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NUREG-2268

Environmental Impact Statement for the Construction Permit Application for Kemmerer Power Station Unit 1

Draft Report for Comment

Office of Nuclear Material Safety and Safeguards

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NUREG-2268

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Draft Report for Comment

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U.S. Department of Energy

COMMENTS ON DRAFT REPORT

Proposed Action Issuance of construction permit for Kemmerer Power Station Unit 1 in Lincoln County, Wyoming

Type of Statement Draft Environmental Impact Statement

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Comments:

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COVER SHEET

Responsible Agency: U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards

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Title: *Environmental Impact Statement for the Construction Permit Application for Kemmerer Power Station Unit 1*

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ABSTRACT

The U.S. Nuclear Regulatory Commission (NRC) prepared this environmental impact statement (EIS) in response to an application submitted by TerraPower, LLC (TerraPower) on behalf of US SFR Owner, LLC (USO), a wholly owned subsidiary of TerraPower, for a construction permit (CP) for a Natrium advanced reactor at a site in Lincoln County, Wyoming designated as Kemmerer Power Station Unit 1 (Kemmerer Unit 1). USO plans to build and operate Kemmerer Unit 1 to demonstrate the Natrium advanced reactor while ultimately replacing electricity generation capacity in the PacifiCorp service area following planned retirement of existing coal-fired facilities (TerraPower 2024-TN10896). This EIS evaluates the environmental impacts of the proposed action and the following alternatives to the proposed action: (1) the no-action alternative (i.e., denying the CP application) and (2) building the proposed Natrium advanced reactor at a different location.

After weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering reasonable alternatives, the NRC staff recommends, unless safety issues mandate otherwise, that the NRC issue the requested CP to USO. This recommendation is based on:

- USO's environmental report (included as part of the CP application), information gathered during the NRC staff's environmental audit, and responses from USO to requests from the NRC staff for clarifying information
- the NRC staff's consideration of public comments received during the scoping process
- the NRC staff's consultation with Federal, State, Tribal, and local agencies
- the NRC staff's independent environmental review

The NRC staff recommendation in this draft EIS is preliminary. Before making a final recommendation in the final EIS, the NRC staff will also consider comments received on the draft EIS from Federal, State, Tribal, and local agencies, as well as from members of the public.

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EXECUTIVE SUMMARY

Background

By letter dated March 28, 2024 (TerraPower 2024-TN10896), TerraPower, LLC (TerraPower) on behalf of US SFR Owner, LLC (USO), a wholly owned subsidiary of TerraPower, submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for a construction permit (CP) pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities" (TN249), that would allow the construction of a Natrium advanced reactor at a site in Lincoln County, Wyoming designated as Kemmerer Power Station Unit 1 (Kemmerer Unit 1). Section 103 of the Atomic Energy Act of 1954, as amended (42 *United States Code* [U.S.C.] 2011 et seq.) (TN663), and its implementing regulations authorize the NRC to issue CPs for production or utilization facilities. To issue a CP, the NRC is required to consider the environmental impacts of the proposed action under the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.) (NEPA) (TN661). The NRC's regulations that implement NEPA in 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions" (TN10253), describe several types of actions that would require an environmental impact statement (EIS). Issuance of a CP to construct a nuclear power reactor is identified in 10 CFR 51.20(b) (TN10253) as one such type of action.

Upon acceptance of the Kemmerer Unit 1 CP application, the NRC staff began the environmental review process described in 10 CFR Part 51 (TN10253) by publishing in the *Federal Register* a notice of intent to prepare an EIS and to conduct a scoping process (89 FR 49917-TN11133). In support of the preparation of this EIS, the NRC staff:

- considered public comments received during the 60-day scoping process that began on June 12, 2024;
- conducted a public EIS scoping meeting in Kemmerer, Wyoming, on July 16, 2024;
- reviewed USO's environmental report (ER) submitted as part of the CP application following the content and organization of the NRC's Regulatory Guide 4.2, Revision 3, "Preparation of Environmental Reports for Nuclear Power Stations" (NRC 2018 – TN6006), and used the review guidance in NUREG-1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants" (NRC 2013-TN3547);
- conducted a full-scope environmental audit addressing the proposed site that began in June 2024 and ended in August 2024; and
- consulted with Federal, State, Tribal, and local agencies.

Proposed Federal Action

The proposed Federal action is for the NRC to decide whether to issue a CP to USO, a wholly owned subsidiary of TerraPower, under 10 CFR Part 50 (TN249) that would allow the construction of Kemmerer Unit 1. If the NRC were to issue the CP, USO could build the proposed Natrium advanced reactor on an approximately 290-acre (ac) (117.4 hectare [ha]) site in Lincoln County, Wyoming, approximately 3 miles (mi) (4.8 kilometers [km]) south of the City of Kemmerer, Wyoming.

The issuance of a CP by the NRC is a separate licensing action from the issuance of an operating license (OL), which allows the operation of facilities built pursuant to a CP. The NRC would perform a separate environmental review for an OL application, if submitted. To obtain an OL, USO would have to submit a separate OL application pursuant to NRC requirements, and USO would have to receive the OL before operating the reactor. To support a complete and effective environmental review, this EIS addresses the potential environmental impacts of the construction of Kemmerer Unit 1, and a discussion of its operations and decommissioning is also provided to aid in the analysis of the entire life-cycle phases of Kemmerer Unit 1. Potential impact determinations are assigned for resource areas that may be affected by construction but are not assigned to the discussion of operations and decommissioning in this EIS. If, however, USO were to apply for an OL for Kemmerer Unit 1, the NRC staff would prepare a supplement to this EIS in accordance with 10 CFR 51.95(b) and therein analyze operations and decommissioning impacts with this more specific information.

The proposed U.S. Department of Energy (DOE) Federal action is the decision whether to provide financial assistance to USO, through TerraPower, to demonstrate the Natrium advanced reactor. DOE must conduct a NEPA review prior to authorizing the expenditure of Federal funds. As part of a Memorandum of Agreement between the NRC and DOE, these parties have agreed to conduct a NEPA review of the Kemmerer Unit 1 project that reflects the obligations of both DOE in its role as funding agency and the NRC in its role as regulator.

Purpose and Need for the Proposed Federal Action

The purpose and need for the proposed Federal action is to allow USO to build Kemmerer Unit 1 to demonstrate the Natrium advanced reactor and to replace electricity generation capacity in the PacifiCorp service area following planned retirement of existing coal-fired facilities.

USO, through TerraPower, participates in DOE’s Advanced Reactor Demonstration Program, the goal of which is to speed the demonstration of advanced nuclear reactors through cost-shared partnerships with U.S. industry. DOE, as a cooperating agency, needs to respond to USO’s request for financial assistance through the cost-shared partnership to complete construction activities for Kemmerer Unit 1, which would further the design and construction of USO’s Natrium advanced reactor.

Environmental Impacts of the Proposed Federal Action

In preparing this EIS, the NRC staff, its contractor staff, and DOE staff, referred to collectively as the review team, reviewed and evaluated the CP application, including USO’s ER, and consulted with Federal, State, Tribal, and local agencies. This EIS evaluates the potential environmental impacts of the proposed action of Kemmerer Unit 1 CP issuance. The environmental impacts of the proposed action are designated as SMALL, MODERATE, or LARGE, as those terms are defined in NUREG-1555 (NRC 2013-TN3547):

> **SMALL**: Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. For the purposes of assessing radiological impacts, the NRC has concluded that those impacts that do not exceed permissible levels in the NRC’s regulations are considered SMALL.

> **MODERATE**: Environmental effects are sufficient to noticeably alter important attributes of the resource but not to destabilize them.

> **LARGE**: Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

Table ES-1 summarizes the review team's determinations of environmental impacts of the proposed action by environmental resource area.

Alternatives to the Proposed Federal Action

In addition to the environmental impacts of the proposed action, the review team also evaluated the environmental impacts of the following alternatives to the proposed action of Kemmerer Unit 1 CP issuance for the proposed site in Kemmerer, Wyoming:

- not issuing the CP (i.e., the no-action alternative); or
- construction of the Natrium advanced reactor at alternative sites—the Naughton 12 site and the Jim Bridger 22 site—both located in the State of Wyoming.

The review team evaluated each alternative using the same resource areas that were used in the evaluation of the environmental impacts of the proposed action. The no-action alternative does not meet the purpose and need of the proposed action. Based on the analysis of alternative sites for the Natrium advanced reactor, the NRC staff concluded that there are no environmentally preferrable alternatives to the proposed action considering that although each alternative site would meet the purpose and need of the proposed action, they would also result in potential environmental impacts to affected resources.

Recommendation

After weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering reasonable alternatives, the NRC staff preliminarily recommends, unless safety issues mandate otherwise, that the NRC issue the requested CP to USO. This preliminary recommendation is based on:

- USO's environmental report (included as part of the CP application), information gathered during the review team's environmental audit, and responses from USO to requests from the review team for clarifying information
- the review team's consideration of public comments received during the scoping process
- the review team's consultation with Federal, State, Tribal, and local agencies
- the review team's independent environmental review

Table ES-1 Summary of Environmental Impacts of the Proposed Action of Kemmerer Unit 1 Construction Permit Issuance

Resource Area	Summary of Impact	Impact Level
Land use and visual resources	Approximately 218 ac onsite would be disturbed by preconstruction and construction activities. The construction of a transmission corridor and water supply pipeline from the Naughton Power Plant to the proposed facility is anticipated to temporarily disturb approximately 216 ac. New facilities such as the reactor building, steam generator, turbine buildings, meteorological tower, and concrete batch plant would be among the tallest structures and most visible features in the area when completed. The proposed construction impacts are consistent with the site's industrial zoning designation and with the land use goals of Lincoln County.	SMALL

Table ES-1 Summary of Environmental Impacts of the Proposed Action of Kemmerer Unit 1 Construction Permit Issuance (Continued)

Resource Area	Summary of Impact	Impact Level
Air quality	Potential impacts to air quality are anticipated to be localized in and around the facility during construction activities. Any potential impact is expected to be temporary and to be minimized by compliance with Federal, State, and local regulations that govern construction activities and emissions. Additionally, any air quality impacts would be mitigated by fugitive dust, sediment, and erosion controls as well as phasing construction to minimize daily emissions. Air emission -producing equipment would be permitted under the Wyoming Department of Environmental Quality.	SMALL
Hydrology and water resources	Land surface modifications during preconstruction and construction activities could affect the local distribution of infiltration, recharge, and surface water runoff on the proposed site. Increased infiltration would occur down gradient of the proposed outfall. Any changes in recharge would be localized to the site and would affect only the shallow groundwater on the site property. Surface water runoff would be controlled using BMPs to minimize hydrologic alterations and surface water quality degradation. Dewatering would temporarily lower shallow groundwater levels around excavations. Groundwater extracted for dewatering would be routed to a stormwater detention pond for eventual discharge or would be used on the site for dust control or compaction. Use for dust control would require an appropriate permit from the Wyoming Department of Environmental Quality. Surface water use during construction activities would be a small fraction of excess capacity of the water supplier.	SMALL
Aquatic ecological resources	Potential impacts on the aquatic ecosystem from construction activities would mainly be associated with impacts to the North Fork Little Muddy Creek and the Muddy Creek basin from the construction of a new raw water line, a new water discharge line, and the stormwater management system. Streams onsite or in the transmission line corridor could be impacted by soil-disturbing activities that lead to soil erosion during site preparation and construction. Potential impacts would be temporary and minimized using BMPs.	SMALL
Terrestrial ecological resources	Permanent loss of a cumulative 218 ac of intermountain basin big sagebrush scrubland and greasewood flat on the site. Temporary disturbance of 216 ac of various natural terrestrial habitats in the utility corridor, of which approximately 118 ac would be permanently disturbed. Introduction of noise and vehicular activity into previously natural terrestrial setting. However, all affected habitats are common in the surrounding landscape and the proposed action is not likely to adversely affect resources protected under the Endangered Species Act. MODERATE impacts primarily reflect the introduction of a sizable complex of industrial features into a little-disturbed wild setting, including the introduction into that setting of transmission towers and conductors capable of injuring birds and other wildlife.	MODERATE

Table ES-1 Summary of Environmental Impacts of the Proposed Action of Kemmerer Unit 1 Construction Permit Issuance (Continued)

Resource Area	Summary of Impact	Impact Level
Historic and cultural resources	There are known historic and cultural resources within the direct and indirect area of potential effects. Construction activities may result in an adverse effect to two historic properties, including one site at the Kemmerer Unit 1 location and one site within the utility corridor. This impact determination may change to MODERATE if USO is able to avoid adverse effects to the two historic properties, or if the adverse effects are resolved through the execution of a memorandum of agreement. Consultation regarding the proposed action under Section 106 of the National Historic Preservation Act of 1966, as amended, is ongoing.	MODERATE to LARGE
Socioeconomics	Given the relatively small number of construction workers in the region, low unemployment, and specialized skill and crafts workers needed to construct the nuclear facility, the majority of construction workers would likely migrate temporarily into the region as each skill and craft is needed. The in-migration of skilled construction workers would increase the demand for temporary housing and traffic volumes on local roads during shift changes. Additional construction jobs would include increased tax revenue, traffic volumes on local roads, and demand for housing and public services. Most of the socioeconomic impacts would occur during peak construction (18–24 months) when the influx of workers to the region of influence (ROI) would lead to a noticeable population increase in the relatively small, sparsely populated ROI. Beneficial impacts of new tax revenue would occur after the peak construction period and would not be available as potential mitigation for adverse impacts during that period.	MODERATE to LARGE
Public and occupational health	Occupational hazards would be managed through compliance with Occupational Safety and Health Administration regulations in 29 CFR Part 1910 (TN654). Emissions would comply with the Clean Air Act (TN1141). The implementation of a Spill Prevention, Control, and Countermeasures Plan, BMPs, and site permits would limit adverse offsite effects during construction. Noise to members of the public would decrease with distance and is expected to be significantly less than safe noise levels to the nearest residence. Other than radioactive material being brought onsite, such as for compaction testing and radiography, there would be no other sources for direct occupational exposure or exposure to the public during construction.	SMALL
Nonradiological waste management	Construction debris created by excavation and land clearing would be either recycled or disposed offsite to a licensed facility. Liquid waste produced during construction would be stored and disposed according to regulations. Construction and commissioning water would be reused when possible. During construction, the applicant would follow all applicable BMPs and Federal, State, and local requirements and standards for handling, transporting, and disposing of nonradiological wastes.	SMALL

Table ES-1 Summary of Environmental Impacts of the Proposed Action of Kemmerer Unit 1 Construction Permit Issuance (Continued)

Resource Area	Summary of Impact	Impact Level
Transportation of Radioactive Material	No radioactive material would be transported during construction, and no radiological impacts are anticipated.	SMALL
Uranium fuel cycle and radiological waste management	No nuclear fuel would be present and no radiological waste would be generated during construction.	SMALL
Postulated Accidents	No nuclear fuel would be present during construction, and no radiological impacts are anticipated	SMALL

BMP = best management practice(s).

ABBREVIATIONS AND ACRONYMS

°C	degree(s) Celsius
°F	degree(s) Fahrenheit
μg/m^3	microgram(s) per cubic meter
μm	micrometer(s)
ac	acre(s)
ACHP	Advisory Council on Historic Preservation
AD/CE	Anno Domini/Common Era
ADAMS	Agencywide Documents Access and Management System
AGL	Above Ground Level
AIS	Aquatic Invasive Species Act of 2010
APE	area of potential effects
APWR	U.S. Advanced Pressurized-Water Reactor
ARDP	Advanced Reactor Demonstration Program
bgs	below ground surface
BLM	Bureau of Land Management
CFR	*Code of Federal Regulations*
cfs	cubic foot/feet per second
cm	centimeter(s)
CO	carbon monoxide
CO_2	carbon dioxide
CP	construction permit
CWIS	Cooling Water Intake Structure
DBA	design basis accidents
dBA	a-weighted decibel
DOE	U.S. Department of Energy
DOI	U.S. Department of Interior
DPS	Distinct Population Segment
EA	environmental assessment
EAB	Exclusion Area Boundary
EI	Energy Island

EIS	environmental impact statement
EMF	electromagnetic field
EPA	U.S. Environmental Protection Agency
EPR	Evolutionary Power Reactor
ER	environmental report
ESA	Endangered Species Act of 1973
FEMA	Federal Emergency Management Agency
FHB	fuel handling building
FR	*Federal Register*
ft	foot/feet
FWS	U.S. Fish and Wildlife Service
FY	fiscal year
gal	gallon(s)
GEIS	generic environmental impact statement
GHG	greenhouse gas
g/kW-hr	gram(s) per kilowatt-hour
GNF-A	Global Nuclear Fuels – America, LLC
gpm	gallon(s) per minute
Gy/day	gray(s) per day
ha	hectare(s)
HALEU	high-assay low-enriched uranium
in.	inch(es)
IPaC	Information for Planning and Consultation
IPCC	Intergovernmental Panel on Climate Change
IRP	Integrated Resource Plan
ISFSI	independent spent fuel storage installation
KDWWJPB	Kemmerer-Diamondville Water and Wastewater Joint Powers Board
Kemmerer Unit 1	Kemmerer Power Station Unit 1
km	kilometer(s)
kV	kilovolt(s)

L	liter(s)
L/s	liter(s) per second
LCF	latent cancer fatalities
LCGP	Large Construction General Permit
LLRW	low-level radioactive waste
LOS	Level-of-Service
Lpm	liter(s) per minute
LWMS	liquid waste management system
LWR	light-water reactor
m	meter(s)
m/s	meter(s) per second
m^3	cubic meter(s)
m^3/min	cubic meter(s) per minute
m^3/s	cubic meter(s) per second
Ma	million years ago (from present)
MACCS	MELCOR Accident Consequence Code System
MBTA	Migratory Bird Treaty Act
MDCT	mechanical draft cooling tower
MEI	maximally exposed individual
mg/L	milligram(s) per liter
MHz	megahertz
mi	mile(s)
mm	millimeter(s)
MOA	memorandum of agreement
mrad	millirad(s)
mrem	millirem(s)
MT	metric ton(s)
MTU	metric ton(s) of uranium
MWe	megawatt(s) electric
MWt	megawatt(s) thermal
NAAQS	National Ambient Air Quality Standards
Natrium reactor	Natrium advanced reactor
NAVD 88	American Vertical Datum of 1988
NEPA	National Environmental Policy Act of 1969
NERC	North American Electric Reliability Corporation

