of the license. In addition, the NRC conducts a separate safety review for the certification process of every transportation and storage canister and cask system design prior to issuing a certificate of compliance for use, and only certified canisters, casks, and systems are allowed to be used.*

No changes were made to the EIS as a result of these comments.

Comments: (1-14) (1-20) (22-3) (27-1) (28-2) (34-4) (38-14) (66-1) (82-2) (85-3) (98-24-5) (98-30-12) (98-49-1) (109-19) (151-7) (167-6-4) (168-18-3) (168-19-3) (169-13-5) (169-15-4) (170-8-3) (188-4) (188-7) (258-3) (300-2) (324-1-4) (324-2-6) (328-2-9) (335-5) (375-1-22) (379-15)

D.2.27 Comments Concerning Emergency Management

D.2.27.1 Emergency Management— Emergency Response

The NRC staff received comments regarding emergency response in the event of accidents involving nuclear material. Commenters expressed concerns about the risks to emergency response personnel and to local communities in the event of a serious accident. One commenter questioned who would be responsible for responding to accidents at the proposed CISF as well as along the SNF transportation route. Commenters were concerned about the reliability and capability (training) of local and regional emergency response personnel. Commenters stated that the EIS does not but should describe and assess the availability, training, equipping, and notification of emergency responders at the proposed CISF site and along transportation routes. NMED commented that the NRC must assess and avoid radiological impacts from SNF transportation accidents and ensure that local communities are properly prepared to respond to an accident.

The NRC staff also received comments expressing concern over the lack of financial assistance for emergency preparedness for States and communities. Two commenters, including NMED, stated that Holtec has no mechanism for outreach (i.e., partnership) with or funding for local first responders concerning emergency preparedness. One commenter stated that is it unacceptable to approve a plan that does not adequately fund and execute a comprehensive emergency response capability. One commenter suggested that the utilities generating the SNF should fund emergency preparedness. Commenters stated that the EIS assumption that rural emergency responders would have access to external funding for training, equipment, and resources for emergency response is unlikely and non-conservative. Instead, these commenters stated that the EIS should assume emergency responders would have insufficient training, equipment, and resources when responding to accidents at the proposed CISF or during SNF transportation. One commenter requested that the EIS include mitigation to fully fund emergency preparedness, require SNF shippers to both assist communities in developing accident response plans and financially contribute to this effort, and provide continual inspections by appropriate authorities of the rail lines, rail cars, canisters, and other SNF transportation equipment.

Response: *The description and assessment of the applicant's emergency response plan is part of the NRC's safety review, documented in the NRC's SER and is outside the scope of the EIS. As such, the adequacy of the Federal, State, and local emergency response capabilities (including training and equipment) and plans applicable to potential radiological incidents during transportation of SNF are addressed as part of broad emergency response planning efforts that are also outside the scope of the EIS. However, the EIS evaluates the risks of potential transportation accidents in EIS Section 4.3.1.2.2. In this section, general emergency response roles, responsibilities, and plans for potential SNF transportation incidents are discussed to provide context for the analysis of potential transportation impacts.*

In EIS Section 4.11.1.2, the roles and responsibilities for developing emergency response plans and responding to SNF transportation incidents are discussed to provide context for a qualitative assessment of socioeconomic impacts. States are recognized as responsible for *protecting public health and safety during transportation accidents involving radiological materials. Federal agencies are prepared to monitor transportation accidents and provide assistance, if States request them to do so. EIS Section 4.11.1.2 also describes funding sources for emergency preparedness. The NRC staff disagrees that the EIS assumes affected communities would be able to obtain funding from external sources. The EIS text states that affected communities may be able to obtain emergency response financial assistance from other sources or Federal programs. As described in EIS Section 4.11.1.2, how the States may distribute funding for first-responder training and equipment to local municipalities is not within NRC's authority and is beyond the scope of this EIS. Importantly, transportation of nuclear materials and other hazardous materials regularly occurs throughout the U.S. and many emergency responders currently have training, equipment, and protocols to respond to potential accident scenarios involving these materials.*

No change was made to the EIS in response to these comments.

Comments: (54-6) (98-15-8) (99-27-4) (99-31-11) (150-6) (240-3-11) (284-4) (322-16) (324-1-12) (328-2-17) (328-3-13) (332-5) (335-4) (337-9) (356-2) (364-2-5) (373-9) (375-3-4) (382-8) (382-23) (384-3)

D.2.28 <u>Comments Concerning Environmental Monitoring</u>

D.2.28.1 Environmental Monitoring

The NRC staff received comments, including from NMED, concerning the adequacy of planned environmental monitoring at the proposed facility and concerns about procedure and instrumentation used during site operations. Specific issues identified the monitoring locations, the types of monitors being used, the types of radiological data being collected, the need for continuous or real-time radiation monitoring, frequency of reporting, and the need to monitor for accidental releases. NMED also had additional concerns about the utilization of ANSI N14.5 for leakage testing, the need for portable air samplers for facility personnel, and the need to monitor for radiological airborne releases above public dose limits to establish total effective dose equivalent (TEDE) and report exceedances to the NRC. Some commenters also stated the need for backup monitors (i.e., multiple monitors at one location), the need for monitoring along the entire national SNF transportation corridor or questioned the frequency of monitoring. Another commenter stated that transported nuclear waste must be retrievable for inspection, and that welded casks do not allow such. One commenter questioned how the EIS determined the impacts would be small if monitoring is not conducted for each canister. One commenter noted that EIS Section 7.3 incorrectly states that casks are welded shut.

Commenters also expressed concerns about the information not included in the monitoring plans [e.g., the REMP]. Specific issues that both NMED and other commenters identified included the need to specify testing methods, to specify minimum detectable activities, to describe NMED's role in the REMP, and to indicate whether monitoring would be conducted at the rail spur, transportation roadways, and in local communities. A specific issue that NMED identified concerning this topic was the need for Holtec to describe the method for determining when continuous monitoring would be required. NMED also requested that any dose exceedance or periodic reporting on air releases NRC required also be sent to the State of New Mexico.

While commenting on environmental monitoring, NMED raised the issue that the EIS should include all applicable State regulatory oversight and environmental impact controls.

Commenters also included issues with the adequacy of the emergency planning and accident impacts discussion in the EIS.

Response: *As described in EIS Chapter 7, Holtec's proposed monitoring programs are to demonstrate compliance with NRC safety regulations in 10 CFR Part 20 and Part 72 regarding radiological effluent release limits, public occupational dose limits, and reporting. As specified throughout EIS Chapter 4, some resource areas relied on compliance with these safety regulations, along with the associated radiological monitoring and reporting programs, to support environmental impact determinations. As described in EIS Section 7.1, required monitoring programs or those proposed in a license application can be modified to address unique site-specific characteristics by adding license conditions to address findings from the NRC safety and environmental reviews. The NRC conducts a concurrent safety review of the application along with the environmental review; the results of the NRC's safety review will address environmental monitoring and will be published in a Final SER. The NRC would not grant a license for the proposed CISF if safety issues exist that would preclude reasonable assurance of adequate protection of public health and safety and the environment. Cask system design and functionality are outside the scope of the EIS. In addition, comments concerning the adequacy of NRC's regulatory requirements, including reporting requirements, are outside the scope of the EIS.*

As described in EIS Section 4.13.1, the NRC staff determined that public and occupational radiological impacts from normal operations would be SMALL because the expected exposure levels did not exceed the applicable NRC regulatory limits. EIS Section 4.15 addresses the environmental impacts of postulated accidents involving the storage of SNF at the proposed CISF. As described in EIS Section 4.15, the NRC staff concludes that the environmental impacts of accidents at the proposed CISF would be SMALL because no credible accidents have been identified, and this will be verified in the NRC's safety analysis (i.e., no credible accidents with release of radiological material at the proposed CISF). As described in EIS Section 7.1, the monitoring programs provide data on operational and environmental conditions so that prompt corrective actions can be implemented when adverse conditions are detected. Because no releases are expected from the proposed CISF, the management of spills and leaks is not part of the routine monitoring program described in EIS Chapter 7. Rather, spills and leaks, including the design of the infrastructure to detect leaks, are described in the NRC SER. The NRC staff anticipate that all reporting of off-normal operations that result in air dose exceedances would be reported to NRC per regulations and would be available to the State of New Mexico as needed. Information on the analysis of transportation risks, dose assessment, and monitoring can be found in Section 2.9 of this appendix and EIS Sections 3.3, 4.3, and 5.3.

The NRC staff have revised text in EIS Section 7.3 to state that canisters, not shipping casks, are welded shut. The welded canister (not cask) is placed in a transportation or storage cask. The applicant would use canister and cask designs the NRC previously approved for transport or storage. The proposed CISF would be designed as an interim storage facility and SNF would be stored until moved to a permanent repository, and therefore retrievability of the SNF packages is incorporated into the design. For additional information regarding the following topics, see the designated section of this appendix: emergency management, Section 2.27; and accidents, Section 2.25.

Comments: (157-4-11) (169-3-3) (252-9) (310-27) (322-20) (323-1-15) (323-2-6) (328-2-19) (328-2-20) (328-2-21) (328-2-22) (328-3-2) (328-3-18) (354-4) (364-1-25) (375-2-11) (405-5) (406-5)

D.2.29 Comments Concerning Mitigation

D.2.29.1 Mitigation

The NRC received comments on identifying mitigation measures in the EIS, the NRC's role in enforcing mitigation, inclusion of decontamination techniques as mitigations, and reporting of mitigation efforts. One commenter suggested repackaging the SNF into smaller containers as a mitigation.

Response: *EIS Tables 6.3-1 and 6.3-2 list mitigation measures identified in the EIS. Mitigation measures that Holtec has committed to implement are listed in EIS Table 6.3-1. These specific mitigation measures are also factored into their respective resource area impact assessments throughout EIS Chapter 4. If Holtec has committed to implement mitigation measures, these measures would be enforced through periodic NRC inspections and reporting. Information identified in EIS Table 6.3-2 and within each resource area as suggested by the NRC staff are not considered in the NRC's impact determination for that resource area. Rather, the NRC staff identified these additional mitigations that could further reduce impacts. However, these measures are not required and are not commitments from Holtec.*

Decontamination techniques are not categorized as mitigations. EIS Section 2.2.1.4 described the activities associated with decommissioning, which is where decontamination would be included. The NRC would evaluate a Final Decommissioning Plan once submitted to verify that the radiological dose would be within the NRC regulatory standards. Repackaging the waste into smaller containers is not a valid mitigation measure because the licensee may use any licensed shipping and storage container approved for transport or approved for use at the proposed CISF; these containers are already required to meet NRC's radiological health and safety standards and be protective of human health.

No changes were made to the EIS as a result of these comments.

Comments: (237-3-2) (237-3-3) (310-24) (310-25) (375-2-10)

D.2.30 Comments Concerning Noise

D.2.30.1 Noise—Operational Noise

The NRC staff received a comment stating that the EIS lacked an estimate of noise levels the operation of the proposed CISF project generated and that noise impacts during operation are likely dominated by rail operations and cask-transfer activities.

Response: *As described in EIS Section 4.8.1.2, the potential noise impacts from the operation of the proposed CISF project, which includes the unloading and handling of casks, is expected to be less than the potential impact from construction of the proposed project and is, therefore, bounded by that impact determination (SMALL). As further stated in the EIS, the noise impact from the operation of the rail spur would result from brief periods of train acceleration during movement of a cask, and outdoor sound levels at distances of up to about 1.6 km [1 mi] might occasionally exceed the 55-dBA level the EPA recommended. However, due to the dissipation of sound with increasing distance, it is not expected that the outdoor noise would be typically noticeable at the nearest residence. Additional details can be found in EIS Section 4.8.1.2.1.*

No changes were made to the EIS as a result of this comment.

Comment: (157-4-1)

D.2.31 Comments Concerning Visual and Scenic Resources

D.2.31.1 Visual and Scenic—Visual and Scenic Impacts

The NRC staff received two comments regarding the visual and scenic impacts of the proposed CISF project as discussed in the EIS. One commenter expressed that the visual and scenic impact conclusions drawn by the NRC staff were reasonable. Another commenter stated that, during construction, dust would be the major visual impact and during night operations, light pollution would be the major visual impact.

Response: *As discussed in EIS Section 4.10, workers traveling on the gravel access road would contribute dust to the viewshed, and the applicant has committed to dust suppression measures to reduce the impact of dust on local visual and scenic resources. However, EIS Section 4.10.1.1 did not explicitly discuss dust contributions from construction activities (i.e., grading, clearing, and the mobilization of construction equipment). In response to this comment, EIS Section 4.10.1.1 has been edited to include additional sources of dust from construction activities.*

As described in EIS Section 4.10.1.2, the security lights used at night at the proposed CISF project would be down-shielded to keep light within the proposed project area as much as possible, thereby minimizing the impacts. However, the NRC staff acknowledge that, even with down-shielding, the light would be visible at night due to the surrounding landscape. The NRC staff reviewed the impact determination for visual and scenic impacts with respect to these comments and have concluded that the impact determination of SMALL for all stages and phases of the proposed CISF project remains appropriate. In response to this comment, the NRC staff has added text to EIS Section 4.10.1.1 to more fully describe the potential for light impacts.

Comments: (157-4-2) (381-14)

D.2.32 Miscellaneous

D.2.32.1 Miscellaneous—General Topic

The NRC received a comment asking for clarification on the magnitude of the studies and effort to develop the CISF EIS when compared to that of Yucca Mountain.

Response: *The proposed CISF and the proposed Yucca Mountain repository are two different types of facilities. The proposed CISF wo uld be licensed under 10 CFR Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste," which governs the licensing of spent fuel storage. The licensing review process for the proposed Yucca Mountain repository was conducted pursuant to 10 CFR Part 63, "Disposal of High-Level Radioactive Wastes in a Geologic Repository at Yucca Mountain, Nevada." Both licensing actions were subject to the NRC's environmental regulations, which implement NEPA, in 10 CFR Part 51. See also NRC's Materials Environmental Reviews web page at https://www.nrc.gov/materials/active-nepa-reviews.html. Although both types of facilities undergo safety, environmental, and potentially adjudicatory reviews, repositories and ISFSIs such as the proposed CISF serve different purposes (permanent disposal versus temporary storage). Thus, the proposed actions varied* *greatly. As the NRC conducts its environmental review based on the proposed action (i.e., the specific licensing action under review), a comparison of the effort undertaken for the proposed CISF EIS versus the Yucca Mountain EIS is not a meaningful comparison.*

No edits were made to the EIS in response to this comment.

Comment: (378-1)

D.2.32.2 Miscellaneous—Definition

The NRC received a comment that expressed concern over the use of the term "spent nuclear fuel" stating that it implied the material was no longer dangerous.

Response: *The NRC's definition of spent nuclear fuel used to review CISF applications is established by regulation in 10 CFR 72.3. Spent nuclear fuel is defined as "fuel that has been withdrawn from a nuclear reactor following irradiation, has undergone at least one year's decay since being used as a source of energy in a power reactor, and has not been chemically separated into its constituent elements by reprocessing. Spent fuel includes the special nuclear material, byproduct material, source material, and other radioactive materials associated with fuel assemblies." The term spent nuclear fuel is also used in other regulatory contexts, such as in the NRC's definition of high-level radioactive waste. The staff's use of the term is consistent with NRC regulations. No changes were made to the EIS as a result of this comment.*

Comment: (167-8-1)

D.2.33 Comments Concerning Editorial Changes

D.2.33.1 Editorial

The NRC staff received several comments suggesting minor editorial corrections to the EIS and EIS Reader's Guide. A few commenters reported an error in the EIS Overview (e.g., the EIS Reader's Guide) regarding the PFS license, stating that the license was never terminated, and this constitutes a significant error. Other commenters suggested minor text clarifications or pointed out a few typographical errors or grammatical mistakes that should be corrected.

Response: *The NRC staff reviewed the changes commenters recommended to correct inaccuracies or inconsistencies or provide clarity. Based on the staff's discretion, the EIS and Reader's Guide were updated where appropriate. These minor revisions did not affect the analyses or the impact conclusions presented in the EIS or the Reader's Guide. The NRC staff disagrees that the error regarding the license status of PFS is a significant error because it does not in any way affect the analyses or conclusions in the EIS. Furthermore, that facility was never built, and the license was subsequently terminated.*

Comments: (16-7) (16-9) (91-17) (106-1) (157-4-9) (157-4-12) (345-2) (345-4) (378-8) (378-22) (380-8) (381-1)

D.2.34 Comments Concerning Security and Terrorism

D.2.34.1 Security and Terrorism—Out of Scope

The NRC staff received several comments expressing concerns about security and the potential for terrorist attacks, sabotage, or theft during SNF transportation or during CISF operations. Commenters expressed general concerns about the likelihood and potential consequences of a terrorist attack on an SNF shipment that results in a release of radioactive material. Commenters also expressed concerns that the mixture of possible transportation modes and the geographic extent of routes would expose communities nationwide to the risk of a terrorist attack. Specific concerns were expressed about the technology (e.g., military ordnance, drones) available to terrorists that could be used to execute an attack on SNF shipments. Other concerns were expressed regarding the roles and responsibilities and staffing for ensuring security and possible plans to secure, track, detect threats, and prevent attacks during transport, including at potential targets such as bridges and stops. Commenters questioned capabilities to salvage a damaged cask after a successful attack. Some comments regarding CISF security focused on potential methods of attack (e.g., aircraft, drones, missiles) and how the facility design either encourages or discourages potential attacks. Some commenters suggested the facility size increases the risk of aircraft attack. Other commenters suggested the subsurface design was protective of safety. Other comments focused on security personnel experience and training. NMED stated that the EIS also should recognize that NRC's licensing of the proposed Holtec facility creates liability against the Federal government arising from potential acts of terrorism and sabotage during transportation of spent nuclear fuel.

Response: *The number of staff analyzed within the EIS is consistent with what Holtec proposed and is a reasonable estimate of the number of staff for the purpose of evaluating the environmental impacts of the proposed action. Small differences in the number of staff would not be anticipated to significantly alter the impact determinations. Precise staffing levels for security relate to sensitive information addressed in the safety review. Comments related to security and terrorism are safety issues that are not within the scope of the environmental review. Security requirements are provided under 10 CFR Part 73, "Physical Protection of Plants and Materials" and 10 CFR Part 72, "License Requirements for the Independent Storage of Spent Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste." The NRC conducts separate reviews and processes outside of the environmental review process to ensure the safety and security of nuclear facilities and materials. No changes were made to the EIS as a result of these comments*.