NFLMC	North Fork Little Muddy Creek
NHPA	National Historic Preservation Act of 1966
NI	Nuclear Island
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRC or Commission	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NWI	National Weather Inventory
NWR	national wildlife refuges
OCED	Office of Clean Energy Demonstrations
OL	operating license
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
pCi/L	picocurie(s) per liter
pH	potential of hydrogen
PM	particulate matter
PRISM	Power Reactor Innovative Small Modular
PSAR	preliminary safety analysis report
RAC	Reactor Air Cooling
rad/day	radiation-absorbed dose per day
RCP	representative concentration pathway
REMP	radiological environmental monitoring program
ROI	region of influence/interest
ROW	right-of-way
Ryr	reactor year
RWG	gaseous radwaste processing system
RWS	solid radwaste processing system
Rx Building	Reactor Building
SAMA	severe accident mitigation alternative
SAMDA	severe accident mitigation design alternative
SCB	Suckley’s cuckoo bumblebee

SFP	spent fuel pool
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Officer
SNF	spent nuclear fuel
SO_2	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasures
SSP	shared socioeconomic pathway
SWAP	State Wildlife Action Plan
SWPPP	stormwater pollution prevention plan
TerraPower	TerraPower, LLC
TFF	Test and Fill Facility
TPY	ton(s) per year
TVES	Terrestrial Visual Encounter Survey
U.S.C.	*United States Code*
USCB	U.S. Census Bureau
USGCRP	U.S. Global Change Research Program
USGS	United States Geological Survey
USO	US SFR Owner, LLC
VOC	volatile organic compound
WECC	Western Electricity Coordinating Council
WGFD	Wyoming Game and Fish Department
WSII	Wyoming Stream Integrity Index
WYDEQ	Wyoming Department of Environmental Quality
WYDOT	Wyoming Department of Transportation
WYNDD	Wyoming Natural Diversity Database
WYPDES	Wyoming Pollutant Discharge Elimination System
yd^3	cubic yard(s)
yr	year(s)

1 INTRODUCTION

By letter dated March 28, 2024 (TerraPower 2024-TN10896), TerraPower, LLC (TerraPower), on behalf of US SFR Owner, LLC (USO), a wholly owned subsidiary of TerraPower, submitted an application to the U.S. Nuclear Regulatory Commission (NRC or the Commission) for a construction permit (CP) pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, “Domestic Licensing of Production and Utilization Facilities” (TN249), that would allow the construction of a Natrium advanced reactor (Natrium reactor) at a site in Lincoln County, Wyoming designated as Kemmerer Power Station Unit 1 (Kemmerer Unit 1).

As discussed in the site alternatives analysis in Section 4.2, the Kemmerer Unit 1 site was previously referred to as the Naughton 19/20 site. Section 103 of the Atomic Energy Act of 1954, as amended (42 *United States Code* [U.S.C.] 2011 et seq.) (TN663), and its implementing regulations authorize the NRC to issue CPs for production or utilization facilities. To issue a CP, the NRC is required to consider the environmental impacts of the proposed action under the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.) (NEPA) (TN661). The NRC’s regulations that implement NEPA in 10 CFR Part 51, “Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions” (TN10253), describe several types of actions that would require an environmental impact statement (EIS). Issuance of a CP to construct a nuclear power reactor is identified in 10 CFR 51.20(b) (TN10253) as one such type of action.

Applicants for NRC licenses are required under 10 CFR 51.45 (TN10253) to submit an environmental report (ER) containing a description of the proposed action, a statement of its purposes, a description of the affected environment, and specific information needed by the NRC staff to evaluate the potential environmental impacts of the proposed action. A USO ER with information needed to assess the potential environmental impacts of the proposed action of CP issuance was submitted as part of the CP application (TerraPower 2024-TN10896).

The U.S. Department of Energy (DOE) has entered into a memorandum of agreement (MOA) with the NRC to be a cooperating agency in the preparation of this EIS. Under the MOA, the NRC is the lead Federal agency. The goal of this agreement is the development of one EIS that serves the needs of the NRC CP decision process and the DOE decision whether to provide financial assistance to USO, through TerraPower, to demonstrate the Natrium reactor. As a cooperating agency, DOE is part of the review team with the NRC staff and its contractor staff and is involved in all aspects of the environmental review, including scoping, public meetings, public comment resolution, and EIS preparation. The EIS is intended to provide information to support the DOE financial assistance decision, as will be documented in DOE’s record of decision (ROD).

1.1 <u>Proposed Federal Action</u>

The proposed Federal action is for the NRC to decide whether to issue a CP to USO, a wholly owned subsidiary of TerraPower, under 10 CFR Part 50 that would allow the construction of Kemmerer Unit 1. USO is required to apply for a separate operating license (OL) under 10 CFR Part 50 (TN249) for authorization to operate Kemmerer Unit 1. The NRC would perform an additional environmental review for that OL application.

The Kemmerer Unit 1 site is approximately 290 acres (ac) (117.4 hectares [ha]) in Lincoln County, Wyoming, approximately 3 miles (mi) (4.8 kilometers [km]) south of the City of Kemmerer, Wyoming, and approximately 3.8 mi (6.1 km) southeast of the existing Naughton Power Plant, comprising two coal units (Naughton 1 and 2) and one natural gas unit (Naughton 3) (Figure 1-1).

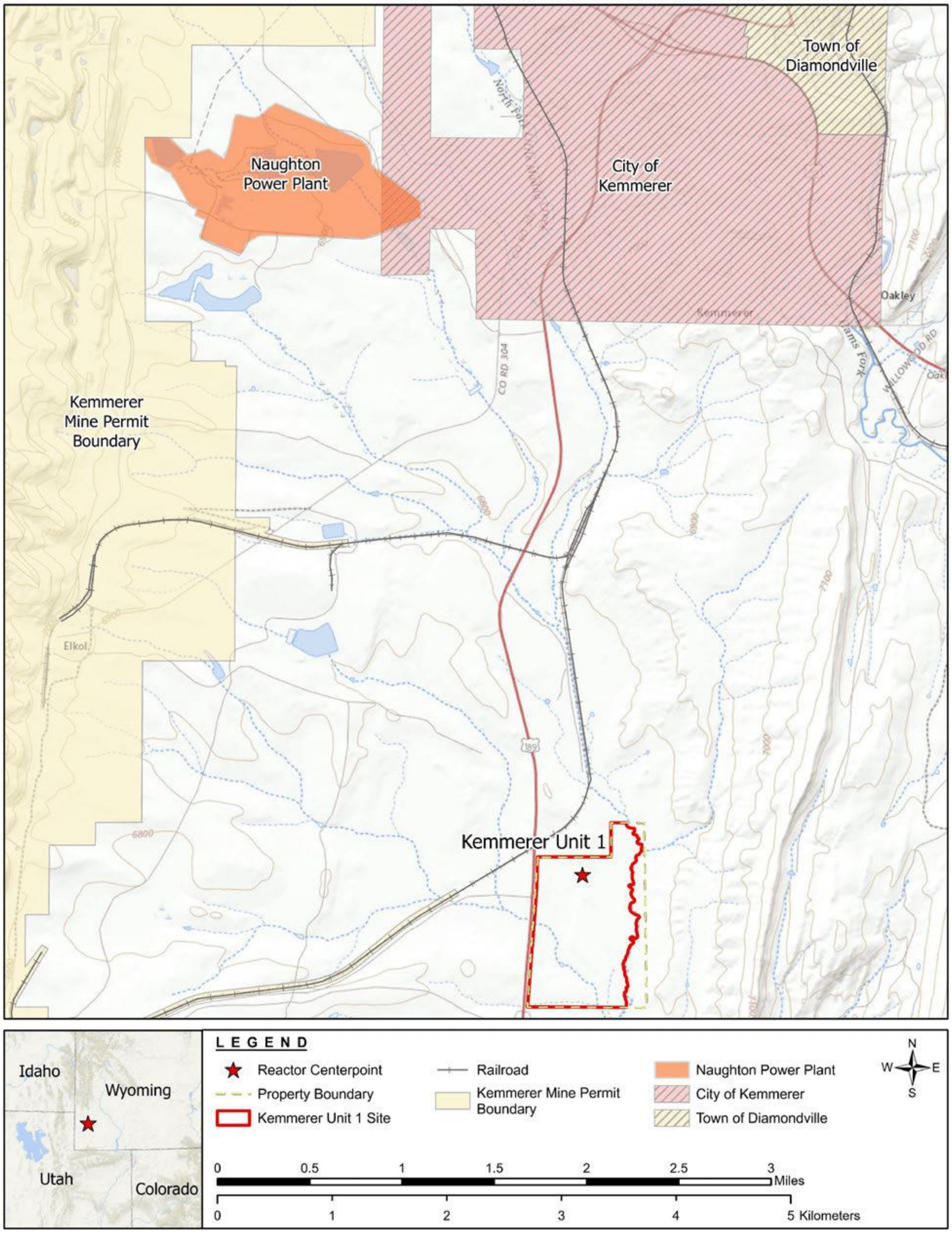

Figure 1-1 Kemmerer Unit 1 Site. Source: TerraPower 2024-TN10896.

This EIS constitutes the review team's evaluation of the potential environmental impacts of the proposed action of CP issuance, as required under 10 CFR Part 51 (TN10253). Chapter 2 of this EIS provides more information about the proposed Kemmerer Unit 1. The issuance of a CP by the NRC is a separate licensing action from the issuance of an OL. To support a complete and effective environmental review, this EIS addresses the potential environmental impacts of the construction of Kemmerer Unit 1, and a discussion of its operations and decommissioning is also provided to aid in the analysis of the entire life-cycle phases of Kemmerer Unit 1. The NRC staff recognizes that new and significant information regarding operations and decommissioning may become available subsequent to any issuance of a CP. The NRC staff would therefore review any application for an OL for Kemmerer Unit 1 for new and significant information that might alter the conclusions made for the CP application. If USO were to submit an OL application, the NRC staff would prepare a supplement to this EIS in accordance with 10 CFR 51.95(b) (TN10253).

The proposed DOE Federal action is the decision whether to provide financial assistance to USO, through TerraPower, to demonstrate the Natrium reactor as part of the Advanced Reactor Demonstration Program (ARDP). DOE must conduct a NEPA review prior to authorizing the expenditure of Federal funds. As part of the MOA between the NRC and DOE, these parties have agreed to conduct a NEPA review of the Kemmerer Unit 1 project that reflects the obligations of both DOE in its role as funding agency and the NRC in its role as regulator. Based on the outcome of the NEPA review of the Kemmerer Unit 1 project, DOE would issue a separate ROD to fulfill its NEPA obligations and issue ARDP funds to TerraPower.

1.2 Purpose and Need for the Proposed Federal Action

USO proposes to build, demonstrate, and operate the Natrium reactor to enhance grid reliability and ultimately replace electricity generation capacity in the service area if PacifiCorp chooses to retire existing coal-fired facilities.

USO, through TerraPower, participates in the DOE ARDP, the goal of which is to speed the demonstration of advanced nuclear reactors through cost-shared partnerships with U.S. industry.

The need for the proposed action is highlighted by two main objectives: (1) replacing the electricity generation capacity of retiring coal-fired plants and (2) enhancing grid reliability in the region. Therefore, the proposed action would address immediate local energy demands in a carbon-neutral manner and advance technological innovation in the nuclear energy sector.

The determination of need and the decision to build a reactor are at the discretion of applicants, such as USO. This definition of purpose and need reflects the NRC's recognition that unless there are findings in the NRC's safety review required by the Atomic Energy Act of 1954, as amended, or findings in the environmental review under NEPA that would lead the NRC to reject a CP application, the agency does not have a role in the planning decisions as to whether a particular reactor should be constructed and operated.

The purpose for the DOE action is to comply with DOE's statutory mandates in the fiscal year (FY) 2020 Further Consolidated Appropriations Act (TN11659) and the Infrastructure Investment and Jobs Act (TN11660) to select and fund the demonstration of advanced reactors through cost-shared partnerships with U.S. industry. The TerraPower Natrium Demonstration Project was selected by DOE under the ARDP. The need for the DOE action is to respond to TerraPower's request for financial assistance through the cost-shared partnership to complete construction activities for Kemmerer Unit 1, as described in this EIS, which would further the design and construction of TerraPower's Natrium reactor under an NRC CP.

1.3 The NRC Construction Permit Application Review Process

The NRC process to review applications for CPs consists of two parallel reviews. The safety review evaluates the applicant's ability to meet the NRC regulatory safety requirements. The NRC staff documents the findings of the safety review in a safety evaluation. The environmental review, governed by NEPA and the requirements in 10 CFR Part 51 (TN10253), evaluates the environmental impacts of the proposed action and alternatives to the proposed action. This EIS presents the results of that evaluation. The NRC considers the findings in both the safety evaluation and the EIS in its decision to grant or deny the issuance of a CP.

To guide its assessment of environmental impacts, the review team uses three levels of significance for potential impacts: SMALL, MODERATE, or LARGE, which are defined as follows:

> **SMALL**: Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. For the purposes of assessing radiological impacts, the NRC has concluded that those impacts that do not exceed permissible levels in the NRC's regulations are considered SMALL.

> **MODERATE**: Environmental effects are sufficient to noticeably alter important attributes of the resource but not to destabilize them.

> **LARGE**: Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

On March 28, 2024, TerraPower, on behalf of USO, submitted USO's ER (TerraPower 2024-TN10896). On May 21, 2024, the NRC notified USO of its decision that the CP application (including the ER) was sufficient to begin its detailed review (NRC 2024-TN11134). The NRC staff published a Notice of Acceptance for Docketing for the CP application in the *Federal Register* on June 4, 2024 (NRC 2024-TN11135) and a separate *Federal Register* notice of intent to prepare an EIS and conduct a scoping process on June 12, 2024 (NRC 2024-TN11136). Issuance of the scoping notice initiated a 60-day scoping period.

On July 16, 2024, the NRC held a public outreach and scoping meeting in Kemmerer, Wyoming. The NRC staff also contacted Federal, State, Tribal, and local agencies to solicit comments. Correspondence between the NRC and Federal, State, Tribal, and local agencies is listed in Appendix C. The NRC report entitled, "Environmental Impact Statement Scoping Process, Summary Report, Kemmerer Power Station Unit 1 Construction Permit, Kemmerer, Wyoming," presents the comments received during the scoping process (NRC 2024-TN11137).

In August and September 2024, the NRC staff conducted a virtual audit to verify information in the ER. During the audit, the NRC staff reviewed specific documentation and discussed specific information needs with USO staff and their contractors.

This EIS presents the review team's analysis that considers and weighs the environmental impacts of the proposed action, including the environmental impacts associated with the construction of the proposed facilities at the proposed site, the environmental impacts of constructing the same facilities at alternative sites, the no-action alternative, and mitigation measures available for reducing or avoiding adverse environmental effects. It also presents the benefits of the proposed action (e.g., meeting an identified need for power). Finally, it provides the review team's preliminary recommendation regarding the issuance of a CP for Kemmerer Unit 1 at the site in Kemmerer, Wyoming.

The CP application also includes four requests for exemptions in accordance with 10 CFR 50.12 (TN249), "Specific exemptions." Specifically, the applicant stated that the Natrium reactor design includes the use of high-assay low-enriched uranium (HALEU) fuel with uranium enrichment that is higher than that specified in 10 CFR 50.68(b)(7) and requested an exemption that would increase the nominal uranium enrichment identified in 10 CFR 50.68(b)(7) from 5 weight percent (w%) to less than 20 w% to account for this use of HALEU fuel (TerraPower 2024-TN10896). The applicant also requested an exemption from the emergency core cooling system analysis requirement in 10 CFR 50.34(a)(4) and 10 CFR 50.34(b)(4) because that analysis cannot be performed as it is specific to light-water reactors and the Natrium reactor is a sodium-cooled reactor (TerraPower 2024-TN10896). Additionally, the applicant requested an exemption from the maintenance rule in 10 CFR 50.65(b) so as to limit the rule's scope to safety-related and non-safety related with special treatment structures, systems, and components to align with the licensing basis of the Natrium reactor (TerraPower 2024-TN10896). Finally, the applicant requested an exemption from the financial qualifications requirements in 10 CFR 50.33 (f) and 10 CFR Part 50 Appendix C to allow the use of the 10 CFR Part 70 (TN4883) financial qualifications standard that the applicant appear to be financially qualified (TerraPower 2024-TN10896). The review team determined that the environmental impacts of these exemption requests, if approved, would not be significant and would be encompassed by the environmental impacts of the proposed action evaluated in this EIS. Moreover, as appropriate, the environmental impacts of these exemption requests would be further reviewed during the OL stage of the licensing process should USO submit an OL application to the NRC.

1.4 Regulatory Provisions, Permits, and Required Consultations

The applicant identified each environmental regulatory requirement, permit, and consultation necessary for the construction of Kemmerer Unit 1 in Tables 1.4-1 and 1.4-2 of the ER (TerraPower 2024-TN10896). The applicant bears the responsibility for applying for each of the permits listed in Table 1.4-1 of the ER. The NRC staff bears the responsibility for performing each of the consultations listed in Table 1.4-2 of the ER required under the Endangered Species Act of 1973, as amended (TN1010), and the National Historic Preservation Act of 1966, as amended (TN4157).

1.5 Preconstruction Activities

In a final rule dated October 9, 2007 (72 FR 57416-TN260), the Commission established the definition of "construction" in 10 CFR 51.4 (TN10253) as those activities that fall within its regulatory authority. Many of the activities required to build a reactor are not part of the NRC action to issue a CP for Kemmerer Unit 1 because they do not have a reasonable nexus with radiological health and safety and/or common defense and security; therefore, they are not within the NRC's authority to regulate. Activities associated with building the proposed facility that are not within the purview of the NRC action are grouped under the term "preconstruction." Under 10 CFR 51.45 (TN10253), applicants are required to include in an ER a description of the impacts of the applicant's preconstruction activities.

Preconstruction activities include clearing and grading, excavating, building service facilities (e.g., paved roads, parking lots, etc.), erecting support buildings, and other associated activities. These preconstruction activities may take place before the application for a CP is submitted, during the NRC staff's review of a CP application, or after a CP is granted. Consequently, in this

EIS, the NRC staff evaluates preconstruction impacts as cumulative impacts and not as direct impacts resulting from the NRC's Federal action. Although preconstruction activities are outside the NRC's regulatory authority, many are within the regulatory authority of local, State, or other Federal agencies.

In October 2020, DOE and TerraPower entered into a cooperative agreement to execute the Natrium demonstration project. As a result, DOE's action of providing financial assistance is considered a Federal action subject to DOE's NEPA regulation (10 CFR Part 1021-TN11138).

The Natrium demonstration project comprises three separate and unique projects: the Sodium Test and Fill Facility (TFF), a fuel fabrication facility, and Kemmerer Unit 1. In order to ensure that all components of the project are appropriately evaluated under NEPA, DOE and the NRC have agreed to conduct the review of the project in four actions:

- Action 1—TFF: DOE completed an environmental assessment (EA) and reached a Finding of No Significant Impact for the TFF in May 2024 (DOE 2024-TN11200).
- Action 2—Kemmerer Unit 1 – Preconstruction: DOE completed an EA and reached a Finding of No Significant Impact for preconstruction activities in February 2025 (DOE 2025-TN11602).
- Action 3—Kemmerer Unit 1 – Construction Activities: These activities are evaluated by the NRC under this EIS. This is separate from the DOE analysis for preconstruction activities. DOE is a cooperating agency in the development of this EIS and will issue a separate ROD based on this analysis to fulfill its NEPA obligations related to awarding ARDP funds to TerraPower.
- Action 4—Natrium Fuel Fabrication Facility: The Natrium Fuel Fabrication Facility is a proposed expansion to the Global Nuclear Fuel – America, LLC (GNF-A), Wilmington, North Carolina facility. GNF-A is currently operating under a license from the NRC. The NRC and DOE would conduct a NEPA review related to the fuel fabrication facility as part of their licensing process and financial assistance, respectively, separate from this EIS.

The TFF is a nonnuclear testing facility that would be used to transfer sodium to Kemmerer Unit 1 for the initial fill. The facility would not result in electric power generation. The NRC determined that the construction of the TFF does not constitute "construction" as defined by 10 CFR 50.10 and that, therefore, a CP or limited work authorization is not required to construct the TFF (NRC 2022-TN11139). Thus, the construction and operation of the TFF does not require authorization from the NRC. The TFF is described and analyzed for cumulative impacts in this EIS.

DOE completed an EA for Kemmerer Unit 1 financial assistance for and initiating preconstruction activities in February, 2025 (DOE 2025-TN11602). Public scoping for this EA was initiated on July 19, 2024. This preconstruction EA is separate from the TFF EA that DOE completed in May 2024. The activities described in both DOE EAs are reasonably foreseeable to occur.

Preconstruction activities reviewed by DOE under the related EA did not include any radioactive material or nuclear-safety-related systems, and all structures are classified as non-safety related. Preconstruction activities described and analyzed in the DOE EA include the following:

- Site preparation—clearing, grubbing, and development of site drainage.

- Earthwork—building excavation, development of spoil and laydown areas, construction of temporary parking lots, placement of common fill, and construction of stormwater management ponds.
- Dewatering—establishing temporary dewatering systems.
- Supporting infrastructure—buildings, utilities, plant roads, and walkways.
  - Support buildings include the TFF, Reactor Fabrication Building, Kemmerer Training Center, Site Support and Personnel Access Building, and buildings in the Energy Island.

The applicant could choose to perform preconstruction work before its receipt of the requested CP, or even if the NRC never issues the CP. However, because the preconstruction is a precursor to construction of the proposed Kemmerer Unit 1, which is subject to NRC authorization, and because discussion of preconstruction and construction impacts together enhances the readability of the document, Chapter 3 of this EIS presents a single combined discussion of preconstruction (including those activities described in the DOE EA) and construction impacts for each resource.

1.6 Report Contents

The sections of this EIS are organized as follows: Chapter 1 is this introduction. Chapter 2 of this EIS provides a description of the proposed Kemmerer Unit 1 project, summarizing key elements of the design needed by the NRC staff to evaluate potential environmental impacts. Most of the information in Chapter 2 of this EIS is drawn from the applicant's description of its project in the ER, preliminary safety analysis report (PSAR), and other parts of the CP application. Chapter 3 of this EIS describes the affected environment for each of the 12 environmental resource areas identified by the review team through its scoping process, followed by the NRC staff's evaluation of potential environmental impacts on each resource area. The review team independently verified and summarized the affected environment descriptions from the ER and other public documents, relying on incorporation by reference to the extent possible to simplify the EIS. The review team developed their evaluations of environmental impacts independently from the applicant but relied in part on impact data presented by the applicant after independent verification. Chapter 4 of this EIS presents the review team's evaluation of a range of reasonable alternatives to the proposed action. Chapter 5 provides a description and assessment of the need for power of the proposed facility. Chapter 6 summarizes the review team's conclusions and recommendation based on the environmental review. Chapter 7 provides references to documents cited throughout the document.

The appendices to this EIS contain additional information and are as follows:

Appendix A—Contributors to the Environmental Impact Statement

Appendix B—Agencies, Organizations, Tribes, and Individuals Contacted

Appendix C—Chronology of Environmental Review Correspondence

Appendix D—Regulatory Compliance and List of Federal, State, and Local Permits and Approvals

Appendix E—Summary of Cumulative Effects and Climate Change

Appendix F—Terrestrial Habitat and Species Analysis

Appendix G—Biological Assessment

2 PROPOSED PROJECT

The information presented below summarizes key characteristics of the Kemmerer Unit 1 project that the review team considered when assessing the environmental impacts of the proposed action. The summaries focus on the construction of the proposed facilities. Any information about the operation and decommissioning of the proposed facilities is provided to aid in the analysis of the entire life-cycle phases of the Kemmerer Unit 1 project (e.g., anticipated operational water discharges to existing surface waters). New and significant information regarding operation and decommissioning may become available after any issuance of the CP and would be described and assessed in the subsequent environmental review related to an OL for Kemmerer Unit 1.

2.1 <u>Project Overview</u>

USO proposes to build Kemmerer Unit 1 on an approximately 290 ac (117.4 ha) site in Lincoln County, Wyoming, that is owned by USO, as depicted in Figure 2-1. The Kemmerer Unit 1 Natrium reactor would demonstrate an advanced reactor that uses liquid sodium as the coolant instead of water (TerraPower 2024-TN10896). The proposed facilities would house one 840-megawatt thermal (MWt) pool-type sodium fast reactor connected to a molten salt energy storage system that enables variable energy supply up to 500 megawatts electric (MWe) net (TerraPower 2024-TN10896) (Figure 2-1).

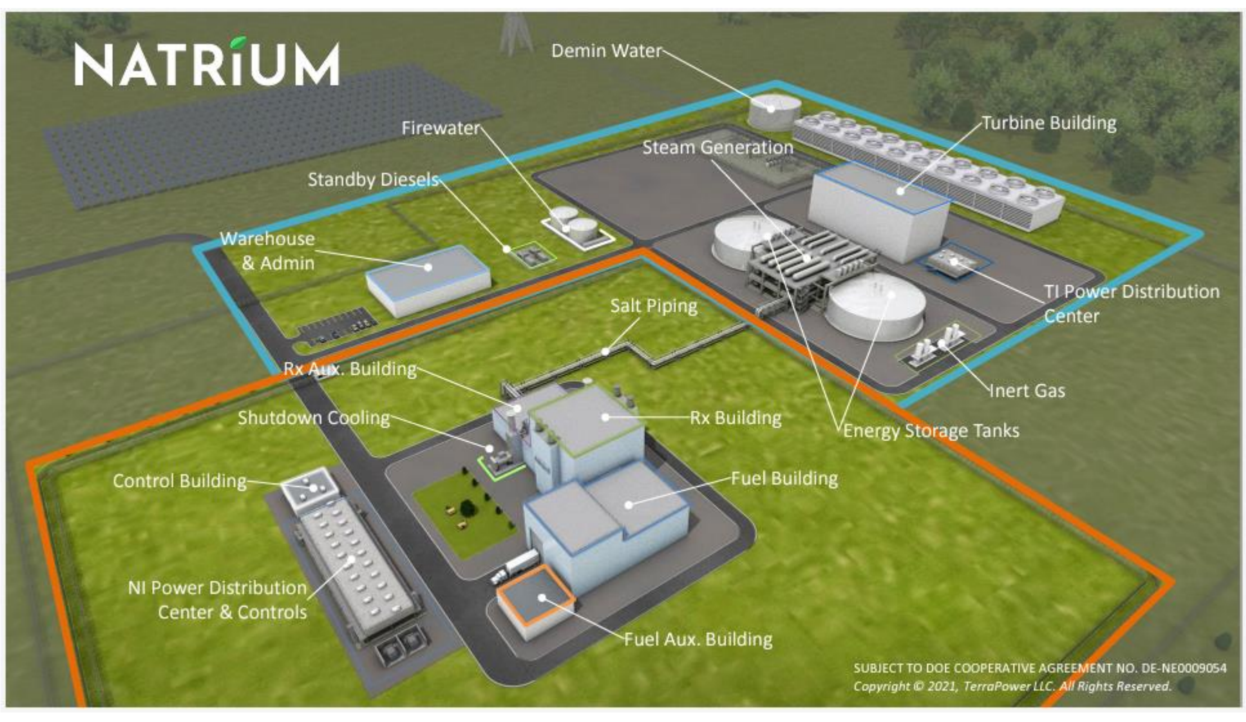

Figure 2-1 Rendering of Kemmerer Unit 1 Site Layout. Source: TerraPower 2021-TN11049.

The reactor core, located in the Reactor Building (Rx Building), would contain 162 fuel assemblies with enriched uranium-235 fuel. The fuel employs a metal fuel system instead of oxides with a burnup in a range exhibited by Gen III+ light-water reactor (LWR) design and GEH Power Reactor Innovative Small Modular or PRISM reactor technology (greater than 33,000 megawatt-days per metric ton of uranium) (TerraPower 2024-TN10896).

When in operation, the heat produced by the reactor is transferred to energy storage structure salt tanks located onsite. The heat from these storage tanks is then used to produce steam, which is transferred to the steam turbine to generate electricity.

2.2 Site Location and Layout

The applicant describes the site location and layout in Chapter 2 of the ER (TerraPower 2024-TN10896). The proposed layout of the facilities includes four principal areas of the site: Nuclear Island (NI), Energy Island (EI), site infrastructure, and linear facilities (Figure 2-2). Of the 290 ac (117.4 ha) site, approximately 218 ac (88.2 ha) would be disturbed by preconstruction and construction activities.

Section 3.1.1 of the ER provides a description of the four principal areas and associated major plant structures of Kemmerer Unit 1 (TerraPower 2024-TN10896). Use of the site would require, as practical, sharing of Naughton Power Plant's infrastructure, such as the raw water settling Basin, intake structure on Hams Fork River, meteorological tower, and tie-in to electric transmission lines. U.S. Route 189 is the nearest major roadway running on the west side and providing access to the site. Bordering the northwest corner of the site is Skull Point Spur of the Cumberland Branch of the Union Pacific Railroad. The east border of the site runs along North Fork Little Muddy Creek (NFLMC) and associated floodplain; otherwise, there are no public roads, railroads, or navigable waterways within the site boundaries (Figure 2-3) (TerraPower 2024-TN10896). While the site boundaries do not house active mining or oil and gas wells, there are potential exploitable coal, oil, and gas resources nearby (TerraPower 2024-TN10896). USO owns the mineral rights for the site (TerraPower 2024-TN10896).

The site would have roadways, walkways, and parking lots with potentially landscaped areas surrounding disturbed surface soil areas (TerraPower 2024-TN10896). A parking area would be located to the west of the NI (Figure 2-4). A 13 ac (6.5 ha) temporary parking area would be set up west of the EI prior to building the permanent lot.

Figure 2-4 identifies the proposed macro-corridors that encompass the potential routes to determine the probable corridor characteristics for routing both the transmission and water supply lines (TerraPower 2024-TN10896). As shown in Figure 2-4, the transmission and water supply lines would share a common north-south corridor and a common east-west corridor and then diverge southwest of the Naughton Power Plant, with the water supply lines extending north-northwest to the Naughton Power Plant Raw Water Settling Basin and the transmission lines extending north-northwest to the Naughton Power Plant switchyard. The total corridor area for analysis in this EIS is conservatively set to 511 ac (206.8 ha) (common macro-corridor area of 314.4 ac [127.2 ha]), with an anticipated 216 ac (87.4 ha) of temporary disturbance; however, the final placement of utilities within the macro-corridors has not yet been determined.

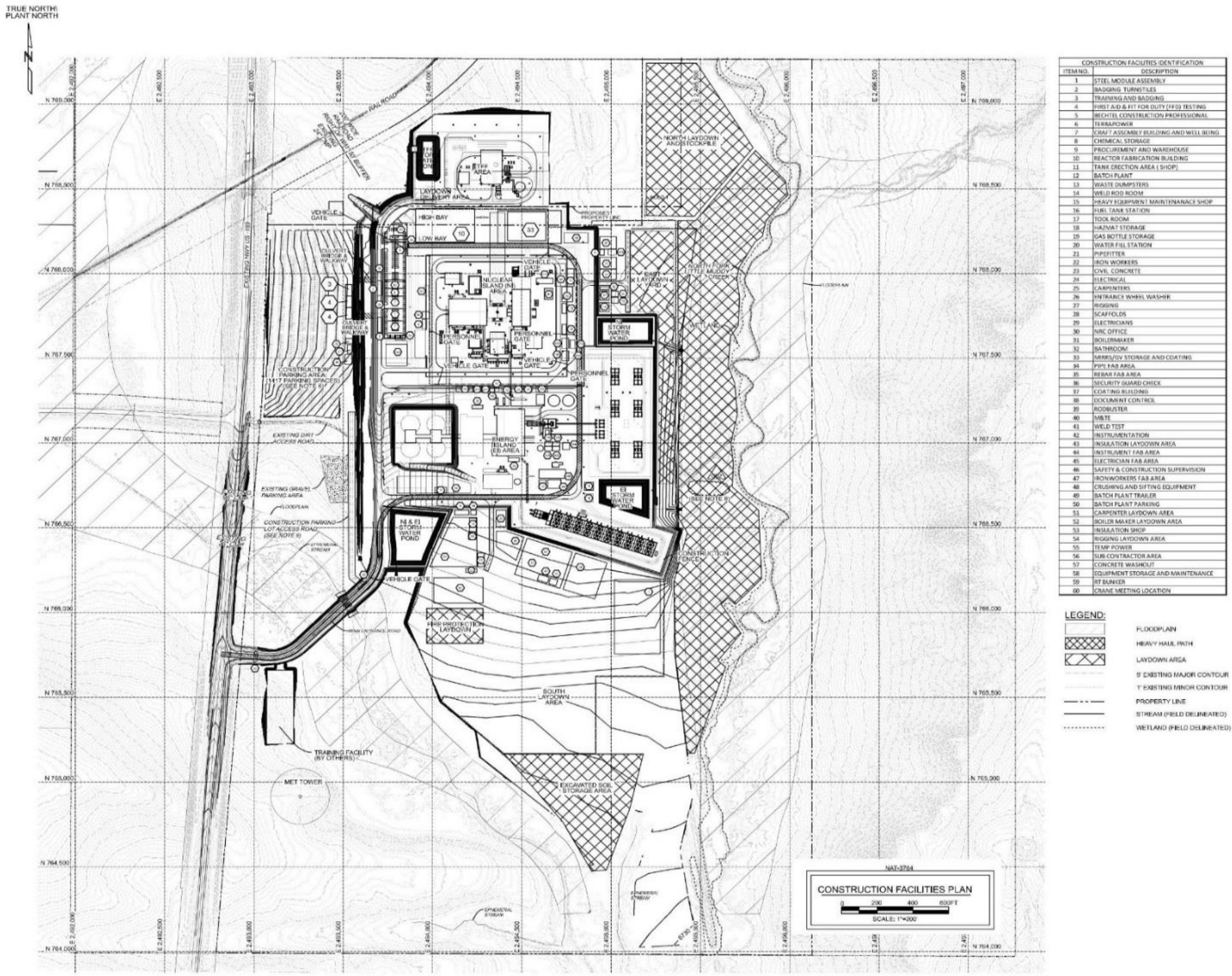

Figure 2-2 Kemmerer Unit 1 Site Construction Layout. Source: TerraPower 2025-TN11595.