Comments: (1-22) (38-2) (38-9) (38-10) (38-12) (72-2) (72-3) (93-4) (98-30-15) (98-48-7) (98-50-12) (99-11-3) (109-12) (118-3) (167-9-5) (170-12-6) (191-3) (204-2) (227-3) (237-2-9) (271-2) (272-2) (280-10) (286-18) (286-20) (319-11) (322-10) (324-2-7) (328-2-14) (328-2-15) (375-1-5) (375-1-24) (377-5) (384-2) (394-5) (405-3) (406-3) (410-1)

D.2.35 Comments of General Concern and Opposition

D.2.35.1 General Concern and Opposition—General Comments

The NRC staff received many comments expressing opposition to or general concerns about the proposed Holtec CISF. Some comments simply stated opposition (including statements of non-consent) to the construction and operation of the proposed project or to transportation of nuclear waste to the proposed CISF. Other commenters cited general concerns regarding safety and accidents, the legacy left for future generations, environmental justice, the potential for exposure to radiation or environmental contamination, the costs and economics of the project, financial assurance, or the lack of an available permanent repository. Many commenters expressed concerns regarding protection of the land, air, water, soils, biota, and people in the vicinity of the project. Several commenters noted the legacy of past nuclear contamination in New Mexico and their desire for additional contamination to be avoided. Some commenters stated concerns about the proximity of the project to Carlsbad Caverns and the proposed project's location on currently undeveloped (pristine) lands. Some commenters also blamed politics or profits as the motivation for the proposed project or said they did not trust Holtec. Additional concerns included damage to local economy in case of an accident, impacts from moving the SNF more than once, lack of a national plan for dealing with nuclear waste, lack of precedent for a project of similar scale, lack of a decommissioning plan, and the potential for terrorism.

Many comments expressed concern that a temporary storage facility is not a solution to the nuclear waste problem or that there is no definite path forward for a solution, and that the proposed Holtec CISF is likely to become permanent. As part of their statements, some comments also called for a cessation of nuclear power or stated their objection to the ISP CISF.

Some commenters cited their concerns with other current or legacy nuclear projects (e.g., uranium mining or processing, weapons testing, and WIPP); or past nuclear accidents in the world. As part of their opposition, some commenters suggested that other locations or solutions should be sought out or that the EIS inadequately addressed concerns about safety and environmental impacts. A commenter stated that the EIS is unnecessary because there will be work on other waste storage solutions.

Response: *The NRC acknowledges the comments in opposition to the project. Through the AEA, Congress has mandated that the NRC establish regulations to allow the licensing of nuclear facilities, including SNF storage sites. The NRC is following its established regulations in this licensing review and EIS process. For an applicant to receive a license, the NRC staff conducts a thorough environmental review in accordance with NEPA and in parallel to its environmental review, the NRC conducts a safety review. The safety and environmental reviews carefully assess the safety and environmental impacts of the proposed CISF and aspects of the associated transportation of SNF, which are documented in an EIS and SER. Information from these evaluations will be used by the NRC in the decision whether to grant a license to Holtec to construct, operate, and decommission the proposed CISF. Together, these reviews evaluate many of the issues raised by commenters, including safety, accidents, security, financial assurance, and facility design (in the safety review) and land use, transportation, water resources, ecology, air quality, geology and soils, socioeconomics, environmental justice, waste management, public and occupational health, visual and scenic resources, and historic and cultural resources. The EIS also evaluates alternatives to the proposed action, cost benefit, and cumulative impacts from past, present, and reasonably foreseeable future actions. Decommissioning is included in the EIS to an extent, and as described throughout these sections of the EIS, the NRC's process requires a decommissioning plan to be submitted and approved prior to project closure.*

While the comments expressing general opposition are useful for the NRC to understand public opinion about the licensing action, the comments provide no new information regarding the draft EIS or CISF environmental review and are not addressed further in the EIS. Regarding comments that the EIS did not adequately address issues of concern, these comments were general in nature and did not provide additional details for the NRC staff to address. If the *general statements of opposition were accompanied by specific comments, those are addressed throughout the subject-matter specific sections of this appendix.*

Related comments that contained additional detail about these areas of review are located in other sections of this appendix (e.g., Section 2.26 on safety, Section 2.25 on accidents, and Section 2.4.2 on de facto disposal and repository availability). Consent-based siting is addressed in Section 2.2.6 [NEPA Process: Public Participation—Consent Based Siting].

Issues related to the proposed geologic repository at Yucca Mountain, cessation of nuclear power, and business practices of the applicant are beyond the scope of the EIS, as explained further in Section 2.37.13 of this appendix.

No changes were made to the EIS as a result of these comments.

Comments: (3-1) (4-1) (5-1) (6-1) (8-1) (9-1) (10-1) (12-1) (12-4) (13-1) (20-1) (22-5) (22-11) (22-14) (24-1) (30-1) (33-2) (36-1) (37-1) (40-1) (41-5) (42-1) (45-7) (48-1) (49-4) (51-1) (51-4) (53-2) (55-1) (58-1) (59-1) (59-3) (61-1) (63-1) (64-1) (64-4) (67-1) (69-1) (69-2) (72-1) (74-1) (79-1) (81-1) (81-2) (82-4) (85-1) (85-4) (88-1) (90-1) (91-13) (96-3) (96-7) (97-1) (97-4) (98-11-1) (98-13-2) (98-18-2) (98-20-1) (98-32-3) (98-36-1) (98-36-4) (98-37-1) (98-37-6) (98-37-7) (98-43-8) (98-46-1) (98-46-3) (98-48-1) (98-48-8) (98-52-1) (98-52-3) (98-52-6) (98-58-1) (98-58-7) (99-4-1) (99-7-4) (99-13-1) (99-14-1) (99-14-8) (99-16-5) (99-18-1) (99-19-4) (99-20-12) (99-21-2) (99-22-3) (99-26-5) (99-27-1) (99-27-12) (99-27-14) (99-28-1) (99-29-4) (99-30-2) (99-32-5) (99-33-1) (99-34-2) (99-36-9) (99-37-4) (99-37-6) (99-41-3) (99-41-11) (109-1) (109-23) (110-2) (110-8) (111-1) (113-1) (115-1) (115-2) (116-1) (117-1) (117-2) (117-7) (118-1) (120-1) (124-3) (124-5) (126-1) (126-3) (127-2) (127-5) (130-1) (131-1) (132-1) (135-1) (136-1) (137-3) (137-9) (140-1) (141-1) (142-1) (146-1) (146-16) (146-17) (147-1) (149-5) (150-1) (150-5) (150-8) (151-1) (151-4) (151-16) (152-3) (155-1) (155-11) (156-5) (157-1-1) (157-1-2) (163-1) (164-1) (166-1) (167-1-3) (167-2-2) (167-3-7) (167-4-7) (167-5-1) (167-7-1) (167-11-1) (167-13-10) (167-14-1) (168-1-7) (168-2-8) (168-6-3) (168-9-2) (168-16-3) (168-16-4) (168-16-8) (168-16-12) (168-17-2) (168-18-1) (168-18-2) (168-18-5) (168-18-7) (169-2-3) (169-2-8) (169-4-1) (169-6-4) (169-7-1) (169-10-1) (169-10-5) (170-5-1) (170-5-5) (170-8-2) (170-8-5) (170-10-1) (170-12-4) (170-13-3) (170-14-3) (170-15-8) (170-19-10) (170-21-2) (170-27-2) (170-27-6) (171-1) (172-4) (172-5) (174-1) (176-1) (177-3) (180-1) (181-1) (182-1) (184-3) (187-1) (188-1) (188-3) (188-12) (190-1) (190-4) (191-1) (192-1) (194-1) (195-1) (196-4) (196-12) (197-1) (198-2) (199-3) (200-1) (202-1) (206-2) (208-1) (210-1) (212-1) (214-1) (215-1) (215-16) (216-2) (216-6) (216-8) (221-1) (222-6) (224-1) (224-3) (225-1) (226-1) (229-1) (230-1) (231-1) (231-14) (231-17) (233-1) (235-2) (236-1) (237-1-2) (239-2) (240-1-2) (240-1-6) (240-1-9) (240-1-19) (246-1) (248-1) (255-1) (262-1) (263-1) (265-1) (265-2) (266-14) (267-1) (267-2) (268-1) (269-2) (269-6) (270-1) (271-3) (280-1) (281-1) (281-3) (282-1) (283-1) (287-7) (290-1) (290-11) (291-1) (291-2) (292-1) (293-1) (294-2) (295-1) (296-3) (299-1) (299-8) (303-1) (303-10) (305-1) (306-2) (307-1-1) (308-3) (308-8) (311-2) (312-1) (312-3) (314-1) (315-1) (316-1) (318-1) (319-1) (321-1) (321-4) (323-1-9) (324-1-6) (324-2-8) (324-2-15) (324-2-17) (327-3) (327-5) (329-1) (331-1) (331-2) (331-3) (332-1) (335-1) (336-1) (336-8) (337-11) (340-1) (342-2) (344-7) (344-8) (347-1) (351-5) (354-6) (357-2) (357-10) (359-1) (361-7) (362-3) (362-6) (364-1-1) (364-1-2) (364-1-3) (373-5) (373-16) (375-3-11) (386-1) (388-1) (389-1) (390-3) (391-1) (391-2) (395-1) (395-6) (399-7) (400-1) (400-3) (400-4) (401-1) (402-1) (403-1) (404-2) (406-1) (407-1) (408-1) (409-1) (410-2) (411-1) (411-3) (412-1) (414-1) (415-1) (417-1) (418-1) (420-1) (421-1) (422-1) (425-1) (426-1)

D.2.35.2 General Opposition—Opposition Due to Concerns About Holtec

The NRC staff received comments expressing concern about the applicant's integrity or motivation (e.g., for profit) and expressing opposition to the proposed project. A commenter indicated that ELEA was not qualified to put forward or run a safe project and is taking advantage of the community in difficult financial times. Another commenter said that as a private corporation, Holtec would lack proper oversight because it is the government's responsibility to secure the waste.

Response: *Regarding the credibility of the applicant and ELEA, the NRC has carefully reviewed the license application and supporting materials to determine whether the proposed project meets all regulatory requirements related to safety, security, and financial assurance, and results of the review are disclosed in the SER and EIS. The NRC has regulatory authority over commercial entities that store SNF, and all licensees are subject to regulatory oversight by the NRC. This regulatory framework includes requirements for safe operations, safeguards, and security, as well as an enforcement process to ensure that regulations are followed properly.*

No changes were made to the EIS as a result of these comments.

Comments: (22-6) (169-2-2) (170-13-5) (246-3)

D.2.36 <u>Comments of General Support</u>

D.2.36.1 General Support—Support for Holtec or the Proposed Project

Many commenters expressed support for the proposed project or for the applicant (Holtec). Some of the reasons cited for support include (i) the conclusions drawn in the EIS, (ii) support for the safety record of the nuclear industry as a whole, (iii) the suitability of the proposed project location, (iv) safety features of the design and its deployment in other locations, (v) lack of impact on other local industries, (vi) the safety record at WIPP or other nuclear facilities, and (vii) socioeconomic benefit to the local area (e.g., gaining jobs). Several commenters discussed the strong nuclear knowledge and awareness in the area based on existing facilities such as WIPP and Urenco. Other commenters expressed their confidence in nuclear material transportation safety. Some commenters also stated support for the project as an alternative to disposal in a repository until a repository becomes available, or that it would provide the benefit of allowing current storage sites to be decommissioned. Several commenters cited community support or local consent for the project. Some commenters also noted that the regulatory framework is robust and ensures safety. A few commenters noted Holtec's coordination efforts with local governments and emergency responders. In conjunction with these statements of support, some commenters questioned the merit of comments opposing the project.

Response: *While these comments are useful for the NRC staff to understand the public perspective on the proposed project, they do not provide any specific information related to the environmental effects of the proposed action or recommend changes to the EIS. Regarding comments citing the safety of the nuclear industry and nearby facilities, the NRC has evaluated Holtec's proposal based on its own merits and whether the proposed facility meets regulatory requirements. As reasons for the statements of support, some of the comments mentioned specific aspects of the Holtec proposal that were evaluated in the EIS, such as site suitability and transportation of SNF. The NRC's impact determinations related to site suitability and transportation can be found in EIS Chapter 4. Aspects of the project related* *to safety are evaluated as part of the NRC's safety evaluation conducted in parallel with this environmental review.*

Regarding criticisms of comments in opposition to the proposed project, see Section 2.2.4 of this appendix [NEPA Process: Public Participation—Concerns About Other Commenters].

No changes were made to the EIS as a result of these comments.

Comments: (23-1) (23-3) (23-4) (23-5) (23-8) (25-2) (31-2) (34-1) (34-2) (34-5) (52-1) (60-1) (62-1) (62-6) (76-1) (87-1) (98-1-1) (98-1-4) (98-2-1) (98-3-5) (98-4-4) (98-4-6) (98-5-1) (98-5-5) (98-6-1) (98-7-1) (98-7-4) (98-9-1) (98-9-4) (98-10-1) (98-10-2) (98-10-3) (98-16-1) (98-16-2) (98-17-2) (98-19-1) (98-19-3) (98-22-1) (98-33-3) (98-33-6) (98-33-8) (98-34-2) (98-34-9) (98-39-4) (98-45-1) (98-45-4) (98-45-6) (98-47-5) (98-53-1) (98-53-6) (98-55-6) (98-57-1) (98-57-4) (98-57-6) (99-5-1) (99-6-1) (99-8-2) (99-10-4) (99-23-4) (99-38-1) (112-1) (123-1) (139-1) (145-2) (154-1) (154-6) (157-1-11) (168-13-1) (168-14-1) (168-15-1) (168-15-2) (168-19-2) (168-24-1) (169-13-6) (170-17-5) (179-1) (185-1) (193-1) (207-1) (238-1) (241-1) (243-1) (245-1) (250-7) (253-1) (257-1) (258-1) (258-4) (264-1) (273-1) (278-1) (279-1) (300-1) (300-6) (317-1)

D.2.36.2 General Support—Statements in Support of the EIS

The NRC staff received several comments in support of the content, quality, and conclusions drawn in the EIS. Some of the commenters stated the importance of the EIS with respect to the licensing process or development of the proposed project.

Response: *The NRC staff acknowledges the comments; however, they are general in nature and do not provide any new information for consideration in the development of the final EIS.*

No changes were made to the EIS as a result of these comments.

Comments: (34-10) (98-8-3) (98-33-2) (98-33-5) (98-39-1) (98-39-5) (98-47-1) (99-1-1) (99-1-3) (99-10-1) (99-31-2) (154-3) (168-24-5) (169-13-7) (170-17-3) (175-4) (375-1-1)

D.2.37 Comments that are Out of Scope

D.2.37.1 Out of Scope—GTCC Reclassification

The NRC received comments regarding the reclassification of GTCC and transuranic (TRU) waste and concerns about the disposition paths of the various wastes.

Response: *The comment relates to a separate ongoing NRC decision related to the potential reclassification of various categories of waste under 10 CFR Part 61 and is therefore beyond the scope of this EIS. Recently released information on this topic can be found in SECY-20-0098, "Path Forward and Recommendations for Certain Low-Level Radioactive Waste Disposal Rulemakings," found at: https://www.nrc.gov/docs/ML2014/ML20143A164.html.*

No changes were made to the EIS as a result of these comments.

Comments: (98-49-7) (221-4)

D.2.37.2 Out of Scope—Black Lives Matter

The NRC staff received a comment that a public meeting for the proposed project took place during the Black Lives Matter and Defund the Police movements, and that the proposed project should be considered within the context of the structural and systemic racism that is being discussed across the country.

Response: *The NRC is committed to engaging with all stakeholders fairly and ethically, without discrimination or racism. All stakeholders, including government representatives, Tribal members, and members of the public, are encouraged to participate in the NRC's licensing actions. The NRC staff analyze environmental justice as it pertains to a proposed project in its EIS documents. For the proposed Holtec CISF, the discussion of potential environmental justice impacts from the proposed project and from cumulative impacts can be found in EIS Sections 4.15 and 5.15, respectively. However, broad discussions of institutional and structural systemic racism in the U.S. are beyond the scope of the EIS and are therefore not addressed in the EIS.*

No changes to the EIS were made as a result of this comment.

Comment: (98-24-12)

D.2.37.3 Out of Scope—Concerns About COVID-19

The NRC staff received comments about the COVID-19 public health emergency. One commenter stated that the proposed project should be thought about in a larger context with respect to overlapping effects of the coronavirus and environmental impacts, such as the climate crisis. Another commenter stated that they had limited time to review the EIS because of the health crisis in their community. A commenter explained that the public health crisis has been magnified in communities that have experienced preexisting conditions from legacy uranium contamination.

Response: *On March 13, 2020, the COVID-19 outbreak in the United States was declared a public health emergency (White House, 2020). The NRC staff has made efforts to maintain contact with the public and the involved Federal, State, Tribal, and local agencies during the development of this EIS.*

The NRC staff recognized that the public health emergency raised challenges for communities, including availability for public engagement and modified the way the NRC has conducted public outreach as well as the timeframe over which the public was invited to participate. The NRC staff provided reasonable means by which commenters could participate in public meetings and provide their input by extending the public comment period from 60 days to 180 days and providing several methods for the public to submit comments. Additional information regarding comments that the NRC staff received about COVID-19 and public outreach are provided in Section 2.2 [Comments Concerning Public Participation] of this appendix.

Regarding legacy contamination issues, the NRC staff evaluated human health impacts related to the proposed facility, as well as the cumulative impacts that could occur from the incremental impact of the proposed CISF when added to past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal), person, or entity undertakes these actions. EIS Chapter 5 provides an assessment of these cumulative impacts in the vicinity of the proposed CISF, and this assessment includes the topics mentioned in the comments, such *as climate change and transportation of SNF. However, the potential impacts from the public health emergency were not explicitly evaluated in the EIS because they are not within the scope of the EIS. Additional information about legacy issues is addressed in other comment responses within this section, and information related to the NRC staff's analysis of present, past, and reasonably foreseeable future actions is provided in Section 2.24 [Comments Concerning Cumulative Impacts] of this appendix.*

No changes were made to the EIS as a result of these comments.