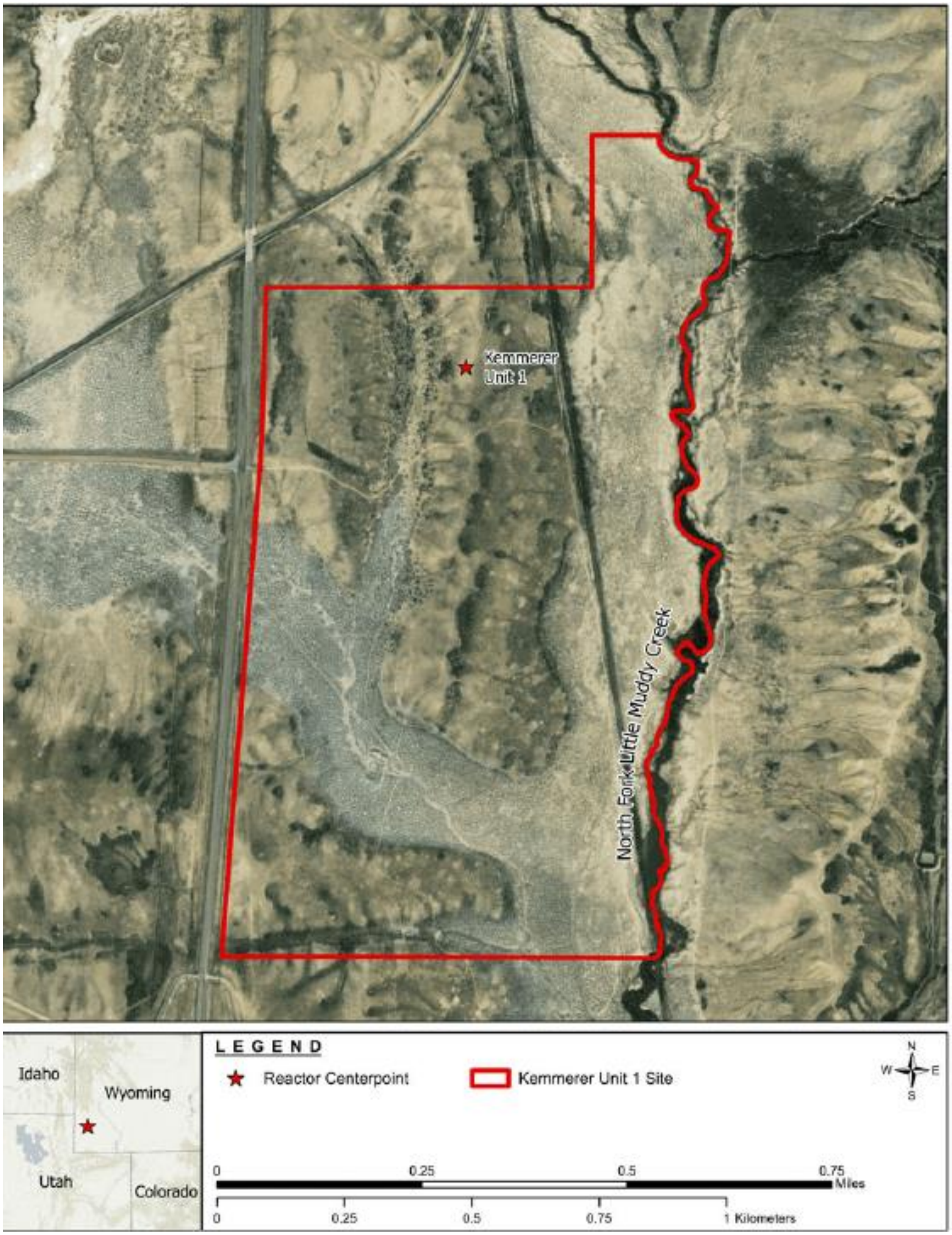

Figure 2-3 Kemmerer Unit 1 Site Aerial Photograph. Source: TerraPower 2024-TN10896.

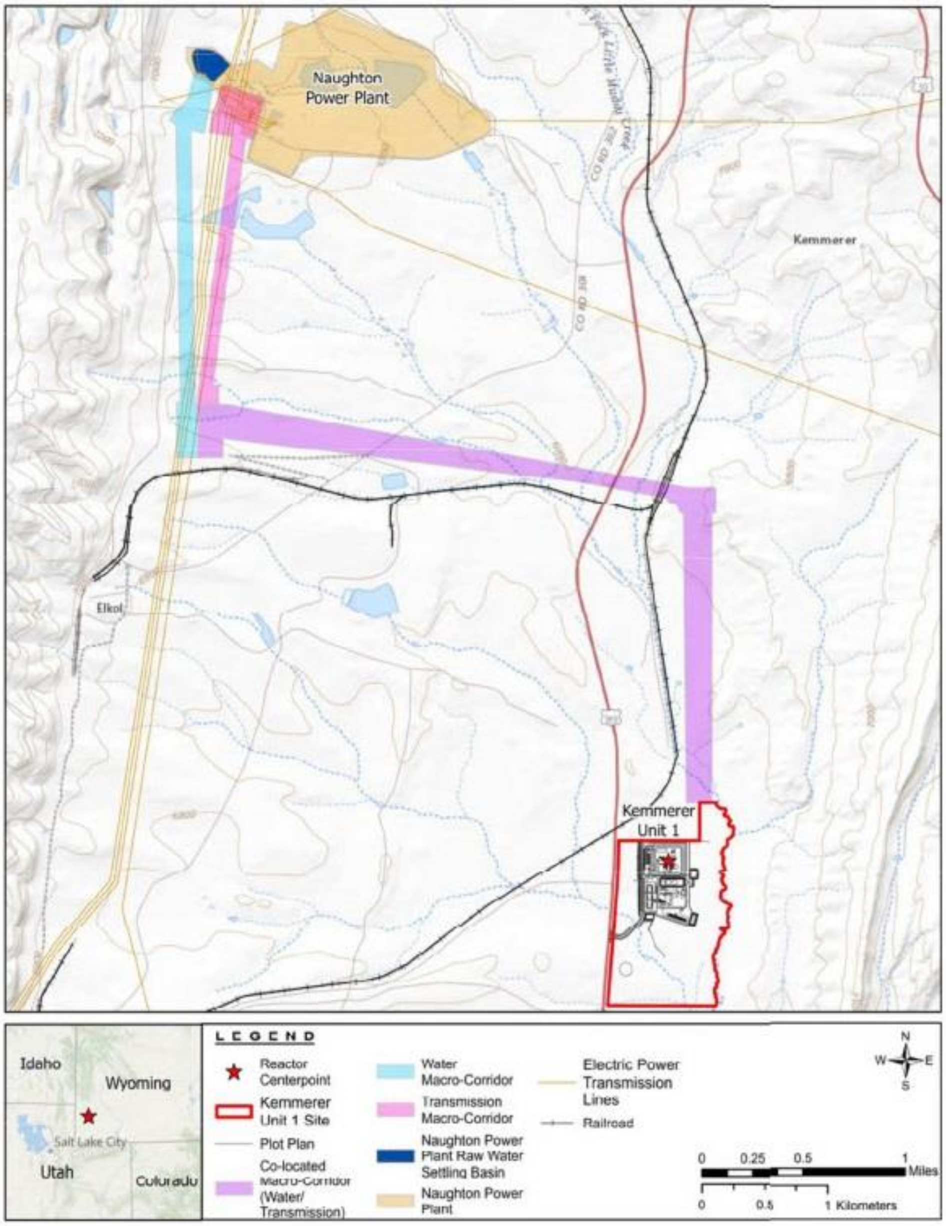

Figure 2-4 Macro-Corridors for Potential Transmission Line and Water Supply Line Routes at Kemmerer Unit 1 Site. Source: TerraPower 2024-TN10896.

To connect the onsite Kemmerer Unit 1 substation to the regional electrical transmission infrastructure at Naughton Power Plant, two new 5.9 mi (9.5 km) long 230 kilovolt (kV) transmission lines would need to be constructed. Of the new infrastructure, 4.1 mi (6.6 km) would be part of a common right-of-way (ROW) with the water supply pipeline. The current design is described as steel towers following current design codes and electrical clearance. Foundations for the towers would be configured to use concrete and would be engineered for installation stability appropriate for the environment and would avoid footings in aquatic environments and culturally sensitive areas. Additional laydown areas of 400 feet (ft) by 400 ft (122 meters [m] by 122 m) would be used at the ends of segments during construction.

To connect the Kemmerer Unit 1 facilities to the existing raw water settling basin at the Naughton Power Plant, there would be construction of a new 6 mi (9.7 km) water supply pipeline (TerraPower 2024-TN10896). The pipeline construction easement is given as 50 ft (15 m) wide. The pipeline construction easement is sufficient space for temporary trench spoil storage and equipment parking. Most of the pipeline would be installed underground using open cut trench excavation techniques. For rail and road crossings, and locations where aquatic resources or culturally sensitive areas occur, horizontal directional drilling would be used to minimize disturbance to sensitive resources (TerraPower 2024-TN10896).

Three entities own the land within the proposed macro-corridors: Kemmerer Operations, LLC; PacifiCorp; and FMC Corporation. Easements and land access for installation of the transmission lines and pipeline are being sought (TerraPower 2024-TN10896).

2.3 Site Workers and Vehicular Deliveries

The applicant estimates the numbers of site workers in Section 3.3.3 and Section 4.4.4 and the number of vehicular deliveries in Section 5.8.6 of the ER (TerraPower 2024-TN10896). The applicant estimates that construction would require a 12-month average of 1,639 workers, with 1,653 at peak times, and would involve an average of 20 truck deliveries per day. Operation is estimated to involve an average of 250 personnel per month, with operation workers present onsite before the completion of construction (TerraPower 2024-TN10896). The planned duration of the Kemmerer Unit 1 construction is 5 years.

2.4 Site Preparation – Material Use and Equipment

Site preparation of the NI, EI, site infrastructure, and linear facilities would include earthwork—clearing and grubbing, site grading, soil excavation, dewatering, and backfill placement (Figure 2-2). Table 3.3-3 of the ER provides details of site-preparation activities (TerraPower 2024-TN10896). The majority of site-preparation activities would occur during preconstruction prior to any issuance of the CP and is described in the DOE EA for preconstruction activities (DOE 2025-TN11602). Site-preparation activities not considered to be preconstruction activities include the placement of structural backfill for buildings in the NI, EI, and some site infrastructure and linear facilities (i.e., switchyard, transmission lines, transformers, facility support buildings, and circulating water piping) (TerraPower 2024-TN10896). Site-preparation activities are anticipated to be completed by winter 2026 (TerraPower 2024-TN11009).

Before any earthwork activities occur, silt fence and erosion controls would be installed to protect from silt and runoff to the surrounding wetlands and waterways. Clearing and grubbing includes stripping topsoil and organic material up to 12 inches (in.) (30 centimeters [cm]) according to the site topography (TerraPower 2024-TN10896). Clearing and grubbing would occur within most of the footprint of the site (Figure 2-2). Topsoil suitable for backfill would be stockpiled on the site for future use. Grading (cut and fill) would occur to create proper site drainage and a base for building pads. An estimated 161,292 cubic yards (y^3) (123,317 cubic meters [m^3]) of material is expected to be cut from the site during clearing and grubbing and site grading activities (TerraPower 2024-TN10896).

Following clearing and grubbing, mass excavation and backfill would occur throughout the site in preparation of construction activities. Areas would be taken to a common subgrade elevation for further excavations for specific commodities such as foundations, duct banks, and underground pipes. The importation of common and structural backfill for site roads, parking areas, and structural pad fill would occur and be stockpiled onsite until needed. Backfill would occur as installation completes. An estimated 1,258,060 y^3 (961,855 m^3) of material is expected to be filled during backfill activities (TerraPower 2024-TN10896). As such, an expected 1,096,768 y^3 (838,539 m^3) of material would need to be imported to the site for total backfill activities (TerraPower 2024-TN10896). Backfill material is expected to be sourced locally.

Site-preparation activities would be performed by qualified contractors using typical heavy construction equipment. Heavy construction equipment includes backhoes, compactors, dozers, excavators, loaders, graders, and rollers (TerraPower 2024-TN10896).

2.5 Construction Activities

Construction activities considered in this EIS include the structural construction and completion of structures, systems, and components as described in Section 3.3.2 of the ER for the NI, EI, and other infrastructure at the site following issuance of a CP (TerraPower 2024-TN10896). Structural construction activities include, but are not limited to, deep excavations for subgrade foundations; installation of subgrade foundation walls; installation of grade foundations and placement of structural concrete; erection of above grade steel; installation of support equipment; and placement of roofing and wall panels. Structures, systems, and components with environmental interfaces are considered relevant to the assessment of the potential environmental impacts of facility construction described in Chapter 3. Structures, systems, and components that are relevant to this review include, but are not limited to, landscaping and stormwater drainage, systems for water intakes and discharges, sanitary waste systems, dewatering systems, and power transmission systems.

2.6 Facility Utilities

Temporary utilities would support the building site and associated activities, including trailers, warehouses, storage and laydown areas, fabrication and maintenance shops, and the concrete batch plant (TerraPower 2024-TN10896). Temporary utilities would be used until permanent utility connections are established and operational.

Temporary power distribution would be delivered from the existing 25 kV line running along U.S. Route 189 (TerraPower 2024-TN10896). The lines would be overhead on new poles. Two new 230 kV transmission lines would be installed via the transmission and co-located macro-corridors from the Naughton Power Plant to provide permanent power distribution.

A detailed description of how the applicant would obtain, use, and discharge water is provided in Section 3.0 of the ER (TerraPower 2024-TN10896). The applicant’s proposed water balance for the new facilities is depicted in Table 3.2-1 of the ER (TerraPower 2024-TN10896). Water demands during construction for the batch plant, dust suppression, flushing water tanks, and miscellaneous water for washing trucks and equipment would be provided by the Kemmerer-Diamondville Water and Wastewater Joint Powers Board (KDWWJPB) and trucked to the jobsite and stored in onsite water tanks. An estimated total of 25,324,000 gallons (gal) (95,861,768 liters [L]) of water would be needed for the planned 5-year duration of construction activities (TerraPower 2024-TN10896). Supplemental water from the Naughton Power Plant Raw Water Settling Basin may be used for dust suppression. Drinking water would be a combination of bottled water and stored municipal water treated with onsite water purification trailers. Wastewater from bathroom trailers and portable toilets would be emptied and disposed of offsite by a subcontractor or treated onsite using treatment trailers for dust suppression or nonpotable use (TerraPower 2024-TN10896). Bathroom trailers and portable toilets would be used until the sanitary wastewater treatment facility is operational.

During operation, Kemmerer Unit 1 would be supplied with raw water by the Naughton Power Plant Raw Water Settling Basin. The Naughton Power Plant Raw Water Settling Basin receives its raw water supply from Hams Fork River, a tributary of the Green River, which is fed by the Viva Naughton Reservoir. A new pump located at the Naughton Raw Water Settling Basin would pump water to a pipeline connected to Kemmerer Unit 1 (TerraPower 2024-TN10896). The water from the raw water settling basin would provide water for the heat rejection system, condensate makeup, potable water system, fire protection system, demineralized water system, service water, and other miscellaneous uses for both the NI and the EI. The Natrium reactor uses sodium as its coolant. Although waste heat would be dissipated by a mechanical draft cooling tower (MDCT), makeup water would still be required to replace cooling-tower blowdown, evaporation, and drift losses.

Plant water use is described in Section 3.2 of the ER (TerraPower 2024-TN10896). Average and maximum water demands for Kemmerer Unit 1 are provided in Table 3.4-1 and Table 3.4-2 of the ER (TerraPower 2024-TN10896). Once operating, Kemmerer Unit 1 would use 3,689 gallons per minute (gpm) (13,964 liters per minute [Lpm]) on average with a maximum demand of 5,270 gpm (19,949 Lpm). Sanitary wastewater generated by the operation of the proposed facilities would be collected to a building lift station. Each lift station pump would convey sanitary waste to the extended aeration skid to treat the sanitary waste stream, which is received by the wastewater system for discharge. The extended aeration skid, heat rejection system (HRS) – cooling-tower basin blowdown, floor and equipment drains, and water treatment reject are collected in a wastewater sump and mixed with a neutralizing acid or caustic substance. When the combined discharge meets Wyoming Pollutant Discharge Elimination System (WYPDES) permit limitations, the combined process waste streams discharge to the rip-rap apron of the EI stormwater pond and then to the NFLMC (Figure 2-2). The discharge outfall would be designed and constructed to accommodate a maximum wastewater discharge flow rate of approximately 1,118 gpm (4,232 Lpm) to the NFLMC (TerraPower 2024-TN10896).

The site would include an underground stormwater management network composed of a series of manholes, catch basins, stormwater ponds, discharge outfalls, and rip-rap aprons around discharge outfalls. The stormwater basins would make use of the sediment basins used during the construction phase (TerraPower 2024-TN10896). There would be three stormwater ponds built on the site—one in the southwest corner (NI and EI stormwater ponds), one in the southeast corner (EI stormwater pond), and one on the east side of the site (NI stormwater pond) (Figure 2-2). Discharge from the EI stormwater pond would flow onto rip-rap located outside the fenced area approximately 300–400 ft (91.4–121.9 m) west of the NFLMC (Figure 2-2). Treated wastewater from the EI would also discharge to the rip-rap apron of the EI stormwater pond (Figure 2-2). Although stormwater or treated wastewater would be indirectly discharged into NFLMC after passing through the rip-rap apron, there is a potential direct discharge pathway to the creek that does not pass through the rip-rap apron. Once operational, no radiological constituents are expected to be discharged in water from the facility.

2.7 Waste Systems

Wastes generated during construction would include nonradioactive solid waste, universal waste, and limited hazardous and mixed wastes (TerraPower 2024-TN10896). Construction activities would generate typical industrial wastes such as metal, wood, paper, and municipal solid wastes (i.e., food wastes), as well as process wastes such as nonradioactive resins, filters, and sludge. Where practicable, solid waste would be recycled based on the capacity of local facilities. Universal wastes (i.e., batteries, pesticides, etc.) generated onsite would be managed using an approved vendor in accordance with local rules and regulations. Any used oil from equipment maintenance would be disposed of using an approved vendor. Any hazardous wastes and mixed wastes, as defined by 40 CFR Part 261 (TN5092), generated during construction activities would be managed appropriately and shipped offsite for treatment and disposal as appropriate. All waste disposals would occur in permitted nonradioactive, nonhazardous, and hazardous waste facilities and licensed radioactive disposal facilities (TerraPower 2024-TN10896).

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

This section presents the affected environment and the potential environmental impacts of the proposed action of issuing a CP for Kemmerer Unit 1. This section is organized into separate subsections addressing specific environmental resource areas identified by the review team's scoping process as being relevant to the proposed action. Each subsection addresses the affected environment for the resource area, the potential direct and indirect impacts on the resource area from the construction of Kemmerer Unit 1, and cumulative impacts. Each subsection culminates in a presentation of the review team's conclusions regarding the significance of the environmental impacts. The range of possible conclusions used by the review team in assessing the significance of impacts on environmental resource areas is presented in Chapter 1 of this EIS.

To present a complete environmental review, this EIS covers the potential impacts of construction and also describes what information is known to aid in the analysis of the subsequent life-cycle phases of the Kemmerer Unit 1 project (i.e., operation and decommissioning). The review team recognizes that new and significant information regarding operation and decommissioning may become available subsequent to any issuance of a CP. The NRC staff would therefore review any application for an OL for Kemmerer Unit 1 for new and significant information that might alter the staff's conclusions made for the CP application. If USO were to submit an OL application, the NRC staff would prepare a supplement to this EIS in accordance with 10 CFR 51.95(b) (TN10253).

The review team recognizes that only a subset of other actions is relevant to the cumulative impact analysis for each environmental resource area. Therefore, in addressing cumulative impacts, the subsections for each resource area highlight those specific actions from Appendix E that are more relevant to an analysis of cumulative impacts for that resource area. Also included with the discussion of cumulative impacts is future climate change scenarios that may, or may not, affect or be affected by an environmental resource area. As explained in Chapter 1 of this EIS, some activities necessary to build a nuclear reactor do not fall within the purview of the NRC's regulatory authority over construction as defined in 10 CFR 50.10 (TN249) and 10 CFR 51.4 (TN10253) and are grouped under the term "preconstruction." The review team does not consider the effects of preconstruction to be direct or indirect impacts of a licensing action, but it does recognize the need for evaluating the contribution of preconstruction to cumulative impacts and in describing the affected environment. Identifying impacts of preconstruction is also necessary to understand the setting for the impacts of NRC-authorized construction activities, as well as impacts of subsequent life-cycle phases (i.e., operation and decommissioning). For example, clearing portions of a site before beginning to build a nuclear reactor is preconstruction, but knowing the extent of the clearing is necessary to know what nearby ecological habitats might be affected by noise generated by the subsequent NRC-regulated activities of nuclear reactor construction. The subsections below therefore describe the impacts of preconstruction and construction jointly for each resource area. The joint description, when combined with information on impacts from operation and decommissioning, other projects in the area, and potential climate change, provides a complete basis for drawing conclusions regarding direct, indirect, and cumulative environmental impacts.

3.1 Land Use and Visual Resources

3.1.1 Affected Environment

As described in Chapter 2 of this EIS, the proposed Kemmerer Unit 1 site consists of approximately 290 ac (117.4 ha) in Lincoln County, Wyoming, 3 mi (4.8 km) south of the City of Kemmerer and 3.8 mi (6.1 km) southeast of the Naughton Power Plant. The site, shown in Figure 2.1-1 of the ER, is bounded by and is visible from U.S. Route 189 (which provides access to the site) on the west, and is bounded by NFLMC on the east. Based on information available to the review team, it appears that the site, including the mineral rights, are owned in fee simple by USO. The review team is not aware of any encumbrances on USO's ownership of the site. The site lies in the Cumberland Flats alluvial plain and has gently rolling terrain with elevations ranging from 6,740 to 6,760 ft (2054 to 2060 m). An elevated railbed for an abandoned mining railroad runs through the site. The site consists of rural lands that are primarily rangeland. As shown in Figure 2.1-4 of the ER (TerraPower 2024-TN10896), the primary land cover is scrub/shrub (over 99 percent), with small areas of delineated wetlands along NFLMC. Portions of the site have been grazed. None of the site meets the definitions of prime or unique farmland (USDA 2019-TN11600). Lincoln County has zoned the site as industrial.

The May 2024 DOE TFF EA addressed the development of approximately 69 ac on the site, and the February 2025 DOE Preconstruction EA addressed the development of up to 165 ac on the site (DOE 2024-TN11200, DOE 2025-TN11602) for preconstruction activities; these activities have commenced.

The offsite macro-corridors, shown in Figure 2.1-1 of the ER (TerraPower 2024-TN10896), comprise approximately 511 ac (206.8 ha) of land, consisting mostly of shrub/scrub with existing transmission lines and other utilities. Most of the land within the corridors is shrub/scrub rangeland (approximately 96 percent) with small amounts of developed lands (related to utilities), wetlands, herbaceous rangeland, and barren land (Appendix F, Table F-1). Land within the macro-corridors is owned by three entities: Kemmerer Operations, LLC; PacifiCorp, and FMC Corporation (TerraPower 2024-TN10896). The macro-corridors do not encompass any prime or unique farmland (TerraPower 2024-TN10896).

The site vicinity, shown in Figure 2.1-6 of the ER (TerraPower 2024-TN10896) (within 6 mi [9.7 km] of the site), comprises a rolling alluvial plain within the Cumberland Flats. The NFLMC and Hams Fork River are the largest waterways in the vicinity. While the vicinity has various potentially exploitable minerals, the only active mine in the vicinity is the Elkol coal mine operated by Kemmerer Operations, LLC that provides coal for the Naughton Power Plant west of the site. The former Kemmerer Coke Plant was located on a 700 ac (283.3 ha) site to the west of the site and was demolished in 2002 (Kemmerer Gazette 2024-TN10897), although various remnants remain on the site (ER Figure 2.1-7). Approximately 91 percent of the vicinity's land cover is scrub/shrub rangeland, with small areas of barren lands, developed lands, wetlands, open water, forest, herbaceous rangeland, and agricultural land (Appendix F, Table F-1). The developed lands consist mostly of the Town of Diamondville, the City of Kemmerer, and the Naughton Power Plant. Approximately 35 percent of the vicinity is Federal lands managed by the Bureau of Land Management Kemmerer Field Office; outside these areas, the majority of lands are zoned rural with industrial zoning at the Naughton Power Plant and along U.S. Route 189.

The region, shown in Figure 2.1-3 of the ER (TerraPower 2024-TN10896) (within 50 mi [80 km] of the site), comprises portions of Lincoln, Sublette, Sweetwater, and Uinta Counties in Wyoming; Cache, Morgan, Rich, and Summit Counties in Utah; and Bear Lake County in Idaho. Eighty percent of the region's land cover is scrub/shrub, with approximately 6.1 percent evergreen forest and 1 percent developed land (Appendix F, Table F-1). Included in the region are Fossil Butte National Monument, managed by the National Park Service, and multiple areas that are part of national forests and wildlife refuges (TerraPower 2024-TN10896).

Visually, the vicinity and region comprise predominantly rural landscapes punctuated by occasional small towns, industrial facilities, and mines.

3.1.2 Environmental Impacts of Construction

Onsite Impacts

Between preconstruction and construction activities, approximately 218 ac (88.2 ha) would be permanently disturbed. Preconstruction and construction activities would include site preparation; earthwork activities including clearing, grubbing, and grading; excavation for the reactor; construction of a pipeline and discharge structure to convey plant wastewater and blowdown to NFLMC; and disposal of spoils for excavated material not suitable for fill. Facilities such as the reactor, steam generator, turbine buildings, meteorological tower, and concrete batch plant would be among the tallest structures and most visible features in the area when completed. According to Figure 2-2 of this EIS, none of these structures would be constructed within wetlands or floodplains. Because the Naughton Power Plant and related structures are already present, the area's visual characteristics would continue to consist of a mostly rural landscape punctuated by energy-related industrial facilities.

The site is fully owned by the applicant and the review team is not aware of any ownership issues that could affect the project. The applicant reports that it owns the surface and mineral rights to the site (TerraPower 2024-TN10896). The applicant plans to follow applicable Federal, State, and local regulations and acquire all necessary permits for all preconstruction and construction activities. The applicant plans to use best management practices (BMPs), including for stabilizing and contouring disturbed areas, revegetation, erosion and sedimentation prevention, and stormwater management. The applicant plans additional mitigation-, including measures for erosion and dust control, plant access, traffic, and at construction zones.

Both preconstruction and construction activities would require the construction of a new U.S. Route 189 intersection to access the Kemmerer Unit 1 site. Most of the construction would occur within the existing Wyoming Department of Transportation ROW for U.S. Route 189. However, land use impacts would occur on parcels adjacent to the site to extend existing culverts, with potential for construction at the stream crossing under Route 189.

The proposed construction impacts are consistent with the site's industrial zoning designation and with the land use goals of Lincoln County, as expressed in the Lincoln County Comprehensive Plan (Lincoln County 2021-TN11954). While the fencing of the site would result in impacts to ranging livestock that would no longer be able to graze on the site, there is ample other unfenced range adjacent to the site.

Offsite Impacts

Offsite land use impacts include the construction of the proposed transmission lines and water supply pipeline to connect Kemmerer Unit 1 to the Naughton Power Plant. The land that would be crossed is currently owned by three entities and would require the development of easements and land access agreements, which are currently being sought. The land is primarily rangeland with a small portion of wetlands and developed lands. A portion of the corridors would cross the Elkol Mine permit boundary and would therefore require compliance with the Mine Safety and Health Administration's mandatory safety standards. Additional details can be found in Section 3.9.2.2 of the ER. Construction activities would be visible from U.S. Route 189 as well as on the Cumberland Flats.

Construction of a 250 ft (76.2 m) wide transmission corridor would temporarily disturb approximately 180 ac (72.8 ha), while construction of a 50 ft (15.2 m) wide water supply pipeline corridor would temporarily disturb approximately 36 ac (14.7 ha) within the 511-ac macro-corridor. Applicable Federal, State, and local regulations would be followed, and necessary permits would be acquired for all site-preparation and construction activities. Wetlands, streams, roads, and railroads would be avoided as practicable, and construction techniques such as horizontal directional drilling would minimize impacts that cannot be avoided.

The transmission and water supply corridors are zoned as industrial except for one section that is zoned as rural, and this development will be compatible with this zoning. While construction would temporarily render these corridors unsuitable for grazing and permanently incompatible with mining, surrounding lands would remain open to such uses. After construction of the transmission and water supply lines is complete, there would be no restrictions on livestock grazing or access. Because the land use impacts would be consistent with applicable zoning, would be confined to land owned by the applicant, would not affect sensitive lands such as wetlands, floodplains, and prime farmland, and would not interfere with adjacent and nearby land uses, the staff concludes that the impacts of construction would be minimal.

3.1.3 Environmental Impacts of Operation

As noted in Section 5.1.1 of the ER (TerraPower 2024-TN10896), the review team expects that the estimated 218 ac (88.2 ha) of land disturbed for the construction of Kemmerer Unit 1 would be repurposed for operational needs and that no additional land use conversion is anticipated. The transmission and water supply corridors would continue to be available for grazing. As a result, the review team expects that new impacts on land use and visual resources from operation would be minimal. Any changes to assumptions made by the applicant in the ER for the proposed action would be identified in the OL application and reevaluated by the NRC staff for impacts at that stage.

3.1.4 Environmental Impacts of Decommissioning

The review team expects that land-disturbing activities during decommissioning would be similar to those during construction. Although most work would take place within the land occupied by the formerly operational facilities, some adjoining onsite land might be temporarily required for laydown of equipment and materials. Decommissioning could ultimately free up all or part of the site for other uses. The overall visual appearance of the site would remain industrial throughout decommissioning, but depending on how decommissioning is performed, the site could then revert to a vacant appearance until the site is ultimately redeveloped. The applicant indicates that the site may be available for other land uses after decommissioning is complete (TerraPower 2024-TN10896. The decommissioning impacts on land use and visual resources would be bounded by the analyses in NUREG-0586, Supplement 1, "Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities" (the decommissioning generic EIS) (NRC 2002-TN7254). Although the conclusions of the decommissioning generic EIS extend only to the site and not to surrounding lands, the land use impacts for decommissioning Kemmerer Unit 1 would not involve the use of surrounding land. As a result, the review team expects that new impacts on land use and visual resources associated with decommissioning would be minimal. Any changes to assumptions made by the applicant in the ER associated with decommissioning would be reevaluated by the NRC staff for impacts at that stage.

3.1.5 Cumulative Impacts

The review team's analysis of cumulative land use and visual impacts focused on those past, present, and reasonably foreseeable projects from Appendix E that lie within the 6 mi (9.7 km) vicinity of the site. In addition to the proposed action, other actions considered include the TFF, Naughton Power Plant (including its proposed conversion from coal to natural gas), and proposed improvements to US Route 189 and other roads in the vicinity. As described in Appendix E, the TFF would permanently disturb approximately 17.5 ac (7.1 ha) of shrub/scrub rangeland and temporarily disturb an additional 14.5 ac (5.9 ha) adjacent to the Kemmerer Unit 1 site. The review team does not expect that the Naughton Power Plant conversion or road improvements to US Route 189 and other roads would affect substantial areas of additional land or substantially alter the overall appearance of the sites.

3.1.6 Conclusions

The review team concludes that the potential direct, indirect, and cumulative impacts of the proposed action on land use and visual resources would be SMALL. This conclusion is based upon the above analysis and is supported by the small amount of land needed for the construction of the Kemmerer Unit 1 facility and infrastructure, particularly in comparison to the large amount of undeveloped land in the surrounding area, and the ability of these lands to support the area's existing uses such as grazing.

3.2 <u>Air Quality</u>

3.2.1 Affected Environment

A detailed description of the proposed Kemmerer Unit 1 site and the local environment around the proposed site is provided in the applicant's ER (TerraPower 2024-TN10896); a summary of the affected environment is provided here. The proposed site is located in Lincoln County, Wyoming, approximately 3 mi (4.8 km) south of the City of Kemmerer at an elevation of 6,947 ft (2,117 m). This area is nominally 85 mi (136.8 km) northeast of Salt Lake City, Utah, and 66 mi (106.2 km) west of Rock Springs, Wyoming. Statewide, the climate is largely driven by its mid-latitude location far from oceanic moisture sources. While the jet stream results in periodic storm systems, the lack of moisture sources leads to a mostly semiarid climate. Due to the State's semiarid climate, temperatures can vary widely from day to night. The hottest year on record was 2012, with a statewide annual average temperature of 44.8 degrees Fahrenheit (°F) (7.1 degrees Celsius [°C]) (3.8°F [5.0°C] higher than the long-term [1895–2020] average) (Frankson et al. 2022-TN10898). High-pressure systems often bring fair weather, clear skies, and calm conditions to Kemmerer. These systems are associated with descending air and typically result in dry conditions. Low-pressure systems, on the other hand, can bring more variable and dynamic weather associated with rising air and often lead to cloudiness, precipitation, and sometimes thunderstorms.

Kemmerer, Wyoming, experiences a relatively cool climate, rarely exceeding 100°F (38°C), although temperatures across Wyoming have risen about 2.5°F (1.4°C) since the beginning of the 20th century (Frankson et al. 2022-TN10898). Kemmerer experiences a wide range of temperatures throughout the year. Winters are typically cold, with temperatures often dropping below freezing. The region tends to have low humidity levels, especially during the summer months. This low humidity can contribute to dry conditions typical of semiarid climates. Precipitation in Kemmerer is relatively low, and the area can be prone to drought conditions. Most precipitation occurs during the spring and early summer, with occasional thunderstorms. Winters are drier, with snowfall being the primary form of precipitation. Wyoming, like the rest of the Great Plains, is susceptible to droughts, which are occasionally severe (Frankson et al. 2022-TN10898).

To characterize the local and regional climate, the applicant used climatological data collected from several sources (TerraPower 2024-TN10896). Station selection varied with respect to the parameter evaluated based on requisite data availability and coverage. A detailed evaluation was performed, which assessed meteorological stations within 50 mi (80.5 km) of Kemmerer Unit 1 to determine the representativeness and applicability for use in determining extreme weather values. The objective of selecting nearby, offsite climatological monitoring stations is to demonstrate that the mean and extreme values measured at those locations are reasonably representative of conditions that might be expected to be observed at Kemmerer Unit 1.

Severe weather events include extreme wind; tornadoes; water precipitation extremes; hail, snowstorms, and ice storms; thunderstorms and lightning; snowpack and probable maximum winter precipitation; extreme temperatures; and restrictive dispersion conditions. Severe weather phenomena that most likely may affect Kemmerer Unit 1 and the region include, but are not limited to, thunderstorms, lightning, and tornadoes. These phenomena are considered in the design and operating bases of the proposed facility. A discussion of severe weather events for the proposed site is provided in Section 2.7.1 of the ER (TerraPower 2024-TN10896).

Air quality is typically evaluated with respect to the National Ambient Air Quality Standards (NAAQS) established by the U.S. Environmental Protection Agency (EPA) for six criteria pollutants: carbon monoxide (CO), lead, nitrogen oxide (NO_x), ozone, particulate matter (PM), and sulfur dioxide (SO_2). The portion of Lincoln County in which Kemmerer Unit 1 would be located has concentrations of NAAQS lower than regulatory thresholds and thus is considered to be in attainment. The nearest nonattainment area to Kemmerer Unit 1 is the Upper Green River Basin Ozone Nonattainment Area (EPA 2024-TN10899) (Figure 2.7-63 of the ER (TerraPower 2024-TN10896)). While this area is in nonattainment, monitored ozone in the Upper Green River Basin met the 2008 ozone standard by July 2015. The Wyoming Department of Environmental Quality is currently assessing a pathway for submitting a request to the EPA to redesignate the Upper Green River Basin back to attainment for the 2008 Ozone NAAQS (WYDEQ 2024-TN10900).

Class 1 Federal lands, as identified under the Federal Clean Air Act, include areas such as national parks, national wilderness areas, and national monuments. These areas are granted special air quality protections under Section 162(a) of the Federal Clean Air Act. Section 51.307 in 40 CFR requires the operator of any new major stationary source or major modification that may affect visibility in any Federal Class I area to contact the Federal land managers for that area. The nearest Class I Federal area is Grand Teton National Park, which is approximately 128 mi (206 km) from the Kemmerer Unit 1 site; at this distance, visibility within the park would not be impacted.

In addition to the NAAQS, the EPA requires compliance with emission rules for greenhouse gases (GHGs). This includes the final rule for mandatory GHG reporting by large GHG emission sources in the U.S. (74 FR 56260-TN1024) and the GHG tailoring rule (75 FR 31514-TN1404). The estimated annual carbon dioxide (CO_2) emissions from Kemmerer Unit 1 (both during construction and operation) are less than the thresholds for each of these rules and, therefore, they should not apply.

3.2.2 Environmental Impacts of Construction

Air quality impacts from construction of Kemmerer Unit 1 are anticipated to be typical for construction of a similar sized power plant. Temporary and minor impacts to the local ambient air quality could occur from emissions of fugitive dust and fine PM emissions associated with preparation, excavation, backfilling, grading, compacting, concrete batching, and vehicular travel. Wind-blown dust from unvegetated areas is also a potential source of airborne PM. Additionally, construction equipment and offsite vehicles produce emissions typical of combustion engines.