Comments: (98-36-2) (167-11-3) (167-11-4)

D.2.37.4 Out of Scope—Miscellaneous Discussions About the Nuclear Industry

The NRC staff received general comments that expressed commenters' perspectives on radiation exposure; SNF management and storage; nuclear energy technologies, including advanced molten salt nuclear power plants; the challenges of reusing SNF; the lack of experience storing a large amount of SNF; and concerns about who pays for SNF storage.

Response: *The Energy Reorganization Act of 1974 established the NRC and assigned it the job of regulating the nuclear industry. The NRC regulates the various commercial and institutional uses of nuclear energy, including SNF storage facilities. Under its responsibility to protect public health and safety, the NRC has three principal regulatory functions: (i) establish standards and regulations; (ii) issue licenses for nuclear facilities and users of nuclear materials; and (iii) inspect facilities and users of nuclear materials to ensure compliance with the requirements. The NRC does not promote the use of nuclear power as a preferred energy alternative, and it does not regulate alternatives to producing electricity that do not involve nuclear power. The decision whether to pursue nuclear power as a power-generation source is a decision that is made by other energy-planning decisionmakers and is outside the scope of this review.*

However, the NRC also performs a safety review to determine whether there is reasonable assurance that activities authorized by a license will continue to be conducted in accordance with NRC's safety regulations, including radiological exposure. The intent of the NRC's safety review is to determine if the applicant has adequately demonstrated that the effects of aging will not adversely affect any systems, structures, or components.

The NRC has extensive successful experience licensing and regulating SNF storage facilities across the country. The comments provide no new information and, therefore, no changes were made to the EIS as a result of these comments.

Comments: (25-1) (26-2) (26-4) (31-4) (99-9-12) (168-8-2) (168-22-1) (168-22-2) (172-13) (352-1) (364-1-4)

D.2.37.5 Out of Scope—Criticisms Regarding NRC Credibility

The NRC staff received comments regarding the integrity of the NRC as a regulator of the nuclear industry, specifically questioning NRC's policies regarding radiological protection, enforcement of regulatory requirements, and that NRC ignores applicant and licensee business infractions. Some commenters indicated that the NRC has an inappropriate relationship with industry. Other commenters stated that the NRC fails to protect workers and the environment because it overlooks and dismisses what commenters state as safety and environmental concerns and does not fully address the potential for accidents. A couple of commenters also expressed concern that the ASLBP was also biased in favor of NRC and industry. One commenter expressed support for NRC credibility.

Response: *The NRC is an independent agency established in 1974 to ensure the safe use of radioactive materials for beneficial civilian purposes while protecting people and the environment. The NRC takes its regulatory responsibilities seriously and strives to conduct its activities in an open and transparent manner, consistent with the NRC Approach to Open Government (https://www.nrc.gov/public-involve/open.html). The NRC's regulatory processes include means to address improper conduct through the allegations process as well as an enforcement process to address infractions or safety concerns regarding licensees.*

The ASLBP conducts all licensing and other hearings as directed by the Commission. Panelists are employees of the NRC whose decisions are subject to Commission review. However, the APA, as well as longstanding agency policy, grants them independence from the Commission. The agency's ex parte and separation of functions rules dictate that the ASLBP and its members remain at arm's length from the litigants, including the NRC staff, to avoid an actual or perceived conflict of interest.

Because these comments do not provide information related to the environmental review of the proposed CISF, no changes were made to the EIS.

Additional information about the NRC's role regarding the business practices of other parties is provided in Section 2.37.13 [Out of Scope—Business Practices of Involved Parties] of this appendix, and Accidents in EIS Section 4.15 and Section 2.25 of this appendix.

Comments: (46-11) (68-7) (79-6) (91-15) (91-16) (91-19) (91-22) (98-1-3) (98-23-4) (98-27-6) (98-31-6) (99-14-2) (99-14-4) (99-17-4) (99-29-2) (99-29-6) (99-29-12) (99-31-3) (99-31-14) (99-33-3) (99-37-2) (108-1) (167-7-3) (167-9-10) (167-12-1) (167-12-4) (167-14-5) (167-15-3) (167-15-4) (167-15-7) (169-11-6) (170-2-2) (170-2-8) (170-8-1) (170-11-3) (170-14-4) (170-15-5) (170-16-6) (170-25-4) (170-27-5) (196-8) (215-10) (231-15) (240-1-7) (240-2-1) (254-1) (278-3) (307-1-3) (307-1-23) (311-7) (319-2) (323-2-3) (323-2-5) (324-2-2) (324-2-10) (324-2-14) (336-5) (341-10) (341-11) (361-1) (369-6)

D.2.37.6 Out of Scope—Financial Assurance

The NRC staff received comments about financial assurance for the proposed CISF. One commenter questioned the financial assurances that would be provided if Holtec were to abandon the project. Another commenter questioned whether Holtec has sufficient bonding to cover a worst-case transportation scenario. Another commenter expressed concern that Holtec could go bankrupt without proper insurance in place. Another commenter requested Holtec's financial statements and expressed concern that liability for SNF was being transferred from large publicly traded companies to Holtec. Another commenter expressed concern over who would provide funding for decommissioning or other expenses that would occur should an accident occur.

Response: *Holtec provided decommissioning funding and cost estimate information in its application. Financial qualifications and decommissioning financial assurance for the proposed CISF is addressed in the safety review, which is conducted in parallel with the environmental review, per 10 CFR 72.22(e) and 10 CFR 72.30, respectively. The results of the safety review are documented in an SER. The safety review considers whether the applicant has provided* *reasonable assurance that it is financially qualified to construct and operate the proposed facility and financial assurance for decommissioning the proposed facility in compliance with NRC's financial qualifications and decommissioning financial assurance regulations.*

Regarding financial liability for accidents, the NRC staff discusses in EIS Section 4.15 the very low risk of accidents due to construction, operation, and decommissioning of the proposed facility based on the applicant's analysis of accidents, and this will also be verified in the NRC's safety analysis (i.e., no credible accidents at the proposed CISF). Thus, the potential for financial liability from radiological accidents at the proposed facility, if licensed, would also be very low. However, regarding financial provisions for potential liability due to accidents, EIS Section 8.3.2.1 notes that Holtec has proposed a license condition addressing liability and financial assurance arrangements with its customers that would be applicable to events occurring during CISF operations, and the NRC staff consider this proposed condition in its safety review. EIS Section 8.3.2.1 also refers to the Price-Anderson Act. Because virtually all property and liability insurance policies issued in the United States exclude nuclear accidents, claims resulting from nuclear accidents are covered under the Price-Anderson Act, which includes any accident (including those that come about because of theft or sabotage) while transporting SNF. Additional cost-benefit considerations are discussed in EIS Chapter 8 and Section 2.20 of this appendix.

No changes were made to the EIS as a result of these comments.

Comments: (98-20-2) (98-49-4) (99-30-5) (99-41-4) (99-41-5) (99-41-6) (99-41-12) (109-3) (153-6) (169-4-9) (169-8-3) (188-6) (240-3-6) (240-3-7) (240-3-8) (240-3-13) (254-3) (259-4) (304-9) (323-1-13)

D.2.37.7 Out of Scope—Legacy Issues

The NRC staff received several comments that expressed concerns about the legacy of past nuclear projects and associated potential health effects, such as cancer, from radiation exposure and uses of nuclear technology, nuclear weapons testing, and uranium mining, primarily in the State of New Mexico. Some commenters expressed concern over the lack of cleanup of nuclear-related facilities, legacy nuclear testing, or radiological facilities or current or proposed facilities and events in the State of New Mexico. Many commenters discussed the need for and the cost of cleaning up legacy sites. Several commenters suggested that the NRC or industry direct resources toward local health issues, such as cancer, or remediation of legacy nuclear projects, such as uranium mining. Some commenters stated that people who have been affected by past nuclear-related projects have not been compensated for the impacts that they experienced as a result of those projects. A number of commenters stated that Tribal communities have been impacted from a number of nuclear-related activities and sites.

Response: *The scope of the EIS focuses on the environmental impacts that could result from the construction, operation, and decommissioning of the proposed CISF. The NRC staff evaluated human health impacts related to the proposed facility, as well as the cumulative impacts that could occur from the incremental impact of the proposed CISF when added to past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal), person, or entity undertakes these actions. EIS Chapter 5 provides an assessment of these cumulative impacts in the vicinity of the proposed CISF regarding the topics mentioned in the comments, including groundwater, surface water, and public health and safety. A detailed description and a map of the actions that the NRC staff considered for all resources, including environmental justice, are provided in EIS Section 5.1. The NRC staff* *reviewed the information the commenters referred to in their comments to evaluate the applicability to the proposed project. The facilities the commenters identified are legacy nuclear testing or radiological facilities that are not in the geographic scope of influence of the proposed CISF or are already included in the analysis in EIS Chapter 5. The scope of the EIS regarding cumulative impacts is further explained in Section 2.24 of this appendix [Comments Concerning Cumulative Impacts]..*

Comments regarding other facilities, legacy sites, concerns about uranium mining, and compensation for past projects are not within the scope of the EIS. Many of the projects listed by commenters are nuclear weapons testing sites, which are not within the statutory purview of the NRC. The potential impacts from legacy sites in the State that would extend beyond the geographic areas of interest for the resource areas affected by the proposed CISF are outside the scope of the EIS. Redirection of resources toward cancer or health research or remediation of past sites is also not within the scope of the EIS. The NRC staff does not have the authority to require an applicant to submit a different proposal, or to direct its resources toward health studies or cleanup of legacy sites.

Concerns about additional dose exposure is discussed in EIS Sections 4.3 and 4.13, which provide dose estimates that members of the public would receive from operation of the proposed CISF and compares those doses to NRC dose limits (i.e., 10 CFR Part 20 and 10 CFR Part 72, where appropriate). EIS Sections 5.3 and 5.13 also discuss cumulative radiological impacts that may result from nearby facilities and past, present, and reasonably foreseeable future actions. The NRC assumes there is some health risk associated with any amount of radiation dose, no matter how small; this approach is consistent with the conclusions of BEIR VII (National Research Council, 2006) and other expert panels, such as the International Commission on Radiation Protection. However, general studies regarding the potential effects on health from radiation and radiation dose standards are not reevaluated in this EIS. Additional information about radiological health is discussed in Sections 2.9.12 [Transportation of SNF—Impact Analysis Approach—Occupational Dose] and 2.22 [Comments Concerning Radiological Health] of this appendix.

No changes were made to the EIS as a result of these comments.

Comments: (45-6) (76-2) (98-13-3) (98-23-2) (98-23-3) (98-38-7) (98-52-2) (99-7-3) (99-13-3) (99-20-10) (99-21-5) (99-25-3) (99-32-3) (105-10) (105-11) (111-7) (113-4) (149-2) (151-5) (153-1) (153-2) (153-4) (153-5) (153-7) (166-2) (167-11-5) (168-23-4) (215-14) (218-1) (250-3) (254-2) (266-7) (294-6) (311-3) (324-1-19) (334-3) (340-2) (348-1) (368-8) (399-2) (399-3) (400-2) (414-2)

D.2.37.8 Out of Scope—Licensing Framework, Policies, and Political Decisions

The NRC staff received comments expressing concern over the regulatory framework governing nuclear material, the NRC and other Federal policies, and the influence of politics on the siting process. One commenter indicated that the political party of the President of the U.S. factored into the project. Another commenter stated that political decisions had been made in favor of Holtec. A commenter stated that policies are not in place to adequately or comprehensively address the country's nuclear waste. A commenter offered their point of view that the NRC denies any discussion of nuclear waste disposal policy, focusing solely on technical issues, with the intent of issuing a license. One commenter stated that the Blue Ribbon Commission lacked authority to site a storage facility.

Response: *The NRC operates on a well-established regulatory framework through which licensing decisions for nuclear facilities are made. This environmental review focuses on the potential impacts that could result from the proposed CISF. Political processes, past and future political decisions, national strategies for nuclear waste, and administrative decisions regarding distribution of funds, such as for capital improvements, are not within the scope of the environmental review.*

Regarding comments made about NRC's operating policies and licensing framework, the AEA of 1954 requires that the NRC establish criteria for the licensing of nuclear facilities, including spent nuclear material storage facilities. The NRC does not participate in site-selection decisions, and the NRC is not an involved party with the Blue Ribbon Commission. The NRC reviews the characteristics of the site selected to ensure that it satisfies applicable regulatory requirements.

No changes were made to the EIS in response to these comments.

Comments: (38-6) (109-16) (128-3) (169-4-12) (169-4-14) (169-15-3) (169-20-2) (217-12) (240-1-21) (240-2-21) (290-2) (304-4) (328-2-23) (349-1)

D.2.37.9 Out of Scope—Site Specific Issues at Other Facilities or Sites

The NRC staff received several comments about site-specific issues at various nuclear facilities, including the licensed but not constructed Private Fuel Storage site; individual nuclear power plants; WIPP; WCS; Los Alamos National Laboratory; URENCO; Chernobyl; Fukushima Dai'ichi; other fuel storage and nuclear-related facilities; and other industrial activities in New Mexico. Some commenters provided personal stories about health and safety issues as illustrations of their concern regarding the proposed project. These comments refer to site-specific licensing issues or on-site spent fuel storage concerns, as well as a range of health, safety, environmental, and cost concerns. A number of commenters expressed concern regarding accidents at WIPP, while two commenters stated that WIPP has a good operating track record. One commenter requested additional information be added to the EIS to describe safety issues at WIPP. One comment noted a recent train derailment in Virginia. One commenter questioned the SNF storage capabilities at the generation sites. Some comments referred to a general lack of trust based on other licensing actions that resulted in unfavorable outcomes.

Response: *The scope of the EIS is limited to an analysis of the environmental impacts from the proposed CISF. The EIS includes a cumulative impacts analysis that considers past, present, and reasonably foreseeable future actions (including existing facilities) in the vicinity of the proposed CISF that could affect the same resources as those affected by the proposed CISF. Comments about site-specific concerns at other locations are outside the scope of the EIS, and previously certified casks and storage systems are not readdressed in the EIS. With respect to safety and accidents, additional information can be found in Sections 2.26 [Comments Concerning Safety] and 2.25 [Comments Concerning Accidents], respectively, of this appendix. The NRC staff notes that WIPP and national laboratories in New Mexico are DOE facilities over which the NRC does not have regulatory authority. Also, there is no high-level waste stored at WIPP, nor is such storage proposed as part of this licensing action. Because these comments are beyond the scope of the EIS, no edits were made to the EIS.*

Comments: (15-2) (28-1) (38-16) (46-3) (79-2) (98-15-2) (98-30-13) (98-31-10) (98-34-4) (98-41-3) (98-43-1) (98-43-3) (98-45-8) (98-47-2) (98-54-1) (98-56-5) (98-58-3) (99-9-9) (99-23-3) (99-26-1) (99-26-6) (137-1) (146-5) (146-6) (146-11) (153-3) (169-5-2) (170-22-2) (170-27-3) (173-2) (214-2) (224-10) (240-2-9) (244-5) (307-1-18) (307-1-24) (316-2) (324-2-1) (324-2-13) (336-7) (341-6) (361-8) (363-4) (379-21) (380-18) (383-4) (414-3)

D.2.37.10 Out of Scope—Storage and Transportation of High-Burn-up SNF

The NRC staff received comments about the safety of storing high-burn-up SNF at the proposed CISF and the lack of discussion of high-burn-up SNF in the EIS. Commenters expressed concerns about high-burn-up fuel acceptance, canister safety, and overall validity of the NRC's analysis in the EIS, citing the possibility that there could be differences in radionuclide inventory associated with high-burn-up SNF received at the proposed CISF compared to what NRC staff evaluated. Several commenters also expressed concerns about canister safety resulting from storage of high-burn-up fuel. One commenter stated that the application itself does not envision taking high-burn-up fuel.

Response: *The NRC staff acknowledge the increasing high-burn-up trend; however, concerns about the NRC's safety programs, including the safety evaluations in licensing and the certification of casks systems for storage and transportation of high-burn-up SNF, are outside the scope of the EIS. It is important to note that casks certified for transportation of high-burn-up SNF would have to meet the same dose rate limits (e.g., by increasing SNF cooling time prior to shipment, adding shielding, or decreasing the number of fuel assemblies allowed). Thus, changes to burn-up assumptions would not change the results or conclusions of the EIS impact analysis. The NRC continues to study the effects of increasing burn-up on the safety of SNF, canisters, and casks to inform its regulatory decisions. Additional information about vulnerability of high-burn-up inventory and transporting high-burn-up fuel is provided in the responses to comments in this appendix in Section 2.9.23 [Transportation of SNF—Impact Analysis Approach—SNF Transportation Challenges], 2.9.24 [Transportation of SNF—Impact Analysis Approach—Risk Assessment Applicability—Burn-up], and 2.9.2 [Transportation of SNF—Accidents].*

No changes were made to the EIS as a result of these comments.

Comments: (54-15) (98-30-9) (98-38-5) (99-11-4) (99-20-7) (109-21) (168-5-5) (170-19-9) (237-1-20) (237-2-13) (237-3-4) (237-4-16) (240-2-10) (290-8) (329-8)

D.2.37.11 Out of Scope—Storage of Foreign Fuel at the Proposed CISF

The NRC staff received a comment about SNF from foreign countries being shipped to the U.S. for disposal at the proposed Holtec CISF.

Response: *The proposed NRC Federal action would be to authorize the construction and operation of the proposed Holtec CISF to store 500 canisters of SNF for the initial phase (Phase 1) of the proposed project for a license period of 40 years. Within the license application, the applicant did not propose to store SNF from foreign countries; therefore, the shipment and consolidated interim storage of SNF originating from foreign countries is not considered in the EIS.*

No changes were made to the EIS as a result of this comment.

Comment: (170-16-2)

D.2.37.12 Out of Scope—Support for Nuclear Power and the Nuclear Industry

The NRC received several comments expressing support for nuclear power and the nuclear industry (including specific nuclear facilities). Some commenters stated that New Mexico residents support and benefit from existing nuclear facilities. One commenter stated that regulations and oversight currently in place in the region are working. One commenter stated that nuclear energy will play a role in reducing greenhouse gas emissions. Some commenters suggested that experience of handling SNF in the industry demonstrates that storage can be done safely.

Response: *Comments in support of nuclear power and nuclear applications, or benefits to New Mexico residents from existing nuclear facilities are beyond the scope of the EIS. This environmental review addresses the potential impacts that could result from the proposed CISF. Further, the NRC is an independent regulatory agency that does not promote nuclear or other types of energy.*

No changes were made to the EIS as a result of these comments.

Comments: (31-1) (60-2) (71-2) (98-4-5) (98-53-2) (98-55-5)

D.2.37.13 Out of Scope—Business Practices of Involved Parties

The NRC staff received comments, including articles, concerning business practices of parties involved in the CISF license application, including Holtec, ELEA, and subcontractors that have conducted work for Holtec and ELEA on the GNEP project, this proposed project, and unrelated projects. Some commenters specifically cited Holtec quality control issues and system failures at other nuclear facilities as proof of Holtec and its subcontractors' inability to maintain safety measures or properly handle nuclear waste. Several commenters stated that the project should be prohibited from moving forward due to bribery charges against Holtec in unrelated projects, lack of integrity, general financial impropriety, and ELEA's alleged illegal acquisition of the proposed project area. Some commenters refer to representatives of ELEA and Holtec as dishonest and deceitful. A few commenters stated that they cannot trust private entities to be responsible for the safe handling of SNF. One commenter stated in defense of ELEA that the ELEA board members are volunteers and do not receive personal gain from serving on the board. One commenter was supportive of Holtec as a responsible business owner. Several commenters provided links to other articles and information sources for NRC review.

Response: *The purpose of the EIS is to disclose the environmental impacts that could result from the construction and operation of the proposed CISF, if licensed. The business practices of the applicant and safety or business concerns at other sites, even if NRC licensed, are not within the scope of this EIS. Site-specific concerns and safety violations at other sites are dispositioned in site-specific reviews, through the NRC's enforcement process, or through the NRC's allegation process. The safe storage of SNF at the proposed CISF is considered in the NRC's safety review and is not within the scope of the environmental review. The results of the safety review can be found in NRC's SER. The NRC staff considers the impacts identified in the EIS and the regulatory compliance determinations in the SER in deciding on whether to grant a license to Holtec for the proposed CISF. Information in the applicant's documents, including its safety analysis report, ER, responses to RAIs, and other supporting documentation is carefully reviewed and verified by the NRC staff. Beyond determining compliance with the*

NRC's regulatory standards, the NRC does not exercise regulatory authority over the business decisions of private companies or organizations such as Holtec, ELEA, their subcontractors, or their interactions with other agencies or businesses. These comments or the reference materials provided do not provide additional information that is within the scope of the NRC's environmental review; therefore, no changes were made to the EIS as a result of these comments.

Comments: (15-1) (18-1) (54-2) (56-1) (67-2) (86-1) (94-1) (98-24-4) (98-24-6) (98-34-3) (98-37-4) (98-42-4) (98-42-6) (98-51-9) (99-2-4) (99-9-4) (99-9-5) (99-9-11) (99-20-9) (99-28-3) (99-29-1) (99-29-11) (99-30-7) (99-32-4) (99-33-4) (99-36-6) (102-6) (109-24) (143-1) (143-3) (167-5-3) (167-15-6) (168-9-4) (168-18-8) (168-23-2) (168-25-1) (169-5-1) (169-14-1) (169-18-1) (169-20-3) (170-2-9) (170-3-1) (170-14-2) (170-16-3) (170-16-5) (170-20-6) (170-21-5) (173-3) (188-11) (217-3) (217-4) (217-5) (217-6) (217-7) (217-8) (217-9) (217-10) (217-11) (217 13) (228-1) (228-3) (228-4) (228-5) (233-2) (240-1-18) (244-3) (244-4) (244-6) (251-7) (251-12) (280-13) (287-2) (287-6) (294-1) (299-10) (307-2-8) (312-2) (316-3) (324-2-11) (325-1) (337-8) (337-10) (339-5) (344-2) (344-10) (347-4) (349-6) (357-9) (366-2) (373-17) (390-2)

D.2.37.14 Out of Scope—Comments Regarding Yucca Mountain

The NRC staff received several comments that questioned the status of the Yucca Mountain project, expressed support or criticism of the project, or questioned the adequacy of that site. Some of these comments discussed the political process that established the Yucca Mountain project, community dissent, or the role of public meetings, and growing opposition. Another commenter indicated that the Yucca Mountain project should not be licensed because it is an illegal action and environmentally unjust. One commenter stated that Yucca Mountain cannot be out of scope for the proposed Holtec project because NRC assumes that the SNF at the proposed CISF would be transferred to Yucca Mountain.

Another commenter indicated that the NRC was indicating bias in the licensing review of Yucca Mountain because the NRC assumed that Yucca Mountain would be the designated repository in the EIS. One commenter stated that Yucca Mountain does not have the storage capacity to handle all the waste from the proposed CISF. Other commenters objected to legal issues in the Yucca Mountain licensing proceeding. One commenter objected that Yucca Mountain had been abandoned as a potential repository, and another commenter noted various aspects of Yucca Mountain that had been studied.

Response: *As described in the EIS, the purpose and need for the proposed action is to provide a temporary storage solution before a repository becomes available. A repository would be a separately licensed facility that would undergo a licensing review by the NRC; therefore, comments concerning the licensing of the Yucca Mountain repository are beyond the scope of the EIS. The completion of Yucca Mountain licensing activities is subject to Congressional appropriations and other actions external to the NRC.*

The NRC is aware that disputes related to past treaties and laws exist between Indian Tribes and the U.S. Government with respect to the Yucca Mountain project. In its role as a regulatory agency, the NRC lacks the authority to resolve these issues. Disposal of SNF and high-level radioactive waste at the Yucca Mountain site in Nevada remains the national policy in the NWPA, as amended. Regardless, the proposed action is for an interim storage facility for a license period of 40 years.

Because these comments are beyond the scope of the environmental review, no changes were made to the EIS.

Comments: (38-4) (46-7) (46-8) (46-10) (68-10) (82-1) (98-26-7) (99-19-2) (99-25-1) (99-25-7) (99-31-12) (102-2) (103-2) (103-3) (104-1) (104-2) (138-3) (155-8) (155-9) (167-5-4) (222-3) (240-2-5) (397-5)

D.2.37.15 Out of Scope—Opposition to Nuclear Power, Weapons, and Industry, and Calls for Renewable Energy Sources

Several commenters expressed opposition to nuclear power, nuclear weapons, and the nuclear power industry, or expressed support for the use of renewable energy sources instead of nuclear energy. Comments included calls for a societal transition to renewable energy technologies. Two commenters recommended a transition to nuclear fusion technology. Several commenters stated that nuclear energy is not cost effective or safe. Other commenters suggested that no additional permits be issued for new reactors or license renewals for existing reactors, citing environmental and cost concerns, and concerns for future generations.

Response: *Comments opposing nuclear power, nuclear weapons, nuclear fusion, and the associated generation of SNF from these activities are beyond the scope of the EIS. This environmental review addresses the potential environmental impacts that could result from the construction, operation, and decommissioning of the proposed CISF. Further, the NRC is an independent regulatory agency that does not promote nuclear or other types of energy, including renewable energy. The NRC has regulatory authority over civilian uses of nuclear materials and does not license or regulate alternative sources of energy, nor can it encourage or require private companies to employ any particular energy source.*

No changes were made to the EIS as a result of these comments.

Comments: (7-1) (11-2) (21-1) (35-1) (39-1) (43-1) (44-1) (45-2) (54-10) (54-11) (72-4) (72-5) (89-1) (92-2) (96-8) (98-18-1) (98-42-5) (98-47-7) (99-20-13) (99-26-4) (99-36-7) (111-3) (111-6) (113-3) (121-1) (124-4) (151-15) (153-8) (161-2) (161-3) (168-2-4) (173-1) (186-1) (209-1) (211-2) (212-2) (222-7) (271-4) (271-5) (313-1) (315-3) (327-1) (327-4) (349-3) (350-1) (355-1) (361-3) (363-5) (371-1) (371-3) (384-1) (386-2) (408-2) (416-2) (419-1) (427-1)

D.2.37.16 Out of Scope—Use of SNF for Reprocessing and Other Nuclear Technologies

The NRC staff received comments about reprocessing SNF, other ways that SNF could be used, and other nuclear technologies. One commenter stated that reprocessing SNF should be completely ruled out, and other commenters suggested that SNF could be repurposed for beneficial uses. Some commenters stated that consolidating waste is a precursor to reprocessing, and environmental consequences of reprocessing should be included in the EIS. One commenter stated that SNF is not waste and would be retrieved as reusable feedstock material for molten salt reactors. A commenter stated that France recycles SNF and is in the process of permitting a geologic repository and this model should be followed in the U.S. Some commenters expressed support of other techniques for reusing SNF such as pyroprocessing or using fast reactors. Other commenters suggested that thorium from the spent fuel could be used for producing additional clean energy. Another commenter suggested that funding should be allocated towards research on decontamination or detoxification of SNF.

Response: *The comments discussing or expressing opinions about reprocessing, other nuclear technologies, or other dispositions of SNF are beyond the scope of the EIS. This EIS considers the alternatives described in EIS Section 2.2 and the potential environmental impacts of the proposed CISF and associated infrastructure from those alternatives. The EIS does not consider potential effects from reprocessing activities, research for decontamination, or other uses of SNF because the license application does not propose such activities. Currently, there are no current expressions of interest or license applications for a reprocessing facility before the Commission; therefore, reprocessing is not considered a reasonably foreseeable future action. Should a reprocessing facility be proposed in the future, it would have to undergo a site-specific NRC license application review that would evaluate the safety and environmental impacts (including cumulative impacts) of the proposed facility. Responses to comments about alternatives evaluated in the EIS for the proposed CISF is provided in this appendix in Section 2.7 [Comments Concerning Alternatives].*

No changes were made in the EIS as a result of these comments.

Comments: (14-4) (23-2) (26-1) (27-2) (38-8) (38-15) (54-9) (64-3) (64-6) (64-7) (64-9) (98-47-6) (98-52-5) (99-2-9) (109-7) (159-1) (251-9) (253-2) (300-5) (324-2-5)

D.2.38 References

10 CFR Part 2. Code of Federal Regulations, Title 10, *Energy*, Part 2. "Agency Rules of Practice and Procedure." Washington, DC: U.S. Government Publishing Office.

10 CFR 2.390. Code of Federal Regulations, Title 10, *Energy*, § 2.390, "Public inspections, exemptions, requests for withholding." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20. "Standards for Protection Against Radiation." Washington, DC: U.S. Government Publishing Office

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51. "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 61. Code of Federal Regulations, Title 10, *Energy*, Part 61. "Licensing Requirements for Land Disposal of Radioactive Waste." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 63. Code of Federal Regulations, Title 10, *Energy*, Part 63. "Disposal of High-Level Radioactive Wastes in a Geologic Repository at Yucca Mountain, Nevada." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 71. Code of Federal Regulations, Title 10, *Energy*, Part 71. "Packaging and Transportation of Radioactive Material." Washington, DC: U.S. Government Publishing Office

10 CFR Part 72. Code of Federal Regulations, Title 10, *Energy*, Part 72. "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste." Washington, DC: U.S. Government Publishing Office

10 CFR 72.54(d). Code of Federal Regulations, Title 10, *Energy*, § 72.54(d), “Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas.” Washington, DC: U.S. Government Publishing Office.

10 CFR 72.54(g). Code of Federal Regulations, Title 10, *Energy*, § 72.54(g), “Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas.” Washington, DC: U.S. Government Publishing Office.

10 CFR 72.54(i). Code of Federal Regulations, Title 10, *Energy*, § 72.54(i), “Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas.” Washington, DC: U.S. Government Publishing Office.

10 CFR Part 73. Code of Federal Regulations, Title 10, *Energy*, Part 73. “Physical Protection of Plants and Materials.” Washington, DC: U.S. Government Publishing Office.

36 CFR 800.16. Code of Federal Regulations, Title 36, *Parks, Forests, and Public Property*, § 800.16. “Definitions.” Washington, DC: U.S. Government Printing Office

40 CFR 1503.1(c). Code of Federal Regulations, Title 40, *Protection of Environment*, § 1503.1, “Inviting comments and requesting information and analyses.” Washington, DC: U.S. Government Publishing Office.

40 CFR 1506.6(c). Code of Federal Regulations, Title 40, § 1506.6(c), :Public involvement.” Washington, DC: U.S. Government Publishing Office.

43 CFR Part 3160. Code of Federal Regulations, Title 43, *Public Lands: Interior*, Part 3160. “Onshore Oil and Gas Operations.” Washington, DC: U.S. Government Publishing Office.

49 CFR Part 107. Code of Federal Regulations, Title 49, *Transportation*, Part 107. “Hazardous Materials Program Procedures.” Washington, DC: U.S. Government Publishing Office.

49 CFR Part 171. Code of Federal Regulations, Title 49, *Transportation*, Part 171. “General Information, Regulations, and Definitions.” Washington, DC: U.S. Government Publishing Office.

49 CFR Part 172. Code of Federal Regulations, Title 49, *Transportation*, Part 172. “Hazardous Materials Table.” Washington, DC: U.S. Government Publishing Office.

49 CFR Part 173. Code of Federal Regulations, Title 49, *Transportation*, Part 173. “Shippers-General Requirements for Shipments and Packagings.” Washington, DC: U.S. Government Publishing Office.

49 CFR Part 174. Code of Federal Regulations, Title 49, *Transportation*, Part 174. “Carriage by Rail.” Washington, DC: U.S. Government Publishing Office.

49 CFR Part 175. Code of Federal Regulations, Title 49, *Transportation*, Part 175. “Carriage by Aircraft.” Washington, DC: U.S. Government Publishing Office.

49 CFR Part 176. Code of Federal Regulations, Title 49, *Transportation*, Part 176. “Carriage by Vessel.” Washington, DC: U.S. Government Publishing Office.

49 CFR Part 177. Code of Federal Regulations, Title 49, *Transportation*, Part 177. "Carriage by Highway." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 178. Code of Federal Regulations, Title 49, *Transportation*, Part 178. "Specifications for Packagings." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 179. Code of Federal Regulations, Title 49, *Transportation*, Part 179. "Specifications for Tank Cars." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 180. Code of Federal Regulations, Title 49, *Transportation*, Part 180. "Continuing Qualification and Maintenance of Packagings." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 390. Code of Federal Regulations, Title 49, *Transportation*, Part 390. "Federal Motor Carrier Safety Regulations; General." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 391. Code of Federal Regulations, Title 49, *Transportation*, Part 391. "Qualifications of Drivers and Longer Combination Vehicle (LCV) Driver Instructors." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 392. Code of Federal Regulations, Title 49, *Transportation*, Part 392. "Driving Commercial Motor Vehicles." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 393. Code of Federal Regulations, Title 49, *Transportation*, Part 393. "Parts and Accessories Necessary for Safe Operation." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 394. Code of Federal Regulations, Title 49, *Transportation*, Part 394. "Other Regulations Relating to Transportation (Continued) Chapter III." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 395. Code of Federal Regulations, Title 49, *Transportation*, Part 395. "Hours of Service of Drivers." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 396. Code of Federal Regulations, Title 49, *Transportation*, Part 396. "Inspection, Repair, and Maintenance." Washington, DC: U.S. Government Publishing Office.

49 CFR Part 397. Code of Federal Regulations, Title 49, *Transportation*, Part 397. "Transportation of hazardous Materials; Driving and Parking Rules." Washington, DC: U.S. Government Publishing Office.

44 FR 38690. "Working Arrangements Between the DOT and NRC With Respect to Inspection/Enforcement and Accident/Incident Investigation." *Federal Register*. Washington, DC: U.S. Government Printing Office. 1979.

59 FR 7629. "Summary of Executive Order 12989—Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." *Federal Register*. Washington, DC: U.S. Government Printing Office. 1994.

65 FR 67249. Executive Order 13175, “Consultation and Coordination with Indian Tribal Governments.” *Federal Register.* pp. 67,249–67,252. Washington, DC: Executive Office of the President. 2000.

69 FR 52040. “Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions.” *Federal Register*. Vol. 69, Issue 163. pp. 52,040–52,048. Washington, DC: U.S. Government Printing Office. 2004.

77 FR 71814. “Oil, Gas, and Potash Leasing and Development Within the Designated Potash Area of Eddy and Lea Counties, NM.” *Federal Register*. Vol. 77, No. 233. pp. 71,814–71,817. Washington, DC: U.S. Government Printing Office. 2012.

82 FR 2402. “Tribal Policy Statement.” *Federal Register*. Vol. 82, No. 5. pp. 2,402–2,417. Washington, DC: U.S. Government Printing Office. 2017.

83 FR 13802. “Holtec International HI-STORE Consolidated Interim Storage Facility Project.” *Federal Register*. Vol. 83, No. 62. pp. 13,802–13,804. Washington, DC: U.S. Government Printing Office. 2018.

85 FR 3860. “Requirements for the Storage of Spent Nuclear Fuel.” *Federal Register*. Vol. 85, No. 15. pp. 3,860–3,867. Washington, DC: U.S. Government Printing Office. 2020.

85 FR 16150. “Holtec International HI-STORE Consolidated Interim Storage Facility Project.” *Federal Register*. Vol. 85, No. 55, p. 16,150–16,151. Washington, DC: U.S. Government Printing Office. 2020.

85 FR 23382. “Holtec International HI-STORE Consolidated Interim Storage Facility Project.” *Federal Register*. Vol. 85, No. 81, p. 23,382–23,383. Washington, DC: U.S. Government Printing Office. 2020.

85 FR 37964. “Holtec International HI-STORE Consolidated Interim Storage Facility Project.” *Federal Register*. Vol. 85, No. 122, p. 37,964–37,965. Washington, DC: U.S. Government Printing Office. 2020.