The ER used EPA emission factors to calculate the maximum estimated emissions from various onsite construction activities (TerraPower 2024-TN10896). The estimates used conservative values for emission factors, conservatively assumed no carpooling for the commuting vehicles, a disturbance area of 511 ac (207 ha) for transmission and water lines, and Tier 2 diesel construction engines. Emissions of a number of compounds were considered: PM of 2.5 micrometers diameter or less ($PM_{2.5}$), PM of 10 micrometers diameter or less (PM_{10}), CO, NO_x, SO_2, CO_2, and volatile organic compounds (VOC) (Table 3-1 below). The largest contributor to PM_{10} emissions is estimated to be vehicle travel on unpaved roads. Similarly, the largest contributor to CO and CO_2 emissions will be vehicle travel to and from the site. These emissions are a conservative estimate; simple steps to reduce emissions could include dust control on roads (i.e., gravel, wetting, paving) and reduction in commuter trips (i.e., carpooling, mass transit).

Table 3-1 Estimated Emissions of Four National Ambient Air Quality Standards Pollutants, Carbon Dioxide, and Volatile Organic Compounds During Construction of Kemmerer Unit 1

Source	$PM_{2.5}$ (tons/yr)	PM_{10} (tons/yr)	CO (tons/yr)	NO_x (tons/yr)	SO_2 (tons/yr)	CO_2 (tons/yr)	VOC (tons/yr)
Unpaved Roads	28.33	133.7	-	-	-	-	-
Various Construction Activities	15.9	80.69	-	-	-	-	-
Transmission/Water Line Construction	4.81	20.79	4.79	8.84	0.36	-	0.77
Onsite Combustion	5.12	5.56	44.67	82.48	3.32	-	7.18
On-Road Commuting	1.53	1.64	88.10	7.79	0.15	15,838	2.26
On-Road Delivering	1.13	1.17	11.81	26.46	0.06	6,616	2.49
Construction Totals	56.82	243.5	149.4	125.6	3.89	22,454	12.69

CO = carbon monoxide; CO_2 = carbon dioxide; NO_x = nitrogen oxides; PM = particulate matter; SO_2 = sulfur dioxide; VOC = volatile organic compound.
"-" denotes no content in table cell.
Adapted from TerraPower 2024-TN10896, TerraPower 2024-TN11009.

Impacts to air quality during construction would be minimized by compliance with Federal, State, and local regulations that govern building activities and emissions. Further, these emissions will disperse and approach background concentrations within 7 km (4.3 mi) of the release point. For example, using a conservative Gaussian dispersion equation, assuming neutral dispersion conditions with low wind speeds, and assuming the annual emissions occur uniformly over the year, the PM_{10} concentration is modeled to decrease to 10 micrograms per cubic meter ($\mu g/m^3$) 6 km downwind of the site.

Aside from the six common criteria pollutants, the EPA has set NAAQS for heat-trapping GHGs such as methane, nitrous oxide, and halocarbons, which would be produced during construction. The GHG of primary concern is CO_2. NRC guidance provides that the total estimated carbon footprint for construction of a 1,000 MWe nuclear power plant is 82,000 metric tons (MT) (NRC 2014-TN3768). The building activities in this guidance are conservatively assumed to last for 7 years; the planned duration of Kemmerer Unit 1 construction is 5 years. The estimated annual emissions are below the thresholds for the EPA's GHG reporting rule and GHG tailoring rule of 25,000 MT CO_2 (74 FR 56260-TN1024, 75 FR 31514-TN1404).

Air emissions from the facility during construction are estimated to be greater than the 100 tons per year EPA requirement for major Title V sources for applicable criteria pollutants (i.e., PM_{10}, CO, and NO_x). Air emissions are estimated to be below the 100 tons per year EPA requirement for SO_2 and VOC.

A construction air permit from the Wyoming Department of Environmental Quality would be required to construct Kemmerer Unit 1, according to Wyoming Air Quality Regulations (WYDEQ 2010-TN11221) Chapter 6 (TerraPower 2024-TN10896). Air emission-producing equipment such as diesel generators, propane heaters, and the concrete batch plant would be permitted under the Air Quality Division New Source Review regulations. Federal emission regulations for engines include 40 CFR Part 63 (TN1403) and 40 CFR Part 60 Subpart JJJJ and Subpart IIII (TN1020).

While emissions from construction activities and equipment would be unavoidable, dust suppression and equipment management requirements outlined in the Storm Water Pollution Prevention Plan would minimize impacts to local ambient air quality and the nuisance impact to the public close to the project. The mitigation measures could include:

- phasing construction to minimize daily emissions, and
- performing proper maintenance of construction vehicles to maximize efficiency and minimize emissions.

3.2.3 Environmental Impacts of Operation

This section describes potential impacts on air quality from operation of Kemmerer Unit 1. A more detailed analysis of the air quality impacts from operating activities would be conducted during the environmental review of an OL application, if USO submits one. Annual impacts to air quality from operation of Kemmerer Unit 1 would be significantly less than those during construction; the estimated annual emissions during operation for the various constituents are between 2 and 50 times lower than those during construction (Table 3-2 below). During the 40-year operational period, air emissions from the facility are estimated to be below the 100 tons per year EPA requirement for major Title V sources for all criteria pollutants (40 CFR Part 71-TN10901). Chemical exposures through air emissions are anticipated to be even lower during operations. Any changes to assumptions made by the applicant in the ER for the proposed action would be identified in the OL application and reevaluated by the NRC staff for impacts at that stage.

Table 3-2 Estimated Emissions of Four National Ambient Air Quality Standards Pollutants, Carbon Dioxide, and Volatile Organic Compounds During Operation of Kemmerer Unit 1

Source	$PM_{2.5}$ (tons/yr)	PM_{10} (tons/yr)	CO (tons/yr)	NO_x (tons/yr)	SO_2 (tons/yr)	CO_2 (tons/yr)	VOC (tons/yr)
On-Road Commuting	0.18	0.20	10.58	0.94	0.02	1,902	0.27
On-Road Delivering	0.20	0.21	2.07	4.64	0.01	1,161	0.44
Paved Roads	0.60	3.53	-	-	-	-	-
Standby Diesel Generators	0.60	0.62	4.87	21.23	0.01	1,06	-
Auxiliary Diesel Boiler	0.08	0.08	0.19	0.90	0.03	836	0.01
Maintenance During Operations	-	-	-	-	-	4,987	-
Operation Total	1.66	4.62	17.71	27.71	0.07	8,733	0.72

CO = carbon monoxide; CO_2 = carbon dioxide; NO_x = nitrogen oxides; PM = particulate matter; SO_2 = sulfur dioxide; VOC = volatile organic compound.
"-" denotes no content in table cell.
Sources: TerraPower 2024-TN10896, TerraPower 2024-TN11009.

3.2.4 Environmental Impacts of Decommissioning

The equipment and vehicles used during decommissioning would likely be similar to those used during construction and would emit GHG. There are no planned activities that would alter the relative numbers of the decommissioning workers to construction workers. Therefore, GHG emissions attributed to Kemmerer Unit 1 decommissioning are expected to be bounded by those identified in NRC guidance (or less than 47,000 MT carbon dioxide equivalent over the duration of decommissioning) (NRC 2014-TN3768). Any changes to assumptions made by the applicant in the ER associated with decommissioning would be reevaluated by the NRC staff for impacts at that stage.

3.2.5 Cumulative Impacts

Appendix E describes past, present, and reasonably foreseeable future projects that could cumulatively contribute to the environmental impacts of the proposed action. Key past, present, and reasonably foreseeable future actions affecting air quality in the region include projects such as the TFF, the conversion of Naughton Power Plant from coal to natural gas, and other projects that may emit criteria pollutants or GHGs during construction and operation. Continued development of new industrial facilities, increased traffic and populations, and the continuation of mineral extraction operations may affect local air quality.

New projects would all be governed by new construction air permits processed through the Wyoming Department of Environmental Quality. The permit process would ensure that counties potentially impacted would continue to be in attainment or maintenance. Additionally, any facilities that are currently operating would continue to operate within their permit limits. Permitting reviews performed by the Wyoming Department of Environmental Quality are conducted to ensure that new projects do not result in regional air quality degradation.

3.2.6 Conclusions

The review team concludes that the potential direct, indirect, and cumulative impacts of the proposed action on air quality would be SMALL. This conclusion is based upon the above analysis and is supported by the expectation that compliance with Federal, State, and local regulations that govern construction activities and emissions would further minimize any impacts. Additionally, air quality impacts from building activities would be mitigated by fugitive dust, sediment, and erosion controls as well as by phasing construction to minimize daily emissions. Air emission-producing equipment would be permitted under the Wyoming Department of Environmental Quality Air Quality Division New Source Review regulations.

3.3 Geology

This section provides a general description of the geology at the Kemmerer Unit 1 site and surrounding region, which informs the groundwater and surface water analysis described in Section 3.4. A detailed description of the regional and site-specific geology of the Kemmerer Unit 1 site is provided in Section 2.6 of the PSAR (TerraPower 2024-TN10896). The review team's description of site and vicinity geologic features and the detailed analyses and evaluations of geologic, seismic, and geotechnical data as required for an assessment of site safety issues related to the proposed plant are, or would be, included in the NRC staff's safety evaluation.

3.3.1 Affected Environment

The Kemmerer Unit 1 site lies near the eastern margin of the Middle Rocky Mountains physiographic province. This province occupies portions of five States and is characterized by mountainous terrain, sharp ridge lines, stream valleys, and alluvial basins (TerraPower 2024-TN10896). In the vicinity of the site (within 25 mi [40 km]), resistant sandstone beds underlie the ridges, while basins are underlain by shale and siltstone (TerraPower 2024-TN10896).

The site is located in the eastern portion of Cumberland Flats, a relatively flat, north–south trending valley produced from weathering of the Upper Cretaceous age (66.0 to 100.5 million years ago [Ma]) Hilliard Shale. At the Kemmerer Unit 1 site, borings of this unit encountered predominately siltstone, sandy siltstone, interbedded sandstones, and minor clay intervals up to 0.2 m thick (TerraPower 2024-TN10896). Quaternary (2.58 Ma to present) alluvial deposits of predominately clay, silt, and sand are present in the stream valleys and drainages across Cumberland Flats (Figure 3-1). Quaternary deposits of well-rounded gravel, cobble, and boulders can be found on some topographically higher benches, including on the Kemmerer Unit 1 site. Quaternary colluvial deposits transported by hillslope processes (e.g., landslide) are present in hollows and at the base of hills. No distinct landslides have been observed on the site (TerraPower 2024-TN10896).

The Upper Cretaceous Frontier Formation comprises Oyster Ridge, the eastern boundary of Cumberland Flats. This formation consists of an interbedded sequence of sandstone, siltstone, and carbonaceous shale, striking generally to the north and dipping 20° to 30° to the west (TerraPower 2024-TN10896). Borehole B-122 at the site was advanced through the Hilliard Shale and encountered the uppermost Frontier Formation member at a depth of 1,255 ft (382.5 m) below ground surface (bgs), equivalent to an elevation of 5,501.5 ft (1,676.8 m) North American Vertical Datum of 1988 (NAVD 88) (TerraPower 2024-TN10896), more than 1,100 ft (335 m) below the maximum excavation depth.

The existing elevation of the Kemmerer Unit 1 site ranges from 6,730 to 6,760 ft (2,051 to 2,060 m) NAVD 88 from the drainage way to the ridge, with the plant grade in the NI at 6,757 ft (2,059.5 m) NAVD 88 (TerraPower 2024-TN10896). Based on borings, a generalized profile of subsurface materials at the site was characterized as about 20 ft (6 m) of overburden soil underlain by 30 ft (9 m) of rock grading from completely to slightly weathered (TerraPower 2024-TN10896). Fresh rock was generally found at a depth of about 50 ft (15 m) bgs. Groundwater was encountered at the site in the weathered rock (TerraPower 2024-TN10896).

Excavation for the Rx Building would be to a depth of 118 ft (36.0 m) below plant grade, at an elevation of 6,639 ft (2,024 m) NAVD 88 (TerraPower 2024-TN10896). Excavation of overburden soils and weathered rock would use conventional equipment with dewatering, rock dowels/bolts, and shotcrete used to support excavation faces. Controlled blasting would be used to excavate fresh rock. Figure 3-2 from the PSAR shows an east–west cross section through the Rx Building excavation that mainly distinguishes fresh rock from weathered rock horizons underlying the site without stratigraphic unit names.

The Wyoming State Geological Survey identifies expansive soils as a potential hazard, with Cumberland Flats being a regional area of susceptibility for a moderate hazard (Wittke et al. 2022-TN10903). Other potential geologic hazards identified by the State include a moderate landslide susceptibility on some of the steeper slopes in the vicinity of the site and a moderate radon source potential. Potential geologic hazards at the site are addressed in the NRC staff's safety evaluation.

Geologic resources within the site vicinity include bentonite, coal, phosphorous, sulfur, oil, and gas (TerraPower 2024-TN10896). Other than the coal mine located about 3.7 mi (6.0 km) west of the Kemmerer Unit 1 site, no rare or unique geologic resources, such as critical minerals, are identified within the site vicinity or within the transmission and water macro-corridors (USGS 2025-TN11226). Soils in the area of the site are well-drained and loamy with varying amounts of clay, sand, and gravel (USDA 2025-TN11218). Soil susceptibility to erosion by wind and water is low to moderate (USDA 2025-TN11218).

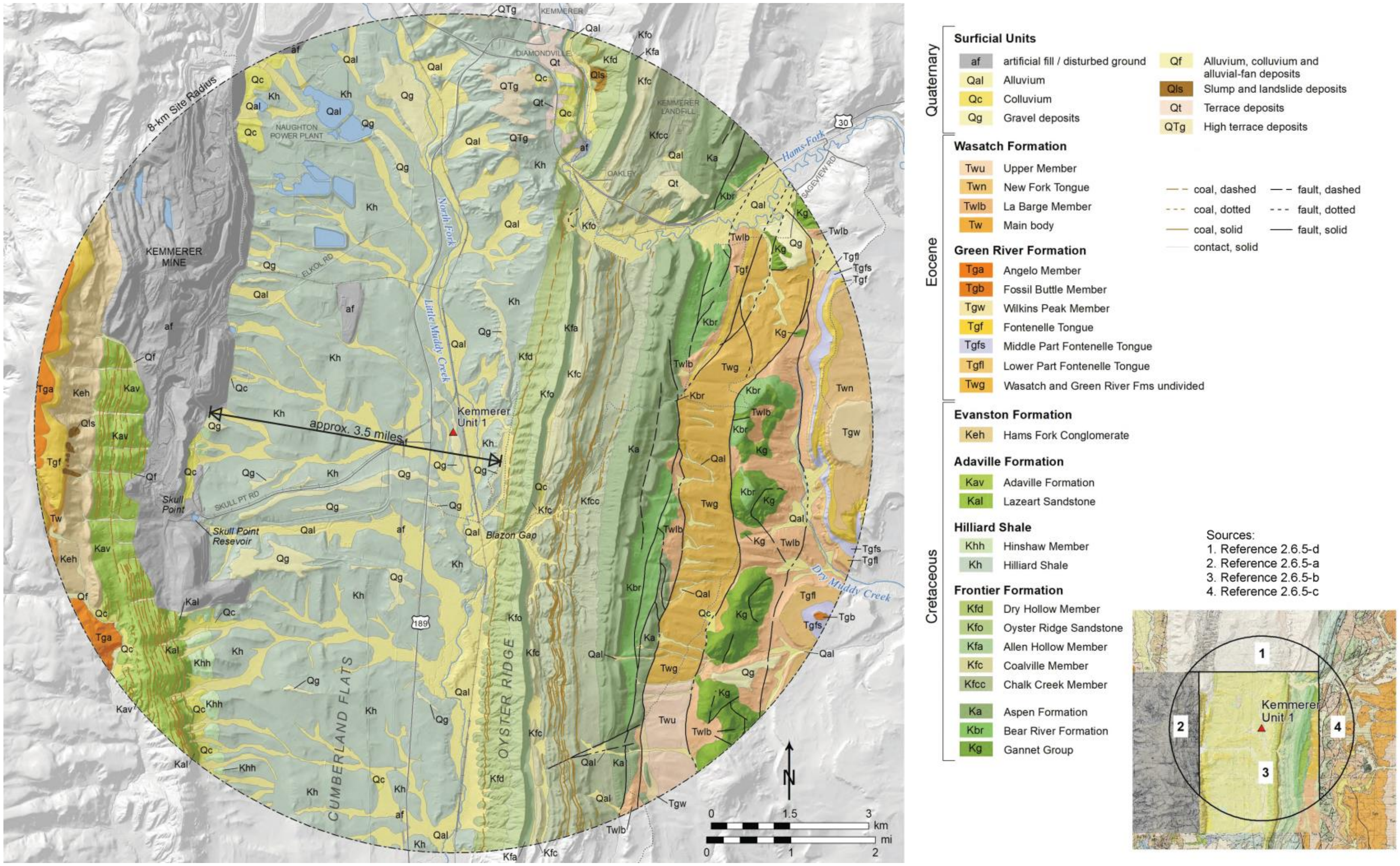

Figure 3-1 Surface Geologic Map of the Kemmerer Unit 1 Vicinity. Source: TerraPower 2024-TN10896.