85 FR 37964. “Holtec International HI-STORE Consolidated Interim Storage Facility Project.” *Federal Register*. Vol. 85, No. 122, p. 37,964–37,965. Washington, DC: U.S. Government Printing Office. 2020.

85 FR 41072. “Leakage Tests on Packages for Shipment of Radioactive Material.” *Federal Register*. pp. 41,072–41,073. Washington, DC: U.S. Government Printing Office. 2020.

20 NMAC 6.2. Title 20, *Environmental Protection*, Chapter 6, Part 2. “Ground and Surface Water Protection.” Santa Fe, New Mexico: New Mexico Administrative Code, The Commission of Public Records Administrative Law Division.

44 U.S. Code § 3502. Title 44, *Public Printing and Documents*, Chapter 35, Subchapter I. § 3502, “Definitions.” Washington, DC: United States Code.

AEC. “Environmental Survey of Transportation of Radioactive Materials to and from Nuclear Power Plants.” WASH-1238. Washington, DC: U.S. Atomic Energy Commission. 1972. Available at <https://www.osti.gov/servlets/purl/4569134> (Accessed 6 March 2021)

AFS. "Design and Prototype Fabrication of Railcars for Transport of High-Level Radioactive Material: Phase 2: Preliminary Design." DE-NE0008390. Federal Way, Washington: AREVA Federal Services LLC. 2018. <https://www.energy.gov/ne/downloads/atlas-railcar-phase-2-final-report> (Accessed 16 December 2020)

ASCE. "2017 Infrastructure Report Card: Rail." Reston, Virginia: American Society of Civil Engineers. 2017. <https://www.infrastructurereportcard.org/cat-item/rail/> (Accessed 16 December 2020)

ANSI. "Radioactive Materials – Leakage Tests on Packages for Shipment." ANSI N14.5. American National Standards Institute, Inc. 2014.

CEQ. "A Citizen's Guide to the NEPA, *Having Your Voice Heard*." Washington, DC: Council on Environmental Quality, Executive Office of the President. 2007.

CEQ. "Environmental Justice Guidance Under the National Environmental Policy Act." ADAMS Accession No. ML12199A438. Washington, DC: Council on Environmental Quality. 1997.

DOE. "Final Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada." DOE/EIS-0250F-S1. ADAMS Accession No. ML081750191 Package. Washington, DC: U.S. Department of Energy, Office of Civilian Radioactive Waste Management. 2008a.

DOE. "Radioactive Material Transportation Practices Manual for Use with DOE O 460.2A." DOE M 460.2-1A. Washington, DC: U.S. Department of Energy. 2008b. <https://www.directives.doe.gov/directives-documents/400-series/0460.2-DManual-1a/@@images/file> (Accessed 22 January 2021)

DOE. "Final Environmental Impact Statement for a Rail Alignment for the Construction and Operation of a Railroad in Nevada to a Geologic Repository at Yucca Mountain, Nye County, Nevada." DOE/EIS-0369. ADAMS Accession No. ML082070185. Las Vegas, Nevada: U.S. Department of Energy, Office of Civilian Radioactive Waste Management. 2008c.

DOE. "Analysis of the Total System Life Cycle Cost of the Civilian Radioactive Waste Management Program, Fiscal Year 2007." DOE/RW-0591. ADAMS Accession No. ML092710177. Washington, DC: U.S. Department of Energy, Office of Civilian Radioactive Waste Management. 2008d.

DOE. "Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada." Appendix J. DOE/EIS-0250F. Washington, DC: U.S. Department of Energy. 2002.

DOT. "Fleet Composition of Rail Tank Cars Carrying Flammable Liquids: 2019 Report." Washington, DC: U.S. Department of Transportation, Bureau of Transportation Statistics. 2019. <https://doi.org/10.21949/1504519> (Accessed 18 December 2020)

DOT. "Safety Compliance Oversight Plan for Rail Transportation of High-Level Radioactive Waste and Spent Nuclear Fuel." Washington, DC: U.S. Department of Transportation, Federal Railroad Administration. 1998 <https://railroads.dot.gov/elibrary/safety-compliance-oversight-plan-rail-transportation-high-level-radioactive-waste-and> (Accessed 20 January 2021)

Double Eagle Water Supply. Email correspondence to T. Holt from K. Cass, “Subject: Double Eagle Water Supply Follow-Up.” ADAMS Accession No. ML21201A139. Washington, DC: U.S. Nuclear Regulatory Commission. 2021.

ELEA. “GNEP Siting Report.” ADAMS Accession Nos. ML17310A225, ML17310A227, ML17310A230, and ML17310A231. Hobbs, New Mexico: Eddy-Lea Energy Alliance. 2007.

EPA. Letter to Kimberly D. Bose, Secretary Federal Energy Regulation Commission from Arturo Blanco, Director of Communities, Tribes and Environmental Assessment, Subject: Draft Environmental Impact Statement for the Holtec International License Application for a Consolidated Interim Storage Facility for Spent Nuclear Fuel and High Level Waste in Lea County, New Mexico. Dallas, Texas: U.S. Environmental Protection Agency. 2020.

EPA. “Promising Practices for Environmental Justice Methodologies in NEPA Reviews.” EPA 300B16001. Federal Interagency Working Group on Environmental Justice and NEPA Committee. Washington, DC: U.S. Environmental Protection Agency. 2016.

FEMA. “FEMA’s National Flood Hazard Layer (NFHL) Viewer.” Hyattsville, Maryland: U.S. Department of Homeland Security, Federal Emergency Management Agency. 2020. <https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd> (Accessed 9 November 2020)

Fort, J.A., J.M. Cuta, and H.E. Adkins, Jr. “A Compendium of Spent Fuel Transportation Package Response Analyses to Severe Fire Accident Scenarios.” NUREG/CR–7209, Final Report. ADAMS Accession No. ML17066A101. Richland, Washington: Pacific Northwest National Laboratory. 2017.

GAO. “Rail Safety: Freight Trains Are Getting Longer, and Additional Information Is Needed to Assess Their Impact.” GAO-19-443. Washington, DC: U.S. Government Accountability Office. 2019. Available at <https://www.gao.gov/assets/700/699396.pdf> (Accessed 8 November 2020)

GAO. “Spent Nuclear Fuel Management: Outreach Needed to Help Gain Public Acceptance for Federal Activities that Address Liability.” Report GAO-15-141. Washington, DC: U.S. Government Accountability Office. 2014.

GAO. “Nuclear Waste Management: Key Attributes, Challenges, and Costs for the Yucca Mountain Repository and Two Potential Alternatives.” Report GAO-10-48). Washington, DC: U.S. Government Office. 2009.

GEI Consultants. “Geotechnical Data Report Hi-Store CISF Phase 1 Site Characterization, Lea County, New Mexico.” ADAMS Accession No. ML18023A958. Woburn, Massachusetts: GEI Consultants. 2017

Holtec. “Safety Analysis Report-HI-STORE Consolidated Interim Storage Facility.” ADAMS Accession No. ML19318G865. Marlton, New Jersey: Holtec International. 2020a.

Holtec. “Environmental Report-HI-STORE Consolidated Interim Storage Facility, Rev 8.” ADAMS Accession No. ML20295A485. Marlton, New Jersey: Holtec International. 2020b.

Holtec. “Responses to Request for Additional Information.” ADAMS Accession No. ML19081A075. Marlton, New Jersey: Holtec International. 2019.

Holtec. “Environmental Report-HI-STORE Consolidated Interim Storage Facility, Rev 1.” ADAMS Accession No. ML17139C535. Marlton, New Jersey: Holtec International. 2017.

Hopi Cultural Preservation Office. Letter (September 16) S. Koyiyumptewa, Hopi Cultural Preservation Office, to Kathryn Brock, NRC. ADAMS Accession No. ML19275F380. Kykotsmovi, New Mexico: Hopi Cultural Preservation Office. 2019.

IAEA. “Selection of Away-from-Reactor Facility of Spent Fuel Storage – A Guidebook.” IAEA-TECDOC-CD-1558. International Atomic Energy Agency. 2007.

ICRP (International Commission on Radiological Protection). “The 2007 Recommendations of the International Commission on Radiological Protection.” Annals of the International Commission on Radiological Protection. ICRP Publication 103. Amsterdam Netherlands: Elsevier, Inc. 2007. <https://www.icrp.org/publication.asp?id=ICRP%20Publication%20103> (Accessed 28 June 2019)

Kelly, T.E. “Hydrologic Assessment of the Salt Lakes Area, Western Lea County, New Mexico.” Prepared by Geohydrology Associates, Inc., Albuquerque, New Mexico for Pollution Control, Inc., Lovington, New Mexico. 1984.

National Research Council. “Health Risks from Exposure to Low Levels of Ionizing Radiation BEIR VII Phase 2.” Washington, DC: National Research Council; Division on Earth and Life Studies; Board on Radiation Effects Research; Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation. 2006.

NHPA National Historic Preservation Act of 1966. Washington, DC: United States Congress. 1966.

Nicholson, A., Jr. and A. Clebsch, Jr. “Geology and Ground-Water Conditions in Southern Lea County, New Mexico.” ADAMS Accession No. ML042430324. Ground-Water Report 6, U.S. Geological Survey in cooperation with the New Mexico Institute of Mining and Technology, State Bureau of Mines and Mineral Resources, and New Mexico State Engineer. Socorro, New Mexico. 1961.

NMENV. “Information for Lea County LF and Sand Point LF” email (June 28, 2019) and attachments: SandPointAnnualReport(s).doc, AnnualReport.LeaCounty(3).doc, 2018LandfillCapacityWorkSheet.SandPoint.pdf, Capacity analysis, LCLF – Dec 2017.docx, from George Schuman, Permit Section Manager, Solid Waste Bureau, New Mexico Environment Department, to Nathan Hall, Southwest Research Institute. 2019.

NMOSE. “OSE PODs.” Santa Fe, New Mexico: NMOSE ITSB, GIS Data Manager. 2020. <https://geospatialdata-ose.opendata.arcgis.com/datasets/ose-pods> (Accessed 5 November 2020)

NOAA. “NOAA Atlas 14 Point Precipitation Frequency Estimates: NM.” Silver Spring, MD: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Office of Water Prediction. 2017.

<https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=nm>
(Accessed 9 November 2020)

NRC. NUREG–2215, "Standard Review Plan for Spent Fuel Dry Storage Systems and Facilities, Final Report." Adams Accession No. ML20121A190. Washington, DC: U.S. Nuclear Regulatory Commission. 2020a. <https://www.nrc.gov/docs/ML2012/ML20121A190.pdf> (Accessed 24 February 2021)

NRC. NUREG–2216, "Standard Review Plan for Transportation Packages for Spent Fuel and Radioactive Material, Final Report." Adams Accession No. ML20234A651. Washington, DC: U.S. Nuclear Regulatory Commission. 2020b. <https://www.nrc.gov/docs/ML2023/ML20234A651.pdf> (Accessed 24 February 2021)

NRC. NUREG/BR–0058, "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission." ADAMS Accession No. ML19261A277. Washington, DC: U.S. Nuclear Regulatory Commission. 2020c.

NRC. SECY–20–0074, "Valuing Nonfatal Cancer Risks in Cost-Benefit Analysis." Washington, DC: U.S. Nuclear Regulatory Commission. 2020d.

NRC. "The Holtec Environmental Impact Statement Public Scoping Period Summary Report." ADAMS Accession No. ML19121A296. Washington, DC: U.S. Nuclear Regulatory Commission. 2019a.

NRC. "Request For Tribal Participation At a Webinar And Site Visit For Section 106 Consultation Activities Associated With The Holtec Hi-Store Consolidated Interim Storage Facility Located In Lea County, New Mexico (Docket Number: 7201051)." ADAMS Accession No. ML19344B782. Washington, DC: U.S. Nuclear Regulatory Commission. 2019b.

NRC. Regulatory Guide 4.2, "Preparation of Environmental Reports for Nuclear Power Stations." Rev. 3. ADAMS Accession No. ML18071A400. Washington, DC: U.S. Nuclear Regulatory Commission. 2018a.

NRC. NUREG–2173, "Tribal Protocol Manual." Rev. 1. ADAMS Accession No. ML17193A424. Washington, DC: U.S. Nuclear Regulatory Commission. 2018b.

NRC. "Holtec International's Application for Specific Independent Spent Fuel Storage Installation License for the HI- STORE Consolidated Interim Storage Facility for Spent Nuclear Fuel-First Request for Additional Information, Part 2." ADAMS Accession No. ML18257A240. Washington, DC: U.S. Nuclear Regulatory Commission. 2018c.

NRC. NUREG–2176, "Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Nuclear Plant Units 6 and 7 (NUREG–2176)." Washington, DC: U.S. Nuclear Regulatory Commission. 2016.

NRC. NUREG–2157, "Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel." ADAMS Accession No. ML14196A105. Washington, DC: U.S. Nuclear Regulatory Commission. 2014a.

NRC. NUREG–2125, "Spent Fuel Transportation Risk Assessment, Final Report." Accession No. 14031A323. Washington, DC: U.S. Nuclear Regulatory Commission. 2014b.

NRC. NUREG–1437, “Generic Environmental Impact Statement for License Renewal of Nuclear Plants.” ADAMS Accession No. ML13106A241. Washington, DC: U.S. Nuclear Regulatory Commission. 2013a.

NRC. NUREG–0561, “Physical Protection of Shipments of Irradiated Reactor Fuel: Final Report.” ADAMS Accession No. ML13120A230. Washington, DC: U.S. Nuclear Regulatory Commission. 2013b.

NRC. NUREG–2113, “Environmental Impact Statement for the Proposed Fluorine Extraction Process and Depleted Uranium Deconversion Plant in Lea County, New Mexico.” ADAMS Accession No. ML12220A380. Washington, DC: U.S. Nuclear Regulatory Commission. 2012. <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr2113/> (Accessed 29 August 2018)

NRC. NUREG–1748, “Environmental Review Guidance for Licensing Actions Associated with NMSS Programs.” ADAMS Accession No. ML032450279. Washington, DC: U.S. Nuclear Regulatory Commission. 2003.

NRC. NUREG–1714, “Final Environmental Impact Statement for the Construction and Operation of an Independent Spent Fuel Storage Installation on the Reservation of the Skull Valley Band of Goshute Indians and the Related Transportation Facility in Tooele County, Utah.” ADAMS Accession No. ML020150170. Washington, DC: U.S. Nuclear Regulatory Commission. 2001.

NRC. “Environmental Assessment and Finding of No Significant Impact for the Storage of Spent Nuclear Fuel in NRC-Approved Storage Casks at Nuclear Power Reactor Sites.” ADAMS Accession No. ML051230231. Washington, DC: U.S. Nuclear Regulatory Commission. 1989.

NRC. NUREG–75/038, “Environmental Survey of Transportation of Radioactive Materials to and from Nuclear Power Plants. Supplement 1 to WASH-1238. Washington, DC: U.S. Nuclear Regulatory Commission. 1975.

NTSB. “Most Wanted List: Ensure the Safe Shipment of Hazardous Materials – Railroad.” Washington, DC: National Transportation Safety Board. 2020. <https://www.ntsb.gov/advocacy/mwl/Pages/default.aspx> (Accessed 19 May 2022)

NWTRB. Preparing for Nuclear Waste Transportation.” Arlington, Virginia: U.S. Nuclear Waste Technical Review Board. 2019.

OFS. “Design and Prototype Fabrication of Railcars for Transport of High-Level Radioactive Material; Phase 3 – Prototype Fabrication and Delivery.” EIR-3021970-000. Federal Way, Washington: Orano Federal Services LLC. 2019. <https://www.energy.gov/ne/downloads/atlas-railcar-phase-3-final-report> (Accessed 16 December 2020)

Powers, D.W. “Basic Data Report for Drillhole NP-1 (CP-1163) Section 1, T19S, R32E Lea County, NM.” 2014.

Powers, D.W., S.J. Lambert, S.E. Shaffer, L.R. Hill, and W.D. Weart, eds. “Geological Characterization Report Waste Isolation Pilot Project (WIPP) Site, Southeastern New Mexico.” SAND78-1956. Albuquerque, New Mexico: Sandia Laboratories. 1978.

Richey, S.F., J.G. Wells, and K.T. Stephens. “Geohydrology of the Delaware Basin and Vicinity, Texas and New Mexico.” U.S. Geological Survey, Water-Resources Investigations Report 84-4077. Albuquerque, New Mexico: U.S. Department of the Interior. 1985.

SEC. “Edgar Company Search Results.” Securities and Exchange Commission. ADAMS Accession No. ML22126A031. Washington, DC: 2021. <https://www.sec.gov/edgar/browse/?CIK=1421461&owner=exclude> (Accessed 21 October 2021)

Snee, J.E.L and M.D. Zoback. “State of Stress in the Permian Basin, Texas and New Mexico: Implications for Induced Seismicity.” *The Leading Edge*, Special Section: Induced Seismicity. Vol. 37, No. 2. pp. 127–34. 2018.

USACE. “No Permit Required – Action No. SPA-2021-00059-LCO, Holtec International HI-STORE FACILITY.” ADAMS Accession No. ML21155A229. Las Cruces, New Mexico: U.S. Department of the Army, Corp of Engineers, Albuquerque District. 2021.

USGS. "Mineral Commodity Summaries 2021.” Reston, Virginia: U.S. Department of the Interior, U.S. Geological Survey. 2021. <https://doi.org/10.3133/mcs2021> (Accessed 25 April 2022)

White House. “Proclamation on Declaring a National Emergency Concerning the Novel Coronavirus Disease (COVID-19) Outbreak.” Washington, DC: White House. March 2020. <https://trumpwhitehouse.archives.gov/presidential-actions/proclamation-declaring-national-emergency-concerning-novel-coronavirus-disease-covid-19-outbreak/> (Accessed 19 May 2022)

Zhang, A., J. Lu, and J.W. Kim. “Detecting Mining-Induced Ground Deformation and Associated Hazards Using Spaceborne InSAR Techniques.” *Geomatics, Natural Hazards and Risk*. Vol. 9, No. 1. pp. 211–223. 2018.

Table D–2 Table of Commenter Names and Affiliations

Commenter	Affiliation (if stated)	Comment Source and Document ID	Correspondence ID
Anonymous, Anonymous		Meeting Transcript (ML20197A225)	99
Anonymous, Anonymous		Meeting Transcript (ML20240A269)	167
Anonymous, Anonymous		Meeting Transcript (ML20244A154)	168
Anonymous, Anonymous		Meeting Transcript (ML20245E172)	169
Anonymous, Anonymous		Meeting Transcript (ML20252A171)	170
Anonymous, Anonymous		Meeting Transcript (NRC-0932)	98
Addington, Bill	Sierra Blanca Legal Defense Fund Inc.	Meeting Transcript (ML20240A269)	167-8
Agnihotri, Anu		reg.gov (ML20266G395)	279
Albidrez, Anthony		Email (ML20269A329)	367
Albright, Bud	United States Nuclear Industry Council	Email (ML20211L765)	154
Alcon, Eliseo Lee	New Mexico State Legislature	Email (ML20268C343)	335
Allen, Catherine		Meeting Transcript (NRC-0932)	98-32
Allen, Vicki		Email (ML20114E243)	33
Anderson, Dorothy		Email (ML20266G198)	192
Anderson, Jude		Email (ML20083K368)	5
Anemone, Anthony		Email (ML20268C257)	318
Anonymous, Anonymous		Email (ML20134H979)	56
Anonymous, Anonymous		Email (ML20267A567)	193
Anonymous, Anonymous		Email (ML20269A205)	381
Anonymous, Anonymous		reg.gov (ML20086J106)	18
Anonymous, Anonymous		reg.gov (ML20086J174)	21
Anonymous, Anonymous		reg.gov (ML20154K436)	92
Anonymous, Anonymous		reg.gov (ML20175A069)	255
Anonymous, Anonymous		reg.gov (ML20177A641)	259
Anonymous, Anonymous	City of Arlington, TX	reg.gov (ML20266G506)	284
Anonymous, Anonymous	Green Party of the Albuquerque Metropolitan Area	reg.gov (ML20259A240)	277
Apple, Neal		Email (ML20114E243)	33

Table D–2 Table of Commenter Names and Affiliations			
Arends, Joni	Concerned Citizens for Nuclear Safety	Meeting Transcript (ML20244A154)	168-7
Armstrong, Deborah	New Mexico State Legislature	Email (ML20268C343)	335
Arnold, Richard	Pahrump Paiute Tribe/Consolidated Group of Tribes and Organizations (CGTO)	reg.gov (ML20267A177)	288
Atwood, Cullen		reg.gov (ML20126G321)	62
Austin, Diana		Email (ML20268A048)	315
Austin, Wendy		Meeting Transcript (ML20244A154)	168-15
Austin, Wendy		Meeting Transcript (NRC-0932)	98-19
Austin, Wendy		reg.gov (ML20176A339)	258
Baca, Baudilio		Meeting Transcript (NRC-0932)	98-22
Baji Rankin, Margaret		Email (ML20147A190)	90
Baker, Bill		Email (ML20196L752)	144
Balinko, Stephanie		Meeting Transcript (ML20244A154)	168-12
Barish, Richard		reg.gov (ML20266G399)	280
Bartelt, Jeannette		Email (ML20175A648)	159
Bass, Audie		Email (ML20268C345)	336
Beatty, Edwin		Email (ML20179A352)	127
Beaudoin, Mary		reg.gov (ML20245E276)	270
Belzer, Richard		Email (ML20269A133)	375
Belzer, Richard		Email (ML20269A139)	376
Bemis, Evalyn		Email (ML20083L192)	10
Bender, Doug		Email (ML20160A143)	68
Bernstein, Ellen	Albuquerque Teachers Federation	Email (ML20268C341)	246
Bezansib, David		Email (ML20177A313)	161
Bezanson, David		Email (ML20083L219)	11
Bhandari, Ranjana	Liveable Arlington	Email (ML20268C336)	332
Bhattacharji, Lee		Email (ML20269A235)	423
Biediger, Tracy		Email (ML20269A004)	340
Birnbaum, Edward		reg.gov (ML20112F460)	74
Bittenbender, Bruce		Email (ML20269A133)	375
Bittenbender, Bruce		Email (ML20269A139)	377
Blaber, Ramona		Email (ML20267A581)	305
Blaber, Ramona		Email (ML20269A420)	425
Blanch, Paul		Meeting Transcript (ML20252A171)	170-6
Blanco, Arturo	Environmental Protection Agency	Email (ML20262G991)	232
Block, Jonathan		Meeting Transcript (ML20244A154)	168-3

Table D–2 Table of Commenter Names and Affiliations			
Blue, Malcolm		Email (ML20178A373)	111
Boehler, Christopher	Concho	Email (ML20266G202)	297
Boney, Brian		Email (ML20269A122)	350
Bonime, Karen	Citizens for Alternatives to Radioactive Dumping	Email (ML20268A005)	310
Bonine, Karen		Meeting Transcript (ML20252A171)	170-26
Bosold, Patrick		Email (ML20241A275)	213
Boudart, Jan		Email (ML20167A124)	125
Boudart, Jan		Email (ML20179A342)	125
Boudart, Jan		Email (ML20269A132)	358
Boudart, Jan		Meeting Transcript (ML20244A154)	168-21
Boudart, Jan		Meeting Transcript (ML20244A154)	168-4
Boudart, Jan		Meeting Transcript (ML20245E172)	169-3
Boudart, Jan		Meeting Transcript (ML20252A171)	170-3
Boudart, Jan		Meeting Transcript (ML20252A171)	170-9
Boudart, Jan		Meeting Transcript (NRC-0932)	98-35
Bowdey, Lisa		Email (ML20269A106)	422
Brown, Cathrynn	New Mexico State House of Representatives	Meeting Transcript (NRC-0932)	98-16
Brown, Cathrynn	New Mexico State Representative	Email (ML20268C356)	207
Brown, Joan		Meeting Transcript (NRC-0932)	98-50
Brown, Joan	New Mexico Interfaith Power and Light	Email (ML20197A175)	146
Brown, Marilyn E.		Email (ML20188A040)	133
Brown, Marty	San Luis Obispo Mothers for Peace	Email (ML20189A185)	135
Brown, Marty	San Luis Obispo Mothers for Peace	Email (ML20268C338)	333
Buchser, John		Meeting Transcript (ML20197A225)	99-31
Burling, Hannah	League of Women Voters New Mexico	Email (ML20216A764)	157
Burnam, Lon	Lone Star Chapter of the Sierra Club	Meeting Transcript (ML20252A171)	170-14
Burns, Terry	Sierra Club, Alamo Group of Lone Star Chapter	Email (ML20211L742)	150
Burns, Terry	Sierra Club, Alamo Group of Lone Star Chapter	Meeting Transcript (ML20245E172)	169-9
Caballero, Patricia Roybal	New Mexico State Legislature	Email (ML20268C343)	335
Calkins, Joanne		Email (ML20261H319)	230
Campbell, G		Email (ML20161A132)	95

Table D–2	Table of Commenter Names and Affiliations		
Campbell, Marcia		Email (ML20266G349)	405
Cardona, Patricia		Email (ML20269A224)	359
Cardona, Patricia		Meeting Transcript (ML20245E172)	169-8
Carlson, Ernie	Eddy County, NM	Meeting Transcript (NRC-0932)	98-4
Carson, Christopher		Meeting Transcript (ML20197A225)	99-23
Carson, Christopher		reg.gov (ML20302A439)	428
Carter, Wes	City of Carlsbad, NM	Meeting Transcript (NRC-0932)	98-8
Carver, George	NAC International Inc.	reg.gov (ML20266G39)	278
Casadone, Joseph		Email (ML20189A184)	134
Cass, K C	City of Carlsbad, NM	Meeting Transcript (ML20244A154)	168-14
Cass, K C	City of Carlsbad, NM	Meeting Transcript (NRC-0932)	98-7
Cecchini, Rose Marie	Office of Peace, Justice & Creation Stewardship	Meeting Transcript (NRC-0932)	98-36
Cevasco, John		Email (ML20211L740)	149
Chamberland, Carol		Email (ML20268C321)	327
Chase, James		Email (ML20268A013)	403
Chavez, JJ	Carlsbad City Council	Meeting Transcript (ML20197A225)	99-8
Chu, Shannon		Email (ML20083G266)	2
Clark, Lonnie		reg.gov (ML20267A175)	287
Clark, Peter		Email (ML20167A122)	110
Clark, Peter		Email (ML20167A123)	110
Clark, Peter		Meeting Transcript (ML20197A225)	99-37
Clements, Charles		Email (ML20083K347)	4
Clements, Tom	Savannah River Site Watch	Email (ML20268A003)	309
Cobb, Sam	City of Hobbs	Meeting Transcript (NRC-0932)	98-9
Coffman, Connie		Email (ML20268A047)	314
Colley, Vina		Meeting Transcript (ML20197A225)	99-26
Colton, Jean		Email (ML20115E245)	44
Commenters, Multiple		Email (ML20162A453)	93
Commenters, Multiple		Email (ML20178A689)	116
Commenters, Multiple		Email (ML20178A800)	117
Commenters, Multiple		Email (ML20258A163)	188
Commenters, Multiple		Email (ML20262H113)	190
Commenters, Multiple		Email (ML20266G180)	191
Commenters, Multiple		Email (ML20269A094)	387
Conca, James	UFA Ventures & Forbes-Reporter	Email (ML20266H092)	300

Table D–2 Table of Commenter Names and Affiliations

Condit, Brian	New Mexico Building Trades Council	Email (ML20268C234)	243
Conklin, Don		Email (ML20244A044)	214
Cordova, Tina		Email (ML20265A084)	389
Corry, Ronit		reg.gov (ML20140A311)	67
Cothran, Virginia and Alex		Email (ML20181A684)	130
Cottrell Probst, Sarah	New Mexico Energy, Minerals, and Natural Resources Department	Meeting Transcript (NRC-0932)	98-15
Crockett, Susan	Eddy County Commissioner	Email (ML20247J474)	185
Currier, Missi		Meeting Transcript (ML20197A225)	99-38
Currier, Missi	Economic Development Corporation of Lea County	Email (ML20268C335)	245
Curtis, Steven		reg.gov (ML20128J226)	64
D'Angelo, Rosalie		Email (ML20266G473)	408
D'Arrigo, Diane		Email (ML20259A160)	385
D'Arrigo, Diane	Nuclear Information and Resource Service	Email (ML20269A109)	349
D'Arrigo, Diane	Nuclear Information and Resource Service	Email (ML20269A414)	349
D'Arrigo, Diane	Nuclear Information and Resource Service	Email (ML20275A334)	251
D'Arrigo, Diane	Nuclear Information and Resource Service	Meeting Transcript (ML20197A225)	99-2
D'Arrigo, Diane	Nuclear Information and Resource Service	Meeting Transcript (ML20240A269)	167-4
D'Arrigo, Diane	Nuclear Information and Resource Service	Meeting Transcript (ML20252A171)	170-19
D'Arrigo, Diane	Nuclear Information and Resource Service	Meeting Transcript (NRC-0932)	98-28
Dakin, Priscilla		Email (ML20195A487)	141
Davis, Allen		Email (ML20179A337)	123
Denton, Richard		Email (ML20134H978)	55
Dilger, Fred	Western Interstate Energy Board	reg.gov (ML20267A329)	286
Doino, Mary		Email (ML20269A013)	417
Donnell, David		Email (ML20268A028)	398
Douglas, Karen	League of Women Voters, New Mexico	Meeting Transcript (NRC-0932)	98-49
Dourson, Michael		Email (ML20269A133)	375
Dourson, Michael		Email (ML20269A201)	378
Dourson, Michael		Email (ML20269A202)	379
Dourson, Michael		Email (ML20269A204)	380
Drake, Tiffany	Missouri Department of Natural Resources	Email (ML20179A007)	119
Drury, Anonymous		reg.gov (ML20182A113)	260
Drury, Kathleen		Email (ML20234A738)	178

Table D–2 Table of Commenter Names and Affiliations			
Dunaway, David		reg.gov (ML20119A010)	79
Dupray, Rosemary		Email (ML20161A135)	97
Durkin, Lisa		reg.gov (ML20119A878)	60
Easton, Jade		Email (ML20269A084)	421
Edlow, Jack	Edlow International Company	Meeting Transcript (ML20245E172)	169-12
Edlow, Jack	Edlow International Company	Meeting Transcript (ML20252A171)	170-1
Elie, Marilyn		Meeting Transcript (ML20197A225)	99-29
Ellison, Martha		reg.gov (ML20086J130)	19
Esposito, Barbara		Email (ML20268A035)	200
Estelle, Beth		Email (ML20248H423)	186
Falcone, Joyce		Email (ML20267A647)	308
Feibelman, Camilla		Meeting Transcript (NRC-0932)	98-20
Ferguson, Tom		Email (ML20134H982)	57
Ferra, Daniel		Email (ML20237F374)	209
Ferrary, Joanne	New Mexico House of Representatives	Email (ML20268C343)	335
PFerrary, Joanne	New Mexico House of Representatives	Meeting Transcript (NRC-0932)	98-52
Finney, Dee		Email (ML20195A496)	142
Fleming, Melissa		Email (ML20238C069)	182
Ford, Aaron	State of Nevada	Email (ML20267A637)	242
Ford, Aaron	State of Nevada	Email (ML20302A438)	242
Fox, Sheila		Email (ML20266G491)	411
Friedenfels, Roxanne		Email (ML20178A659)	114
Fronzak, Robert	America Association of Railroads	reg.gov (ML20189A552)	261
Fulfer, Greg	New Mexico State Senate	Meeting Transcript (NRC-0932)	98-17
Gadagbui, Bernard		Email (ML20269A133)	375
Gale, Daryl		Email (ML20269A333)	368
Garcia Richard, Stephanie	Commissioner of Public Lands	Email (ML20269A00)	247
Garcia, Danielle	Albuquerque Teachers Federation	Email (ML20268C341)	246
Gardner, Rose		Email (ML20268C29)	321
Gardner, Rose		Email (ML20268C290)	320
Gardner, Rose		Email (ML20268C300)	325
Gardner, Rose		Email (ML20269A037)	404
Gardner, Rose		Email (ML20269A126)	353
Gardner, Rose		Meeting Transcript (ML20197A225)	99-40
Gardner, Rose		Meeting Transcript (ML20240A269)	167-13
Gardner, Rose		Meeting Transcript (ML20244A154)	168-18

Table D–2 Table of Commenter Names and Affiliations			
Gardner, Rose		Meeting Transcript (NRC-0932)	98-58
Gardner, Rose	Alliance for Environmental Strategies	Meeting Transcript (ML20252A171)	170-5
Gardner, Rose	Alliance for Environmental Strategies	reg.gov (ML20266G305)	252
Gellert, Sally Jane		Email (ML20177A015)	160
Gentile, Allison		Email (ML20266H396)	413
George, Anne		Email (ML20268A031)	312
Gibson, Kenneth		reg.gov (ML20170A261)	254
Giese, Mark		Email (ML20255A105)	187
Giese, Mark M.		Email (ML20115E247)	45
Gilbert, Petuuche	Laguna Acoma Coalition for a Safe Environment	Meeting Transcript (ML20240A269)	167-1
Gilbert, Petuuche	Multicultural Alliance for a Safe Environment	reg.gov (ML20266G305)	252
Gilmore, Donna		Meeting Transcript (NRC-0932)	98-54
Giorgi, Elena		reg.gov (ML20141L619)	70
Gledhill, Diane		Email (ML20211L762)	153
Gomez, Melissa	JB Henderson Construction Company Inc.	Email (ML20197A168)	145
Gould, Robert	Physicians for Social Responsibility	Meeting Transcript (ML20244A154)	168-2
Grass, Victoria		Email (ML20083L314)	14
Gray, Erica		reg.gov (ML20267A179)	290
Gray, Erica		reg.gov (ML20267A223)	292
Greenwald, Janet	Citizens for Alternatives to Radioactive Dumping	Email (ML20268A005)	310
Greenwald, Janet	Citizens for Alternatives to Radioactive Dumping	Meeting Transcript (ML20252A171)	170-22
Griffin, Glenn		Email (ML20267A532)	304
Griggs, Ron	New Mexico State Senate	Meeting Transcript (ML20197A225)	99-6
Grisham, Michelle Lujan	State of New Mexico	Email (ML20269A025)	343
Gromoll, Norda		Email (ML20114E257)	39
Gromoll, Norda		Email (ML20238C078)	211
Gura, Jovette		Email (ML20266J760)	239
Gutierrez, Bernice		Email (ML20266G200)	236
Haas, Amanda		Email (ML20211L760)	152
Hacker, Gloria L		Email (ML20179A006)	118
Hacker, Gloria L		reg.gov (ML20233A250)	269
Hadden, Karen		Meeting Transcript (ML20244A154)	168-20
Hadden, Karen		Meeting Transcript (ML20252A171)	170-18

Table D–2	Table of Commenter Names and Affiliations		
Hadden, Karen		Meeting Transcript (NRC-0932)	98-31
Hadden, Karen	Sustainable Energy & Economic Development (SEED) Coalition	Meeting Transcript (ML20197A225)	99-17
Hadden, Karen	Sustainable Energy & Economic Development (SEED) Coalition	Meeting Transcript (ML20245E172)	169-1
Hadden, Karen	Sustainable Energy & Economic Development (SEED) Coalition	Meeting Transcript (ML20245E172)	169-17
HaLevy, Libbe		Email (ML20260H136)	396
Hall, Linda		Email (ML20083L163)	9
Hall, Linda		Email (ML20114E259)	40
Halpin, Becky		Meeting Transcript (ML20252A171)	170-12
Hanks, Laura		reg.gov (ML20115E526)	77
Hanratty, Linda		Email (ML20266G301)	298
Harbaugh, Gene		Email (ML20179A338)	124
Hardy, Sandra	Hardy McKenzie Law	Meeting Transcript (ML20245E172)	169-6
Hart, Marcia		Email (ML20266G304)	299
Harvey, Jasmine		Meeting Transcript (ML20197A225)	99-15
Healingline, Helgaleena		reg.gov (ML20226A170)	267
Heaton, John	Eddy-Lea Energy Alliance	Email (ML20105A181)	29
Heaton, John	Eddy-Lea Energy Alliance	Meeting Transcript (ML20244A154)	168-11
Heaton, John	Eddy-Lea Energy Alliance	Meeting Transcript (ML20244A154)	168-25
Heaton, John	Eddy-Lea Energy Alliance	Meeting Transcript (NRC-0932)	98-34
Hedin, Richard		reg.gov (ML20122A030)	87
Hedrick, Gary	San Clemente Green	Meeting Transcript (ML20197A225)	99-16
Henderson, Helen		Email (ML20239A801)	184
Henry, Ron		Email (ML20111A172)	32
Herzer, Kelsie		Email (ML20269A124)	352
Hickman, Virginia		Email (ML20266G485)	410
Hill, Leigh	We the Fourth	Email (ML20262H117)	233
Hisasue, Carole	San Luis Obispo Mothers for Peace	Email (ML20189A185)	135
Hisasue, Carole	San Luis Obispo Mothers for Peace	Email (ML20268C338)	333
Hladky, Mary		Email (ML20259A245)	225
Hodgin, C. Reed		Email (ML20269A133)	375
Hodgin, C. Reed		Email (ML20269A205)	382