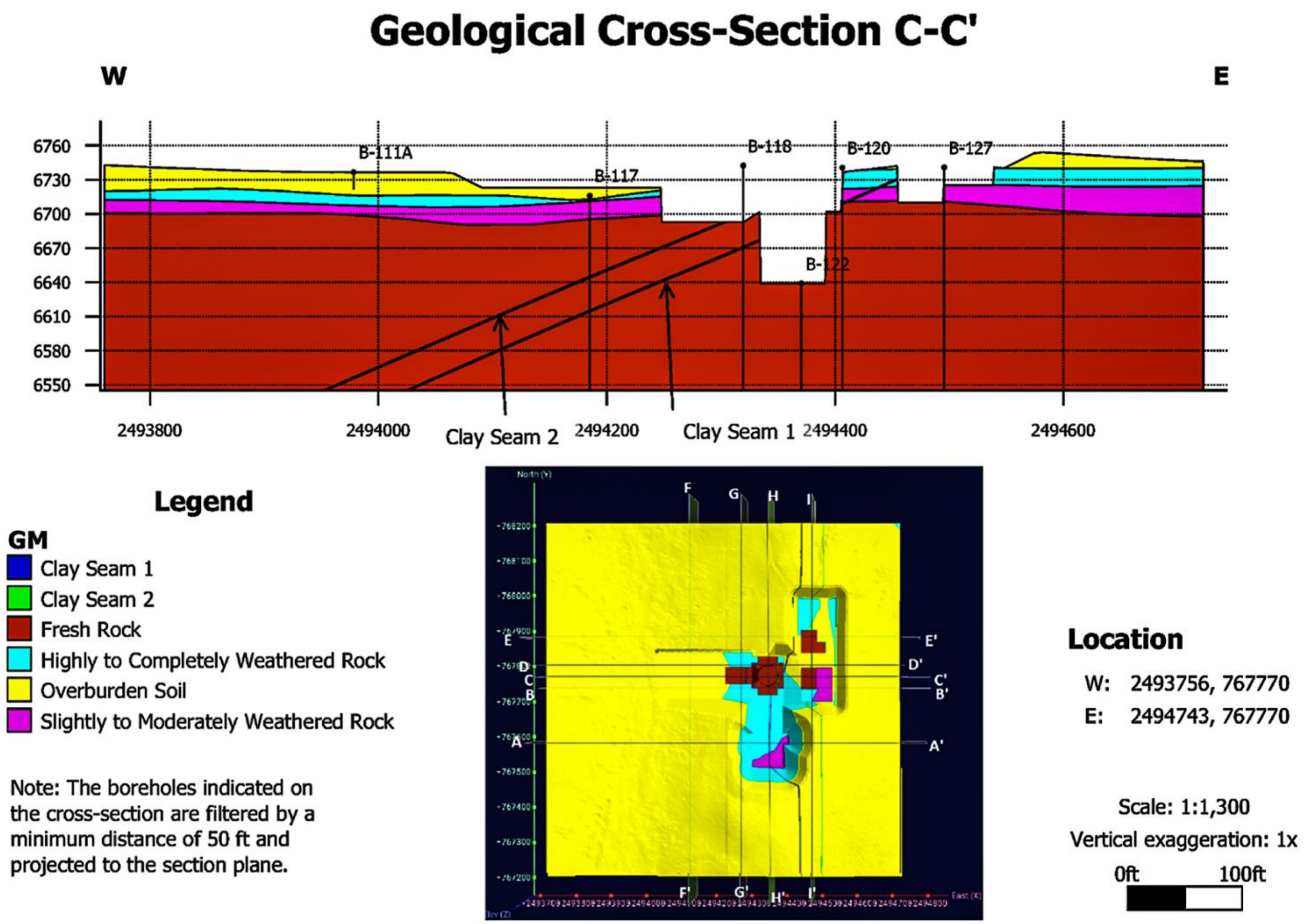

Figure 3-2 East–West Cross Section (Vertical Axis Shows Elevation, ft NAVD 88) through the Reactor Building Location of Kemmerer Unit 1 Showing the Extent of Proposed Excavations and the Subsurface Materials Encountered in Site Borings. Source: TerraPower 2024-TN10896.

3.4 <u>Hydrology and Water Resources</u>

3.4.1 Surface Water

This section describes the hydrology, water use, and water quality of the potentially affected surface-water resources in the Kemmerer Unit 1 region. A description of surface-water hydrology is provided in Section 2.2 of the ER (TerraPower 2024-TN10896) and Section 2.5 of the PSAR (TerraPower 2024-TN10896). The descriptions presented here are based on information from these and other sources of publicly available hydrologic information.

3.4.1.1 Affected Environment

<u>The Site Region</u>

The Kemmerer Unit 1 site is located in the Upper Green River Basin in Lincoln County, Wyoming, on the east side of U.S. Route 189 (Figure 3-3 and Figure 3-4) (TerraPower 2024-TN10896). The City of Kemmerer is approximately 3 mi (4.8 km) to the north, and the Town of Diamondville is adjacent to the City of Kemmerer (Figure 3-4). The Naughton Power Plant is approximately 3.8 mi (6.1 km) northwest of the Kemmerer Unit 1 site (Figure 3-4).

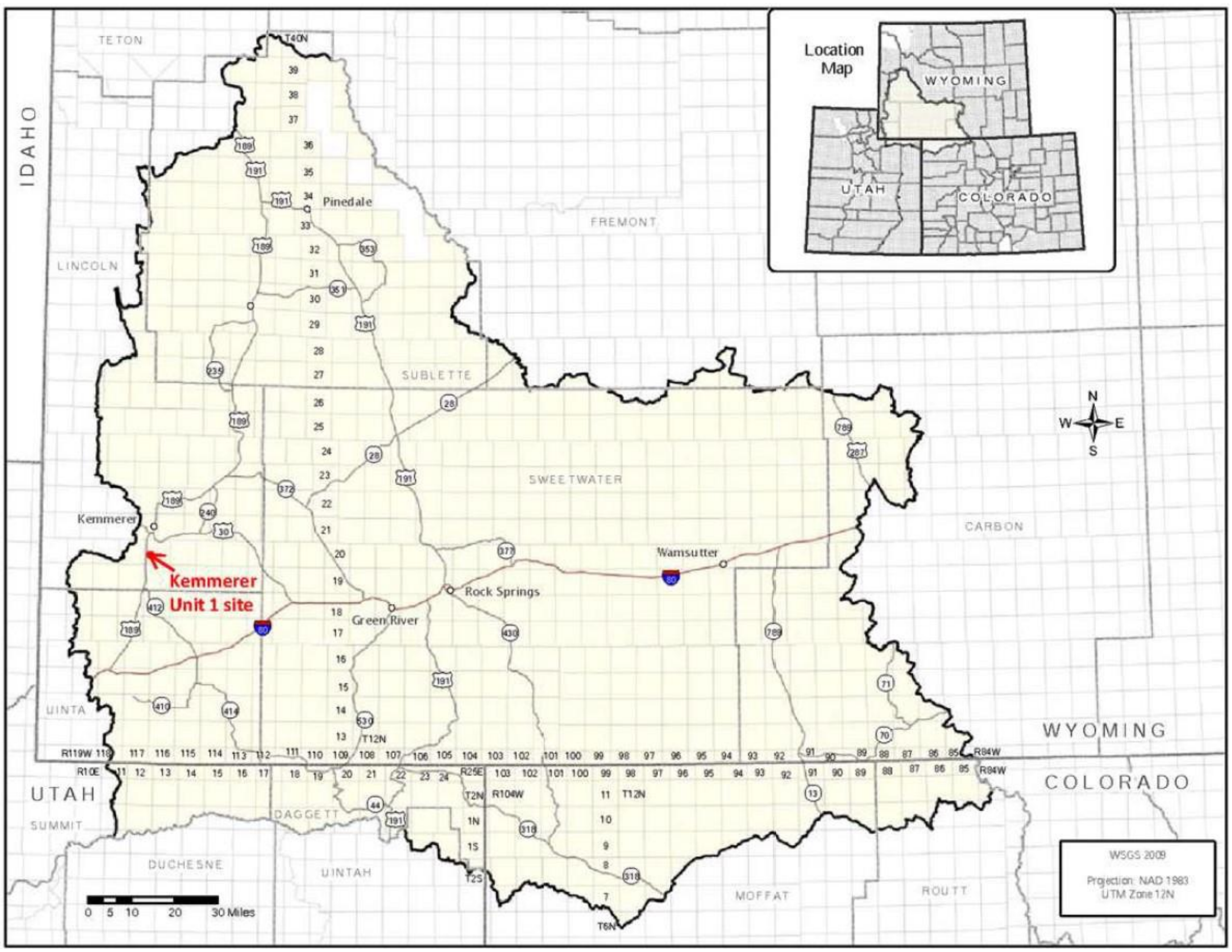

Figure 3-3 Kemmerer Unit 1 Site Within the Green River Basin. Source: TerraPower 2024-TN10896.

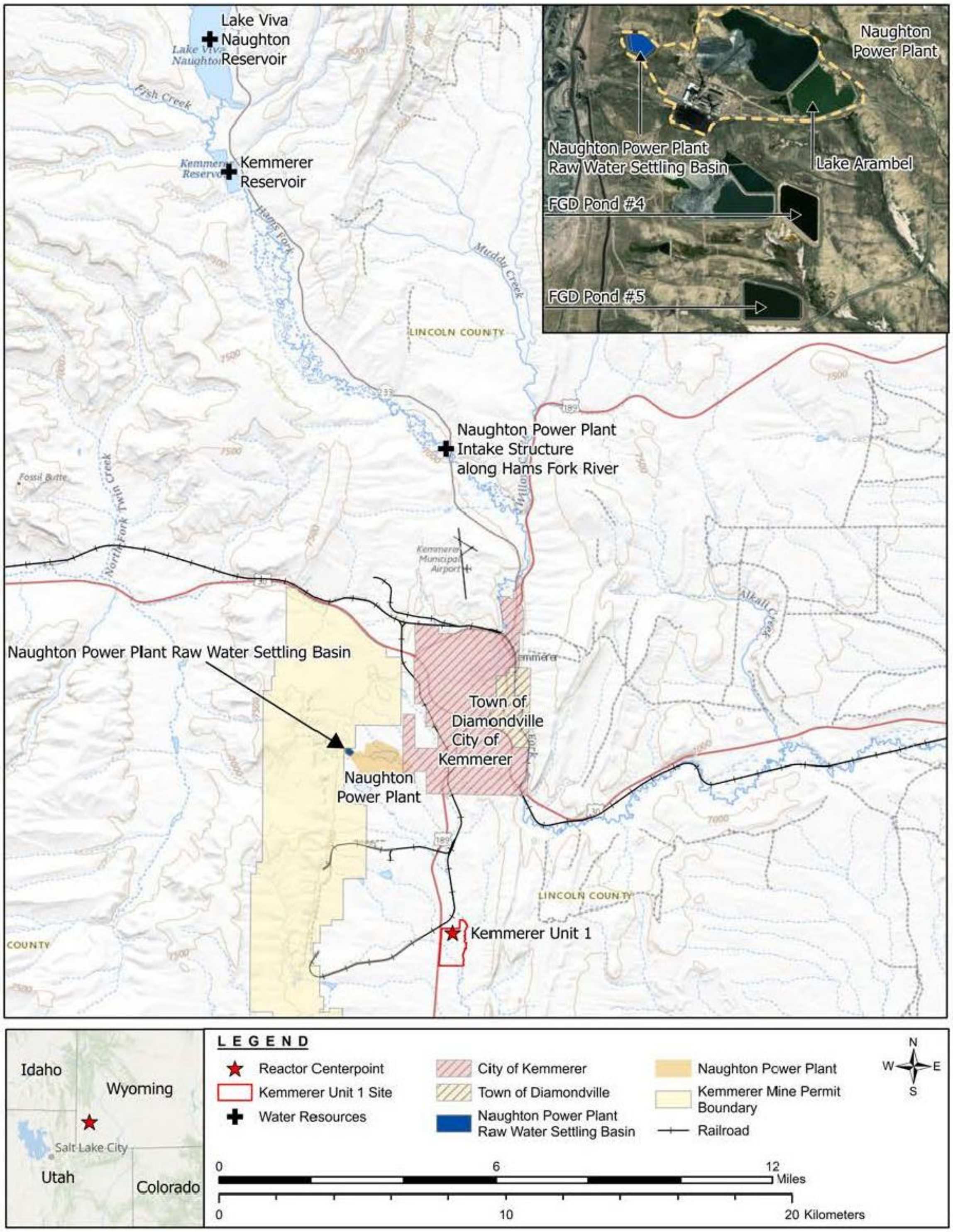

Figure 3-4 Kemmerer Unit 1 Site, Nearby Cities, Industries, and Surface-Water Features. Source: TerraPower 2024-TN10896.

The Upper Green River Basin drains areas in the States of Wyoming, Colorado, and Utah. The basin comprises significant areas of Wyoming's Sweetwater, Sublette, Carbon, Lincoln, and Uinta Counties. Green River generally drains to the south before it merges with the Colorado River. The surface-water features of relevance to Kemmerer Unit 1 include the Viva Naughton Reservoir, the Kemmerer Reservoir, and Hams Fork River (Figure 3-4). The site is located within the Upper NFLMC drainage (Figure 3-5). The NFLMC flows through the site on its eastern edge. An unnamed tributary to the NFLMC flows through the site to the southeast from across U.S. Highway 189 (Figure 3-5).

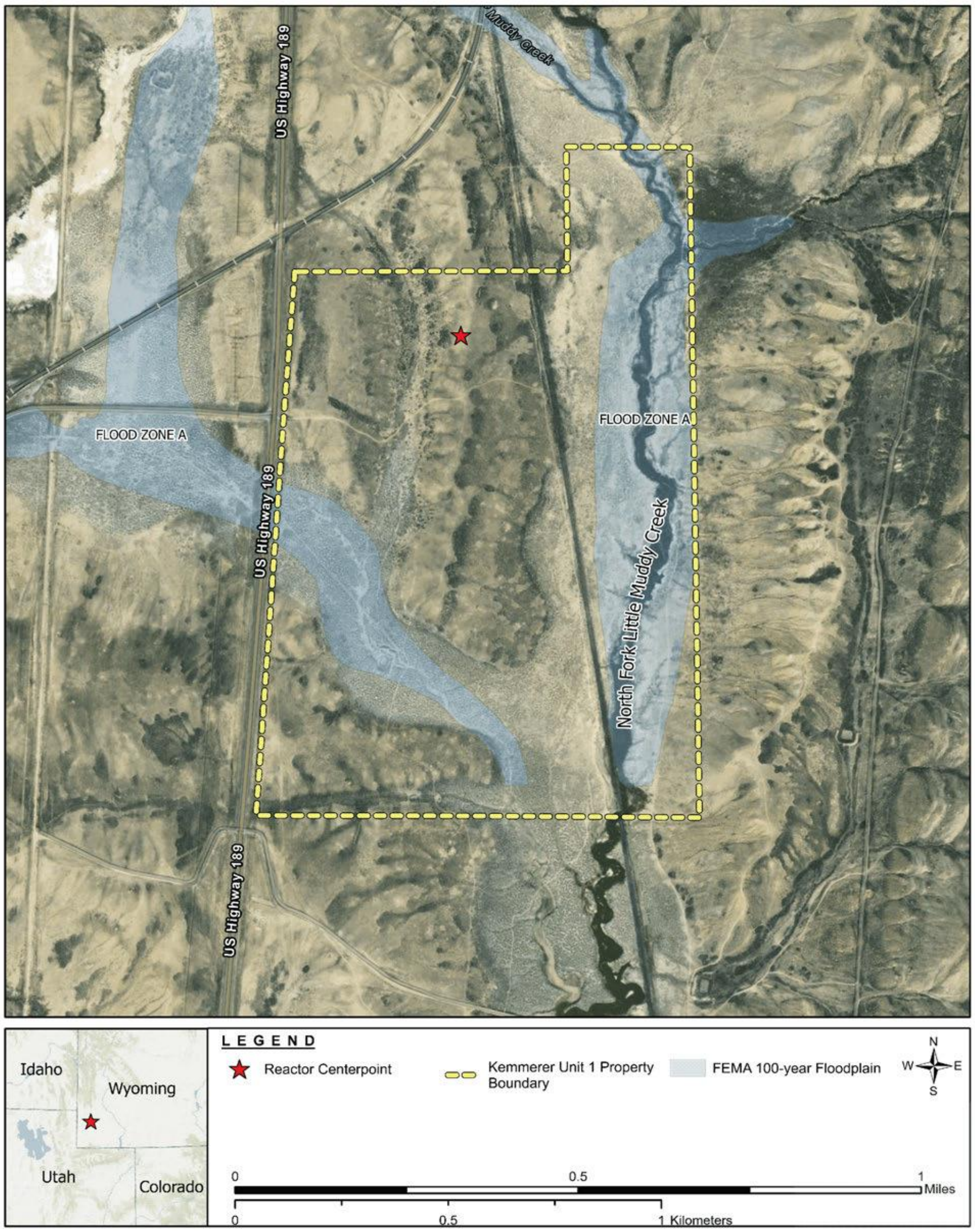

Figure 3-5 Kemmerer Unit 1 Site, U.S. Highway Route, North Fork Little Muddy Creek, and the 1-Percent Change Floodplain. Source: TerraPower 2024-TN10896.

Regional Climate

The regional climate is semiarid with approximately 9.4 in. (23.9 cm) of annual average precipitation based on June 1990 through May 2016 data recorded at Kemmerer 2N station (WRCC 2024-TN10904). At the same station, annual average maximum and minimum temperatures were 53.8°F and 23.6°F (12.1°C and -4.7°C), annual average total snowfall was 50.5 in. (128.3 cm), and average annual snow depth was 2 in. (5 cm) (WRCC 2024-TN10904). The ER states that the Kemmerer Unit 1 meteorological station measured annual precipitation of 4.91 in. (12.5 cm) between April 9, 2022, and April 8, 2023 (TerraPower 2024-TN10896). Over the same period, precipitation measured at the Naughton Power Plant meteorological tower was 6.15 in. (15.6 cm), and that at Big Piney, Wyoming station was 6.85 in. (17.4 cm) (TerraPower 2024-TN10896). In comparison, annual total precipitation during 2019 and 2020 at Naughton Power Plant was 9.59 in. (24.4 cm) and 5.17 in. (13.1 cm).

Based on 1990–2024 data, average temperatures at Kemmerer 2N station fall below freezing from November through March (WRCC 2025-TN11161). Based on 1989–2024 data, snowfall occurs during the months of September through June with December through February being the heaviest snowfall months with mean snowfalls of 8.78, 8.9, and 5.3 in. (22.3, 22.6, and 13.5 cm) and maximum snowfalls of 32.0, 33.1, and 23.0 in. (81.3, 84.1, and 58.4 cm) (WRCC 2025-TN11162). Snow accumulation generally persists from January through March.