Table D–2 Table of Commenter Names and Affiliations			
Hoffman, Ace		Meeting Transcript (ML20244A154)	168-22
Hogan, Frances		Email (ML20268C280)	386
Holden, Karen B.		Email (ML20182A191)	131
Holder, Elaine	San Luis Obispo Mothers for Peace	Email (ML20189A185)	135
Holder, Elaine	San Luis Obispo Mothers for Peace	Email (ML20268C338)	333
Holland, Brooke	Nuclear Issues Study Group	Meeting Transcript (ML20197A225)	99-13
Holland, Elizabeth		Email (ML20269A360)	370
Hollenberg, Kai		Email (ML20269A129)	356
Hopkins, Steve		Email (ML20083L349)	15
Horowitz, Shel		Email (ML20247J479)	388
Houser, Donald		Email (ML20267A605)	194
Huff, Mildred		Email (ML20269A015)	418
Hughes, Ed		Meeting Transcript (ML20240A269)	167-6
Hughes, Ed		Meeting Transcript (ML20244A154)	168-17
Hughes, Ed		Meeting Transcript (ML20244A154)	168-5
Hughes, Patty		Meeting Transcript (ML20252A171)	170-15
Hughs, Ed		Email (ML20261H567)	231
Hughs, Ed		Meeting Transcript (ML20245E172)	169-20
Hughs, Ed		Meeting Transcript (ML20252A171)	170-10
Hughs, Patty		Email (ML20261H567)	231
Hughs, Patty		Meeting Transcript (ML20244A154)	168-16
Hughs, Patty		Meeting Transcript (ML20244A154)	168-26
Hughs, Sidney		reg.gov (ML20182A112)	272
Hyde, Don		Email (ML20268A025)	311
Inserra, Marie		reg.gov (ML20267A236)	294
Irving, Pamela		Email (ML20226A071)	174
Iwane, Cathy		Email (ML20269A130)	357
Jackson, Cynthia		Email (ML20267A593)	306
Jagiello, Carol		Email (ML20269A036)	344
Janway, Dale	City of Carlsbad, NM	Meeting Transcript (NRC-0932)	98-1
Jarosh, Dean		reg.gov (ML20141L615)	69
Jensen, Louise		Email (ML20268C330)	330
Johnson, Molly	San Luis Obispo Mothers for Peace	Email (ML20189A185)	135
Johnson, Molly	San Luis Obispo Mothers for Peace	Email (ML20268C338)	333

Table D–2	Table of Commenter Names and Affiliations		
Johnson, Ron	Tribal Radioactive Materials Transportation Committee	reg.gov (ML20267A177)	288
Johnston, Steve		Email (ML20179A011)	120
Josephs, Robert		Email (ML20266G478)	409
Kamps, Kevin	Beyond Nuclear	Email (ML20179A354)	100
Kamps, Kevin	Beyond Nuclear	Email (ML20181A578)	101
Kamps, Kevin	Beyond Nuclear	Email (ML20181A582)	102
Kamps, Kevin	Beyond Nuclear	Email (ML20181A585)	103
Kamps, Kevin	Beyond Nuclear	Email (ML20181A587)	104
Kamps, Kevin	Beyond Nuclear	Email (ML20181A681)	105
Kamps, Kevin	Beyond Nuclear	Email (ML20181A685)	106
Kamps, Kevin	Beyond Nuclear	Email (ML20181A686)	107
Kamps, Kevin	Beyond Nuclear	Email (ML20181A687)	108
Kamps, Kevin	Beyond Nuclear	Email (ML20195A532)	143
Kamps, Kevin	Beyond Nuclear	Email (ML20248H392)	217
Kamps, Kevin	Beyond Nuclear	Email (ML20248H409)	219
Kamps, Kevin	Beyond Nuclear	Email (ML20253A351)	244
Kamps, Kevin	Beyond Nuclear	Email (ML20254A120)	220
Kamps, Kevin	Beyond Nuclear	Email (ML20255A250)	222
Kamps, Kevin	Beyond Nuclear	Email (ML20255A251)	223
Kamps, Kevin	Beyond Nuclear	Email (ML20259A445)	228
Kamps, Kevin	Beyond Nuclear	Email (ML20266G298)	397
Kamps, Kevin	Beyond Nuclear	Email (ML20269A008)	341
Kamps, Kevin	Beyond Nuclear	Email (ML20269A054)	345
Kamps, Kevin	Beyond Nuclear	Email (ML20269A232)	361
Kamps, Kevin	Beyond Nuclear	Meeting Transcript (ML20197A225)	99-25
Kamps, Kevin	Beyond Nuclear	Meeting Transcript (ML20240A269)	167-9
Kamps, Kevin	Beyond Nuclear	Meeting Transcript (ML20244A154)	168-10
Kamps, Kevin	Beyond Nuclear	Meeting Transcript (ML20244A154)	168-23
Kamps, Kevin	Beyond Nuclear	Meeting Transcript (ML20245E172)	169-16
Kamps, Kevin	Beyond Nuclear	Meeting Transcript (ML20245E172)	169-5
Kamps, Kevin	Beyond Nuclear	Meeting Transcript (ML20252A171)	170-11
Kamps, Kevin	Beyond Nuclear	Meeting Transcript (NRC-0932)	98-27
Keegan, Michael	Don't Waste Michigan	Meeting Transcript (ML20240A269)	167-12
Keegan, Michael	Don't Waste Michigan	Meeting Transcript (ML20252A171)	170-16
Keegan, Michael	Don't Waste Michigan	Meeting Transcript (NRC-0932)	98-43
Keegan, Michael J.	Don't Waste Michigan	Email (ML20269A056)	346
Kenney, James C.	New Mexico Environment Department	Email (ML20268C322)	328

Table D–2 Table of Commenter Names and Affiliations			
Kenney, James C.	New Mexico Environment Department	Meeting Transcript (NRC-0932)	98-14
Kernan, Gay	New Mexico Senate	Meeting Transcript (ML20197A225)	99-1
Key, Shannon	Concho	Email (ML20266G202)	297
Keyes, Alicia	New Mexico Department of Economic Development	Email (ML20269A415)	374
King, Gary		Meeting Transcript (NRC-0932)	98-47
King, Nicholas		Meeting Transcript (ML20197A225)	99-41
Kipen, Ethel		Email (ML20262H157)	234
Kipen, Ken		Email (ML20262H157)	234
Kirsh, David		reg.gov (ML20266G505)	283
Kleuskens, Tonya		Email (ML20254A367)	221
Kolb, James		Email (ML20269A107)	400
Koons, Cedar		reg.gov (ML20211M172)	265
Kovac, Scott	Nuclear Watch New Mexico	Email (ML20269A323)	364
Kovac, Scott	Nuclear Watch New Mexico	Meeting Transcript (NRC-0932)	98-25
Kovac, Scott	Nuclear Watch New Mexico	reg.gov (ML20266G305)	252
Kraft, David	Nuclear Energy Information Service	Email (ML20269A357)	369
Kraft, David	Nuclear Energy Information Service	Meeting Transcript (NRC-0932)	98-38
Kral, Martin		Email (ML20097F495)	23
Kral, Martin		reg.gov (ML20099A103)	25
Kral, Martin		reg.gov (ML20099D841)	26
Kral, Martin		reg.gov (ML20100J345)	27
Kral, Martin		reg.gov (ML20101J871)	28
Kral, Martin		reg.gov (ML20107F975)	31
Kral, Martin		reg.gov (ML20108F616)	73
Kral, Martin		reg.gov (ML20114E094)	75
Kral, Martin		reg.gov (ML20115E323)	76
Kral, Martin		reg.gov (ML20119A008)	78
Kral, Martin		reg.gov (ML20120A543)	84
Kral, Martin		reg.gov (ML20121A140)	86

Table D–2 Table of Commenter Names and Affiliations			
Kral, Martin		reg.gov (ML20128J275)	65
Kral, Martin		reg.gov (ML20140A306)	66
Kral, Martin		reg.gov (ML20161A012)	94
Kral, Martin		reg.gov (ML20169A645)	253
Kral, Martin		reg.gov (ML20233A248)	273
Kral, Martin		reg.gov (ML20239A747)	274
Kral, Martin		reg.gov (ML20239A749)	275
Kral, Martin		reg.gov (ML20239B006)	276
Krause, Randall		Email (ML20183A151)	132
Kray, Marilyn	American Nuclear Society	Email (ML20114E247)	34
Kuerschner, Waltraud		Email (ML20267A062)	416
Lacy, Ann		Email (ML20268A038)	201
LaForge, John	Nukewatch	Meeting Transcript (ML20240A269)	167-3
Lambert, Sylvia		Email (ML20267A052)	302
Lamont, Susa		Email (ML20268A042)	202
Laveta, Tawnya		Email (ML20247J473)	216
Lee, Jonathan		Email (ML20268C332)	331
Lee, Michel	Council on Intelligent Energy & Conservation Policy and Promoting Health and Sustainable Energy	Meeting Transcript (NRC-0932)	98-21
Lee, Michel	Council on Intelligent Energy & Conservation Policy and Promoting Health and Sustainable Energy	reg.gov (ML20267A227)	293
Lee, Michelle		Meeting Transcript (ML20252A171)	170-8
Levine, Valerie		Email (ML20237F386)	181
Lewis, Marvin		Meeting Transcript (ML20240A269)	167-10
Lewis, Marvin		Meeting Transcript (NRC-0932)	98-44
Lewis, Sherry	San Luis Obispo Mothers for Peace	Email (ML20189A185)	135
Lewis, Sherry	San Luis Obispo Mothers for Peace	Email (ML20268C338)	333
Lewison, Linda	Nuclear Information and Resource Service	Meeting Transcript (ML20240A269)	167-5
Lewison, Linda	Nuclear Information and Resource Service	Meeting Transcript (ML20244A154)	168-9
Lewison, Linda	Nuclear Information and Resource Service	Meeting Transcript (ML20252A171)	170-21
Lieberman, Sharon and Jim		Email (ML20114E252)	35

Table D–2 Table of Commenter Names and Affiliations			
Lieberman, Sharon and Jim		Email (ML20179A015)	121
Lieberman, Sharon and Jim		Email (ML20226A008)	173
Livers, Paulette		reg.gov (ML20266G505)	283
Llanes, Bridget		Email (ML20269A243)	363
Lloyd, Robin		Email (ML20265A081)	235
Lodge, Terry		Email (ML20086P309)	1
Lodge, Terry		Meeting Transcript (ML20252A171)	170-25
Lodge, Terry	Citizens' Environmental Coalition	Email (ML20269A393)	372
Lodge, Terry	Don't Waste Michigan	Email (ML20269A393)	372
Lodge, Terry	Nuclear Energy Information Service	Email (ML20269A393)	372
Lodge, Terry	Nuclear Issues Study Group	Email (ML20269A393)	372
Lodge, Terry	Public Citizen, Inc.	Email (ML20269A393)	372
Lodge, Terry	San Luis Obispo Mothers for Peace	Email (ML20269A393)	372
Longsworth, Jonathan		Email (ML20119A477)	50
Lopez, Antoinette Sedillo	New Mexico State Senate	Email (ML20268C343)	335
Lopez, Linda	New Mexico State Senate	Email (ML20268C343)	335
Lovato, Anhara		Email (ML20211L759)	151
Lowe, John	City of Carlsbad, NM	Meeting Transcript (ML20244A154)	168-13
Lowe, John	City of Carlsbad, NM	Meeting Transcript (NRC-0932)	98-6
Luehring, Lester		reg.gov (ML20119A525)	80
Lundeen, Kelly		Meeting Transcript (ML20197A225)	99-12
Lynne, Martha		reg.gov (ML20267A178)	289
Magrath, Barney		Email (ML20179A355)	128
Malyon, Hilary		Email (ML20115E244)	43
Marford, Sean		Meeting Transcript (ML20197A225)	99-3
Marida, Patricia		Meeting Transcript (ML20252A171)	170-13
Marida, Patricia		Meeting Transcript (NRC-0932)	98-51
Mark, Dara		Email (ML20195A485)	140
Mark, Dara		Email (ML20195A486)	140
Martinez, Richard	New Mexico State Senate	Email (ML20191A399)	139
Martinez, Rudolpho	New Mexico State Legislature	Email (ML20268C343)	335
Martinez, Sofia		Meeting Transcript (ML20240A269)	167-14
Maxwell, Nick		Meeting Transcript (ML20197A225)	99-33

Table D–2	Table of Commenter Names and Affiliations		
Maxwell, Nick		Meeting Transcript (ML20240A269)	167-15
Maxwell, Nick		Meeting Transcript (ML20245E172)	169-14
Maxwell, Nick		Meeting Transcript (ML20245E172)	169-18
McCoy, David	Citizen Action New Mexico	Email (ML20267A107)	240
McCoy, David	Citizen Action New Mexico	Email (ML20268C276)	319
McCoy, David	Citizen Action New Mexico	Meeting Transcript (ML20197A225)	99-20
McCoy, David	Citizen Action New Mexico	Meeting Transcript (ML20240A269)	167-7
McCoy, David	Citizen Action New Mexico	Meeting Transcript (ML20245E172)	169-15
McCoy, David	Citizen Action New Mexico	Meeting Transcript (ML20245E172)	169-4
McCoy, David	Citizen Action New Mexico	Meeting Transcript (NRC-0932)	98-30
McCullum, Rodney	Nuclear Energy Institute	Meeting Transcript (NRC-0932)	98-33
Mcdowell, Holly		Email (ML20269A450)	426
McLeod, Mike	XCEL Energy	Meeting Transcript (NRC-0932)	98-53
McManus, Cal		Email (ML20269A234)	362
McManus, Cal		Email (ML20269A362)	402
McMurrian, Katrina	Nuclear Waste Strategy Coalition (NWSC)	Email (ML20269A397)	250
McMurrian, Katrina	Nuclear Waste Strategy Coalition (NWSC)	Meeting Transcript (ML20197A225)	99-5
McReynolds, John		Email (ML20211L739)	148
Mead, Craig	Owl Nation	Email (ML20268A039)	313
Meeks, Mark		Email (ML20235J237)	208
Mellon, Cynthia		Email (ML20269A128)	355
Melody, Moya		reg.gov (ML20120A018)	82
Mennel-Bell, Mari		Email (ML20178A660)	115
Mermelstein, Jon		Email (ML20233A857)	177
Mermelstein, Keith		Email (ML20150A322)	91
Mermelstein, Keith		Email (ML20182A000)	91
Merrill, Carol		Meeting Transcript (ML20197A225)	99-30
Metzler, Caroline		Email (ML20161A134)	96
Miller, Basia		Email (ML20183A291)	165
Miller, Basia		Email (ML20266G299)	390
Mirsky, Susan		Email (ML20260H311)	229
Mitchell, Larry	Carlsbad Department of Development	Email (ML20226A076)	175
Moloney, Dorothy		Email (ML20083L251)	12
Moloney, Dorothy		Email (ML20118C289)	48
Mondragon, April		Email (ML20199M204)	166
Montes, Ivan		Email (ML20178A374)	112

Table D–2 Table of Commenter Names and Affiliations			
Montgomery, Bruce	Nuclear Energy Institute	Meeting Transcript (ML20244A154)	168-19
Montgomery, Bruce	Nuclear Energy Institute	Meeting Transcript (ML20245E172)	169-13
Montgomery, Bruce	Nuclear Energy Institute	Meeting Transcript (ML20252A171)	170-17
Montoya, Danielle		Email (ML20268C346)	246
Moore, Tansey	Tribal Radioactive Materials Transportation Committee	reg.gov (ML20267A177)	288
Morgan, Leona	Nuclear Issues Study Group	Email (ML20269A362)	401
Morgan, Leona	Nuclear Issues Study Group	Meeting Transcript (ML20197A225)	99-7
Morgan, Leona	Nuclear Issues Study Group	Meeting Transcript (ML20240A269)	167-2
Morgan, Leona	Nuclear Issues Study Group	Meeting Transcript (NRC-0932)	98-29
Mueller, Guntram		Email (ML20259A252)	227
Mueller, Rebecca		reg.gov (ML20196L983)	263
Mullany, Jim		Email (ML20191A394)	137
Munoz, George	New Mexico State Senate	Meeting Transcript (NRC-0932)	98-12
Murphy-Young, Paige		Email (ML20268C354)	339
Nelson, Pam		Email (ML20118C288)	47
Nelson, Scott D.		Email (ML20114E261)	41
Nesbit, Steve	American Nuclear Society	Meeting Transcript (NRC-0932)	98-39
Nesser, Brad		Email (ML20266J494)	238
Nguyen, M		Email (ML20265A085)	296
Niemann, Jo		reg.gov (ML20108F523)	72
Noel, Susan		reg.gov (ML20259A246)	316
Norris, Dwayne	Albuquerque Teachers Federation	Email (ML20268C341)	246
Norwood, Nancy	San Luis Obispo Mothers for Peace	Email (ML20189A185)	135
Norwood, Nancy	San Luis Obispo Mothers for Peace	Email (ML20268C338)	333
Novak, Marilyn		Email (ML20259A245)	226
O'Neil, Laurie		Email (ML20268A021)	197
Ogella, Edith		Email (ML20083K425)	7
Olea, Jacqui		Email (ML20115E242)	42
Ooley, Nancy		Email (ML20269A047)	419
Ostiguyu, Nancy		Email (ML20266G498)	412
Overlock, Christopher		Email (ML20126G325)	54
Overlock, Christopher		reg.gov (ML20126G323)	63
Padilla, Elizabeth		Email (ML20268C353)	206
Padilla, Patrick	EOG Resources, Inc.	Email (ML20179A268)	122
Paladin, John		Email (ML20178A375)	113

Table D–2 Table of Commenter Names and Affiliations

Papen, Mary Kay	New Mexico Senate	Meeting Transcript (NRC-0932)	98-10
Parry, Ronald		Email (ML20266H611)	414
Peirce, Susan		Email (ML20213B109)	155
Peirce, Susan		reg.gov (ML20143A000)	88
Peixinho, Mateo		Meeting Transcript (ML20197A225)	99-19
Penkala, Stanley		Email (ML20268A064)	317
Perales, Monica		Meeting Transcript (NRC-0932)	98-56
Perales, Monica	Fasken Oil and Ranch	Meeting Transcript (ML20245E172)	169-10
Perkins, Elizabeth		Email (ML20114E253)	36
Perrotte, Marlene		reg.gov (ML20267A619)	252
Piburn, Coleman		reg.gov (ML20126G319)	61
Pino, Paul		Email (ML20269A108)	348
Pinto, Shannon	New Mexico State Senate	Email (ML20268C343)	335
Pope, Karen		reg.gov (ML20267A161)	295
Propst, Sarah	New Mexico Energy, Minerals and Natural Resources Department	Email (ML20268C296)	322
Pyle, Sasha		Email (ML20267A643)	196
R, R		Email (ML20268A033)	199
Ramsay, Rebecca		Meeting Transcript (NRC-0932)	98-18
Ramsay, Rebecca		reg.gov (ML20087F111)	30
Rase, Greg		Meeting Transcript (ML20244A154)	168-8
Reade, Deborah		Email (ML20267A620)	307
Reed, Fran		Email (ML20248H394)	218
Reed, Robert		Email (ML20083K158)	3
Rein, Gail		Email (ML20136A113)	58
Reppenhagen, Garett		Email (ML20269A327)	366
Resnikoff, Marvin	Radioactive Waste Management Associates	reg.gov (ML20266G509)	285
Rhodes, Geri		Email (ML20199M197)	147
Rice, Nancy		Email (ML20191A381)	136
Richard, Pamela		Email (ML20119B067)	51
Richter, Mark	Nuclear Energy Institute	Meeting Transcript (ML20197A225)	99-10
Riseley, Mary Burton		Email (ML20267A531)	303
Rivera, Alondra		Email (ML20182A001)	164
Rivera, Bianca		Meeting Transcript (ML20197A225)	99-39
Rivera, Ethyl		Meeting Transcript (ML20252A171)	170-27
Roddy, Steve		Email (ML20237F375)	180

Table D–2	Table of Commenter Names and Affiliations		
Rodriguez, Ed	Carlsbad City Council	Meeting Transcript (NRC-0932)	98-3
Rodriguez, Isaac		Email (ML20269A123)	351
Rodriguez, Nancy	New Mexico State Senate	Email (ML20268C343)	335
Romeling, Shannon	Amigos Bravos	Email (ML20268C323)	329
Romero, Andrea	New Mexico State Legislature	Email (ML20268C343)	335
Rosen, David		Email (ML20238C076)	183
Rosen, David		Email (ML20265A088)	393
Roxlau, Kathy		Email (ML20083L399)	16
Rubio, Angelica	New Mexico State Legislature	Email (ML20268C343)	335
Rubio, Angelica	New Mexico State Legislature	Meeting Transcript (NRC-0932)	98-46
Salazar, Jesus		reg.gov (ML20267A188)	291
Salazar, Maria		Email (ML20178A781)	163
Salhab, Monique		Email (ML20269A326)	365
Sanchez, Kathy	Tewa Women United	Email (ML20266G348)	391
Sanders, Sandy		Email (ML20241A042)	212
Sarinana, Debra	New Mexico State Legislature	Email (ML20268C343)	335
Sattison, Martin	Idaho Section American Nuclear Society	reg.gov (ML20211M152)	264
Sayre, Johannes		Email (ML20231A120)	384
Schlies, Dianne		Email (ML20118C291)	49
Schunk, Toby		Email (ML20269A454)	427
Schuurman, Susan		Meeting Transcript (NRC-0932)	98-24
Scott, David	XTO Energy. Inc.	Email (ML20268C261)	203
Scott, Georges		Meeting Transcript (NRC-0932)	98-57
Scott, Larry	New Mexico State	Meeting Transcript (NRC-0932)	98-13
Seamster, Teresa		Meeting Transcript (ML20197A225)	99-35
Seeley, Linda	San Luis Obispo Mothers for Peace	Email (ML20189A185)	135
Seeley, Linda	San Luis Obispo Mothers for Peace	Email (ML20191A395)	138
Seeley, Linda	San Luis Obispo Mothers for Peace	Email (ML20268C338)	333
Sellers, Janet		Email (ML20083K393)	6
Seltzer, Elizabeth		reg.gov (ML20226A176)	268
Sena, Jonathan	Lea County Commission	Meeting Transcript (NRC-0932)	98-5
Seydel, G Robin	Citizens for Alternatives to Radioactive Dumping	Email (ML20268A005)	310
Shaughnessy, Brendan		Email (ML20269A017)	248
Shaughnessy, Brendan		Email (ML20269A020)	249

Table D–2 Table of Commenter Names and Affiliations			
Shaughnessy, Brendan		Meeting Transcript (ML20197A225)	99-21
Shaughnessy, Eileen		Meeting Transcript (ML20197A225)	99-14
Shaughnessy, Eileen		Meeting Transcript (NRC-0932)	98-23
Shaughnessy, Noreen		Meeting Transcript (ML20197A225)	99-18
Shaughnessy, Terrence		Meeting Transcript (ML20197A225)	99-34
Sheely, Patricia		Email (ML20244A219)	215
Shepperd, Ben	Permian Basin Petroleum Association	Email (ML20213B141)	156
Shirley, Jason		Email (ML20267A380)	241
Shoup, Kayley		Email (ML20266J953)	415
Simpson, Robert		Email (ML20174A660)	158
Siwik, Allyson	Gila Resources Information Project	Email (ML20269A231)	360
Skerman, Susan		Meeting Transcript (ML20197A225)	99-36
Skopic, Catherine		Email (ML20268C348)	337
Skopic, Catherine		Email (ML20269A098)	347
Skopic, Katherine		Meeting Transcript (ML20197A225)	99-4
Small, Sue		reg.gov (ML20211M197)	266
Smith, Judy		Meeting Transcript (NRC-0932)	98-42
Smith, Tom	Public Citizen, Texas Office	Meeting Transcript (NRC-0932)	98-48
Smith, William	Utility Workers Union of America	Email (ML20275A334)	251
Smock, Sharon		Email (ML20114E255)	38
Smock, Sharon		Email (ML20226A004)	172
Smock, Sharon		reg.gov (ML20086J215)	22
Snyder, Melanie	WIEB HLRWC	reg.gov (ML20267A329)	286
Sondheim, Steven		Meeting Transcript (ML20197A225)	99-24
Sondheim, Steven		Meeting Transcript (ML20252A171)	170-24
Soria, Sandra		Email (ML20181A591)	129
Sprinkle, Jim		Email (ML20120A448)	52
Sprinkle, Jim		Email (ML20237F349)	179
Stanfield, Lee		reg.gov (ML20267A172)	271
Stanley, Judith		Email (ML20266G396)	406
Steele, Joanne		reg.gov (ML20266G402)	281
Stefanics, Elizabeth	New Mexico State Senate	Email (ML20268C343)	335
Steinborn, Jeff	New Mexico State Senate	Email (ML20268C343)	335

Table D–2 Table of Commenter Names and Affiliations			
Steinborn, Jeff	New Mexico State Senate	Meeting Transcript (ML20197A225)	99-27
Steinborn, Jeff	New Mexico State Senate	Meeting Transcript (ML20252A171)	170-20
Steinborn, Jeff	New Mexico State Senate	Meeting Transcript (NRC-0932)	98-11
Stern Broad, Yolanda		Email (ML20122A027)	53
Stewart, Mimi	New Mexico State Senate	Email (ML20268C343)	335
Summer, Rebecca		Email (ML20179A348)	126
Sutton, Patrice	Physicians for Social Responsibility	Meeting Transcript (ML20244A154)	168-6
Swanson, Jane	San Luis Obispo Mothers for Peace	Email (ML20189A185)	135
Swanson, Jane	San Luis Obispo Mothers for Peace	Email (ML20268C338)	333
Takats, Ferenc		Email (ML20269A205)	383
Tallman, Bill	New Mexico State Senate	Email (ML20268C343)	335
Tandrow, Marilyn		Email (ML20268A023)	198
Tapley, Dennis		reg.gov (ML20120A020)	83
Taylor, Wallace	Sierra Club	Email (ML20266G300)	237
Taylor, Wallace	Sierra Club	Email (ML20275A324)	237
Taylor, Wallace	Sierra Club	Meeting Transcript (NRC-0932)	98-40
Temple, Edward		Email (ML20269A055)	420
Thatcher, Tami		Email (ML20268C298)	323
Thatcher, Tami		Meeting Transcript (ML20245E172)	169-11
Thatcher, Tami		Meeting Transcript (ML20245E172)	169-19
Thatcher, Tami		Meeting Transcript (ML20252A171)	170-23
Thomas, Ellen	Women's International League for Peace and Freedom, Western Carolina Branch, and Proposition One Cam	Meeting Transcript (NRC-0932)	98-41
Thompson, Sally-Alice		Email (ML20267A631)	195
Thomson, Elizabeth	New Mexico State Legislature	Email (ML20268C343)	335
Tipton-Katzman, Judy		Email (ML20139A081)	59
Todd, David		reg.gov (ML20086J069)	17
Townsend, Patricia K.		Email (ML20260H188)	189
Trabaudo, Alice		Email (ML20224A222)	171
Treichel, Judy	Nevada Nuclear Waste Task Force	Email (ML20160A142)	46
Trujillo, Christine	New Mexico State Legislature	Email (ML20268C343)	335
Trujillo, Lynn	New Mexico Indian Affairs Department	Email (ML20268C342)	334
Tsosie-Peña, Beata	Tewa Women United	Email (ML20268C347)	399

Table D–2 Table of Commenter Names and Affiliations			
Turco, Diane	Cape Downwinders	Email (ML20265A091)	394
Turko, Diane	Cape Downwinders	Meeting Transcript (ML20252A171)	170-28
Turman, Vance		Email (ML20268C279)	205
Turner, Bill		Meeting Transcript (ML20244A154)	168-24
Ulloth, John		Email (ML20269A374)	371
Vaile, Barbara		Email (ML20147A186)	89
van Rossum, Maya	Delaware Riverkeeper Network	Email (ML20258A116)	224
Vetter, M		Email (ML20268C236)	392
Villegas, Lorraine		Meeting Transcript (ML20197A225)	99-28
Volkmann, Wendy		Email (ML20083L130)	8
Volpato, Jack		Email (ML20142A223)	71
Volpato, Jack		Meeting Transcript (NRC-0932)	98-45
Walker, Kalene		Meeting Transcript (ML20252A171)	170-4
Walker, Kayleen		Meeting Transcript (ML20197A225)	99-22
Wallace, Cathy		Email (ML20265A377)	395
Walterscheid, Mark	Carlsbad City Council	Meeting Transcript (NRC-0932)	98-2
Warren, Barbara	Citizens' Environmental Coalition	Email (ML20268C299)	324
Warren, Barbara	Citizens' Environmental Coalition	Email (ML20268C319)	324
Warren, Barbara	Citizens' Environmental Coalition	Meeting Transcript (ML20197A225)	99-11
Warren, Barbara	Citizens' Environmental Coalition	Meeting Transcript (ML20252A171)	170-7
Watchempino, Laura		Email (ML20178A042)	162
Watchempino, Laura		Email (ML20269A398)	373
Waters, John		Meeting Transcript (NRC-0932)	98-55
Waters, Judi		reg.gov (ML20176A336)	257
Weber, Hannalore		Email (ML20114E254)	37
Webster, Mark		reg.gov (ML20119A534)	81
Weehler, Cynthia	Energia Mia	reg.gov (ML20266G305)	252
Weehler, Cynthia	Nuclear Issues Study Group	Email (ML20269A127)	354
Weiss, Danny		reg.gov (ML20191A191)	262
Wertheim, Bianca Ortiz	New Mexico Department of Homeland Security and Emergency Management	Email (ML20268C263)	204
Wheeler, Cynthia		Meeting Transcript (ML20197A225)	99-9
Wheeler, Cynthia		Meeting Transcript (ML20244A154)	168-1

Table D–2 Table of Commenter Names and Affiliations			
Wheeler, Cynthia		Meeting Transcript (ML20245E172)	169-2
Wheeler, Cynthia		Meeting Transcript (ML20252A171)	170-2
Wheeler, Cynthia		Meeting Transcript (NRC-0932)	98-37
Whiting, Carolyn		Email (ML20164A006)	109
Whitworth-Smith, Pauline		Email (ML20269A011)	342
Williams, Mary Jane		Meeting Transcript (ML20245E172)	169-7
Williamson, Katherine		Meeting Transcript (ML20197A225)	99-32
Wilson, Megan		Email (ML20266J873)	301
Wirth, Peter	New Mexico State Senate	Email (ML20268C343)	335
Wisoff, Barbara		Email (ML20266G401)	407
Witte, Jeff	New Mexico Department of Agriculture	Email (ML20268C302)	326
Wooten, Kathy		Email (ML20083L283)	13
Wooten, Kathy		reg.gov (ML20086J150)	20
Wooten, Kathy		reg.gov (ML20086J242)	24
Wyant, Jeff		Email (ML20269A389)	424
Wyosnick, David		Email (ML20268C352)	338
Yazzie, Janene		Meeting Transcript (ML20240A269)	167-11
Yoshikawa, Ken		reg.gov (ML20266G50)	282
Zabarte, Ian	Western Bands of the Shoshone Nation of Indians	Meeting Transcript (NRC-0932)	98-26
Zabarte, Ian	Western Bands of the Shoshone Nation of Indians	reg.gov (ML20176A334)	256
ZamEk, Jill	San Luis Obispo Mothers for Peace	Email (ML20189A185)	135
ZamEk, Jill	San Luis Obispo Mothers for Peace	Email (ML20268C338)	333
Zelnio, Diana		Email (ML20227A024)	176
Zelnio, Diana		Email (ML20238C072)	210
Zelnio, Diana		reg.gov (ML20121A010)	85

NRC FORM 335 U.S. NUCLEAR REGULATORY COMMISSION
(12-2010)
NRCMD 3.7

BIBLIOGRAPHIC DATA SHEET

(See instructions on the reverse)

1. REPORT NUMBER
(Assigned by NRC, Add Vol., Supp., Rev., and Addendum Numbers, if any.)
NUREG-2237
Final

2. TITLE AND SUBTITLE
Environmental Impact Statement for the Holtec International's License Application for a Consolidated Interim Storage Facility for Spent Nuclear Fuel

Final Report

3. DATE REPORT PUBLISHED

MONTH	YEAR
July	2022

4. FIN OR GRANT NUMBER

5. AUTHOR(S)

6. TYPE OF REPORT
Technical

7. PERIOD COVERED (Inclusive Dates)

8. PERFORMING ORGANIZATION - NAME AND ADDRESS (If NRC, provide Division, Office or Region, U. S. Nuclear Regulatory Commission, and mailing address; if contractor, provide name and mailing address.)
Office of Nuclear Material, Safety and Safeguards
U.S. Nuclear Regulatory Commission
11545 Rockville Pike
Rockville, MD 20852

9. SPONSORING ORGANIZATION - NAME AND ADDRESS (If NRC, type "Same as above", if contractor, provide NRC Division, Office or Region, U. S. Nuclear Regulatory Commission, and mailing address.)
Same as above

10. SUPPLEMENTARY NOTES
Prepared

11. ABSTRACT (200 words or less)
The U.S. Nuclear Regulatory Commission (NRC) prepared this final environmental impact statement (FEIS) as part of its environmental review of the Holtec International (Holtec) license application to construct and operate a consolidated interim storage facility (CISF) for spent nuclear fuel (SNF) and Greater-Than Class C waste, along with a small quantity of mixed oxide fuel. The proposed CISF would be located in southeast New Mexico at a site located approximately halfway between the cities of Carlsbad and Hobbs, New Mexico. This FEIS includes the NRC staff's evaluation of the environmental impacts of the proposed action and the No-Action alternative. The proposed action is the issuance of an NRC license authorizing the initial phase (Phase 1) of the project to store up to 8,680 metric tons of uranium (MTUs) [9,568 short tons] in 500 canisters for a license period of 40 years. Holtec plans to subsequently request amendments to the license to store an additional 500 canisters for each of 19 expansion phases of the proposed CISF (a total of 20 phases), to be completed over the course of 20 years, and to expand the proposed facility to eventually store up to 10,000 canisters of SNF. Holtec's expansion of the proposed project (i.e., Phases 2-20) is not part of the proposed action currently pending before the agency. However, as a matter of discretion, the NRC staff considered these expansion phases in its description of the affected environment and impact determinations in this DEIS, where appropriate, when the environmental impacts of the potential future expansion can be determined so as to conduct a bounded analysis for the proposed CISF project.

12. KEY WORDS/DESCRIPTORS (List words or phrases that will assist researchers in locating the report.)
environment, environmental impact, cumulative, impacts, consolidated interim storage, spent fuel, storage facility, Holtec, CISF, interim

13. AVAILABILITY STATEMENT
unlimited

14. SECURITY CLASSIFICATION
(This Page)
unclassified
(This Report)
unclassified

15. NUMBER OF PAGES

16. PRICE

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

OFFICIAL BUSINESS

@NRCgov

NUREG-2237
Final

Environmental Impact Statements for Holtec International's License Application for a Consolidated Interim Storage Facility for Spent Nuclear Fuel in Lea County, New Mexico

July 2022