Lincoln County in Wyoming, where the Kemmerer Unit 1 site is located, has experienced frequent drought conditions (Figure 3-6), including the Dust Bowl drought of the 1930s. From mid-2002 through the end of 2005, almost all of the county was in extreme to exceptional drought. A large portion of the county was in severe or extreme drought from mid-2021 through the end of 2023. More recently, since late November 2024, about 60 percent of the county has been in severe drought, and about 27 percent in extreme drought (Figure 3-6) (NOAA 2025-TN11163).

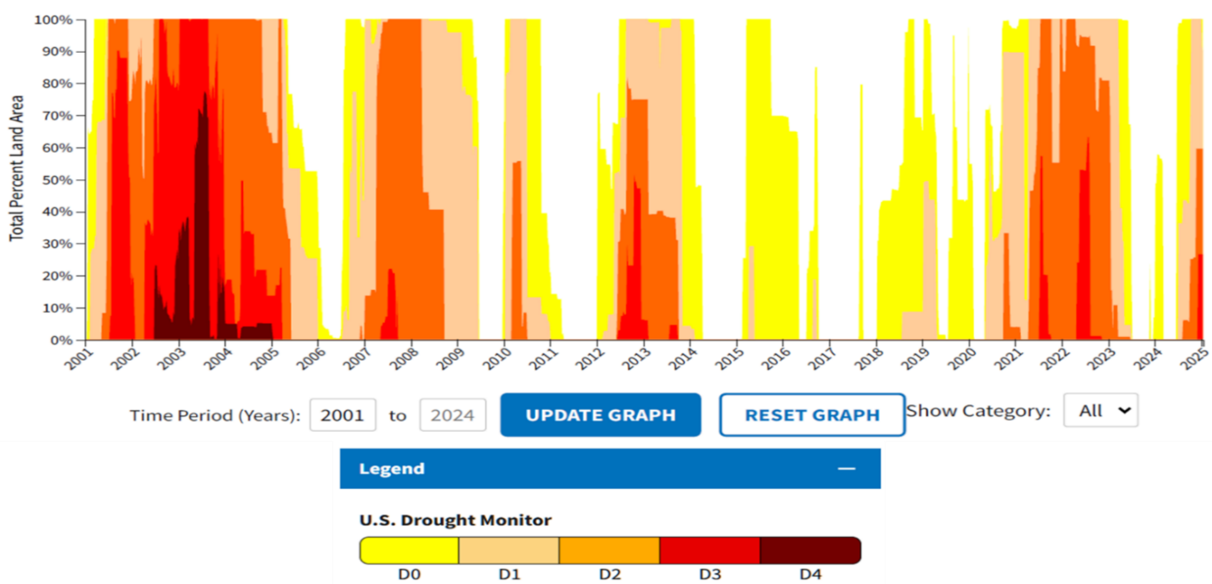

Figure 3-6 Precipitation-Based Drought in Lincoln County, Wyoming, Since 2001. This Graph Uses Five Drought Categories: D0–Abnormally Dry, D1–Moderate Drought, D2–Severe Drought, D3–Extreme Drought, and D4–Exceptional Drought (NOAA 2025-TN11163).

Regional Surface-Water Features

Originating in the Wyoming Range of the Rocky Mountains, Hams Fork River flows south and southeast approximately 160 mi (257 km) to merge with Blacks Fork in Sweetwater County, Wyoming (TerraPower 2024-TN10896). The Blacks Fork flows into the Green River just above the Flaming Gorge Reservoir. Based on streamflow measurements during water years 2007 through 2016 at the United States Geological Survey (USGS) gauge, monthly mean discharge in Hams Fork River below the Viva Naughton Reservoir ranges from 32 cubic feet per second (cfs) (0.9 cubic meters per second [m^3/s]) in March to 413 cfs (11.7 m^3/s) in June (USGS 2025-TN11164). The annual discharge at this USGS gauge ranged from 52.3 cfs (1.5 m^3/s) in water year 2013 to 246.9 cfs (7.0 m^3/s) in water year 2011 (USGS 2025-TN11168). Peak streamflow discharge ranged from 147 cfs (4.2 m^3/s) in water year 2013 to 1,150 cfs (32.6 m^3/s) in water year 2011 (USGS 2025-TN11167).

At the Kemmerer Unit 1 site, flow in the NFLMC is sustained by discharge from the Naughton Power Plant (TerraPower 2024-TN10896). Runoff during spring snowmelt and following heavy precipitation events also occurs in NFLMC. The unnamed tributary to the NFLMC is ephemeral and carries runoff during spring snowmelt and following heavy precipitation events.

Viva Naughton Reservoir is an impoundment on Hams Fork River approximately 18 mi (29 km) northwest of the Kemmerer Unit 1 site (TerraPower 2024-TN10896). At the dam, Viva Naughton Reservoir has an approximately 235 mi^2 (609 km^2) drainage area (TerraPower 2024-TN10896). The reservoir is owned by PacifiCorp and is used for fishing, hunting, camping, boating, and other recreational activities. The reservoir is a State-designated Class 2AB waterway, protected for cold-water fishery, drinking water, game fish, non-game fish, fish consumption, other aquatic life, recreation, wildlife, agriculture, industry, and scenic value (WYDEQ 2021-TN10905). Viva Naughton Reservoir is approximately 1,525 ac (617 ha) in surface area. Its maximum operating water level is 7,241.7 ft (2,207.3 m) NAVD 88 with a corresponding storage volume of 44,732 ac-ft (55.2 million m^3). Raw water for the Naughton Power Plant is provided from the Viva Naughton Reservoir via an intake structure on Hams Fork River. Releases from the Viva Naughton Reservoir are controlled. Water is pumped from the intake structure through two 7 mi (11 km) long buried pipelines to the raw water settling basin on the Naughton Power Plant site (Figure 3-7).

Kemmerer Reservoir, located approximately 1 mi (1.6 km) south of Viva Naughton Reservoir, is a source of drinking water for the City of Kemmerer, Town of Diamondville, and surrounding areas (TerraPower 2024-TN10896). It has a drainage area of approximately 271 mi^2 (702 km^2) and a maximum storage capacity of 1,058 ac-ft (1.3 million m^3). The reservoir is impounded by a dam and has an unregulated spillway on its east abutment.

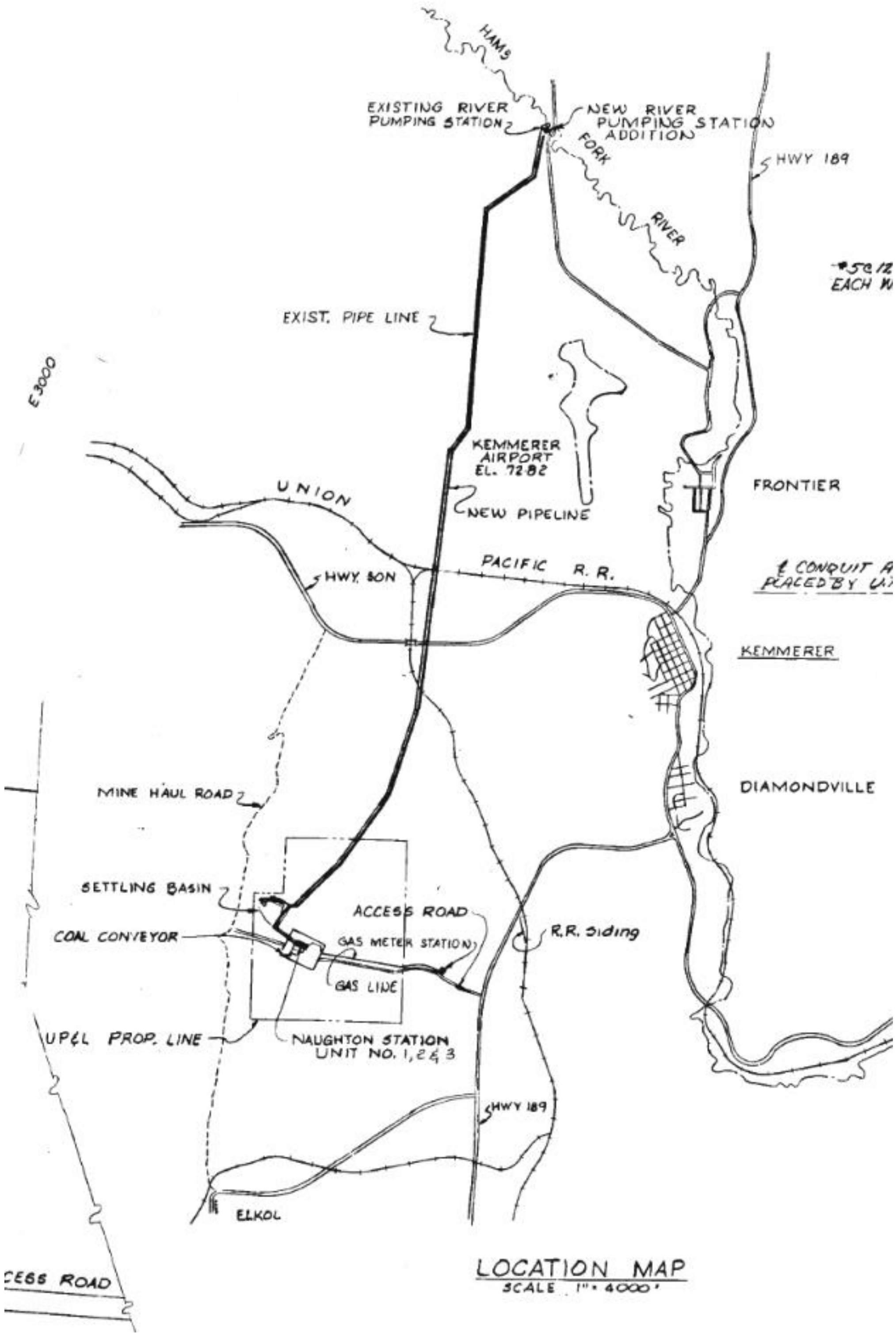

Figure 3-7 Intake Water Pipeline from Cooling-Water Intake Structure on Hams Fork River to the Raw Water Settling Basin on Naughton Station Site. Source: TerraPower 2024-TN11009.

Regional Surface Water Use

The 2010 update of the Green River Basin Plan describes water use within the Green River Basin including the Hams Fork drainage (WWDC 2010-TN11169). Within the Hams Fork River drainage, water use includes irrigation, municipal and domestic, industrial, recreational, environmental, and evaporation uses. In 2009, the consumptive use in the Hams Fork drainage for irrigation was estimated as 15,431 ac-ft (19 million m^3). Municipal and domestic water use is supported by both surface and groundwater sources. The Kemmerer-Diamondville Joint Powers Water Board primarily obtains its water supply from Hams Fork River and used 301 ac-ft (371,300 m^3) to support a population of 3,950 in 2005. Industrial water use in the Green River Basin comprises power production (70 percent), soda ash industry (29 percent), and small industries (coal and uranium mining, oil and gas production; 1 percent). Recreational and environmental water uses are primarily non-consumptive. Large reservoirs within the Green River Basin annually evaporate approximately 121,300 ac-ft (150 million m^3) of water.

The 2010 Green River Basin plan projected water use to 2055 using high-, medium-, and low-growth scenarios (WWDC 2010-TN11169). The scenarios were based on future demand of agriculture products. Compared to 2005 water use, projected consumptive agricultural water use in 2055 ranged from an approximately 2.5 percent reduction for the low-growth scenario to an approximately 7 percent increase for the high-growth scenario (WWDC 2010-TN11169). From 2005 to 2055, surface water use for municipal use was projected to increase approximately 7 percent for the low-growth scenario to over 112 percent for the high-growth scenario. However, the system capacity to serve municipal use was still deemed adequate in 2055 in the Kemmerer-Diamondville Joint Powers Water Board area (WWDC 2010-TN11169). From 2005 to 2055, water use for electric power generation was projected to increase approximately 26 percent for the low-growth scenario to approximately 190 percent for the high-growth scenario. From 2005 to 2055, water use for the soda ash industry was projected to increase approximately 88 percent for the low-growth scenario to approximately 334 percent for the high-growth scenario. For all industries, consumptive water use for 2055 compared to 2005 was projected to increase from approximately 47 percent for the low-growth scenario to approximately 256 percent for the high-growth scenario.

The 2010 Green River Basin plan also analyzed water availability in the Green River Basin. The Hams Fork River was part of the Blacks Fork assessment (WWDC 2010-TN11169). Based on streamflow data through 2007, the decrease in physically available water in the Blacks Fork drainage ranged from 6 percent in wet years to 34 percent in dry years compared to the 2001 Green River Basin Plan. For the Lower Hams Fork, physically available water was estimated as 27,275 ac-ft/year (33.6 million m^3) for a dry year, 76,696 ac-ft/year (yr) (94.6 million m^3) for a normal year, and 169,218 ac-ft/yr (208.7 million m^3) for a wet year. Based on the moderate surface water depletion scenario and dry hydrologic conditions, the 2010 Green River Basin plan concluded that the basin would have adequate surface water supplies in the year 2055 with approximately 150,000 to 250,000 ac-ft (185.0 to 308.4 million m^3) of unused water under Wyoming's allocations in the Upper Colorado River Basin and Colorado River Compacts (WWDC 2010-TN11169).

The 2010 Green River Basin plan identified water issues, strategies, and recommendations (WWDC 2010-TN11169). A lack of irrigation storage and future industrial water use challenges apply to the Hams Fork drainage. The plan recommended watershed plan initiation in the Blacks Fork basin to address future agricultural water use. For municipal and industrial uses, the plan recommended considering leasing early-priority agricultural water rights. Water conservation was also recommended for municipal and agricultural uses.

Plant Cooling-Water Sources

The Natrium reactor uses sodium, not water, as the coolant (TerraPower 2024-TN10896). The ultimate heat sink for the Natrium reactor does not rely on any surface water source (TerraPower 2024-TN10896). The Reactor Air Cooling (RAC) system passively removes decay heat by natural convection of air and heat rejection to the atmosphere. The RAC, Primary Heat Transport System, and Rector Enclosure System together provide long-term emergency core cooling. Water would be used to generate steam in the EI from the heat stored in the molten salt. The turbines are driven by the steam, and waste heat would be dissipated by mechanical draft cooling towers. Raw water for Kemmerer Unit 1 would be obtained from the Naughton Power Plant's raw water settling basin as described in Chapter 2 of the ER (TerraPower 2024-TN10896). Water released from Lake Viva Naughton flows downstream in Hams Fork River for approximately 18 mi (29 km) before it reaches the Naughton Cooling Water Intake Structure (CWIS). PacifiCorp has a 20 cfs or 8,977 gpm (0.57 m^3/s) appropriation from Hams Fork River for industrial and domestic use (State of Wyoming 2014-TN11116). A low-head dam impounds the Hams Fork River near the CWIS to provide adequate submergence for the cooling-water intake pumps. The CWIS has two intake bays—one supports Naughton Units 1 and 2, and the other supports Naughton Unit 3. The two bays pump water into two separate underground pipelines that run approximately 7 mi (11.3 km) to the Naughton Raw Water Settling Basin (Figure 3-7). A water availability analysis was performed with the Viva Naughton Reservoir at a 1-in-100 chance water level and no inflow into the reservoir and is described in the PSAR (TerraPower 2024-TN10896). Accounting for Viva Naughton Reservoir's outlet pipe submergence level, the combined raw water demands for Naughton Power Plant and Kemmerer Unit 1 (68.5 ac-ft/day [84,493 m^3/day]), and the future water demand for the City of Kemmerer (14.1 ac-ft/day [17,392 m^3/day]), the applicant estimated that sufficient water would be available in Viva Naughton Reservoir to meet water supplies for 54 days (TerraPower 2024-TN10896).

Flooding

On and adjacent to the Kemmerer Unit 1 site, the Federal Emergency Management Agency (FEMA) has delineated 1-percent chance floodplains on either side of the NFLMC and an unnamed tributary (Figure 3-5) (TerraPower 2024-TN10896). The delineated 1-percent chance floodplain is classified as Zone A or an area for which base flood elevations have not been determined. FEMA has not delineated the 0.2-percent chance floodplain near the Kemmerer Unit 1 site.

There is no systematic streamflow or flood observation for NFLMC. As stated above, peak streamflow discharge in Hams Fork River below the Viva Naughton Dam ranged from 147 cfs (4.2 m^3/s) in water year 2013 to 1,150 cfs (32.6 m^3/s) in water year 2011 (USGS 2025-TN11167). USO reported that few major floods have occurred in Lincoln County, and there are no reports of significant flooding near the Kemmerer Unit 1 site (TerraPower 2024-TN10896).

Regional Surface Water Quality

Section 303(d) of the Clean Water Act requires States to identify all impaired waters for which effluent limitations and pollution control activities are insufficient to attain water quality standards for the designated use of those waters. Wyoming Statute Title 35, Chapter 11, Article 3 addresses water quality (WY Admin. Code 35-11-TN11222). The Wyoming Surface Water Quality Standards, Section 3 defines designated water uses including agriculture, fisheries, industry, drinking water, recreation, scenic value, aquatic life other than fish, wildlife, and fish consumption (WYDEQ 2024-TN11170). Wyoming Surface Water Quality Standards, Chapter 4 defines surface water classes and uses. NFLMC is designated as Class 3B, which is tributary waters including adjacent wetlands that are not known to support fish populations or to provide drinking water. Class 3B waters are intermittent and ephemeral streams that normally support aquatic life including invertebrates, amphibians, and other flora and fauna. Hams Fork River near the Naughton CWIS is not listed on the Wyoming Section 303(d) list.

Wastewater discharges from the Naughton Power Plant to NFLMC are controlled under its existing Wyoming Pollutant Discharge Elimination System (WYPDES) permit WY0020311 (TerraPower 2024-TN10896). This discharge contains cooling-tower blowdown, boiler water treatment blowdown, boiler quench water, and treated sewage.

USO reported water quality observations at two locations—the USGS streamflow gauge on Hams Fork River near Frontier, Wyoming, and the Naughton Power Plant Raw Water Settling Basin (TerraPower 2024-TN10896). USGS water quality data at this gauge include water temperature (48 measurements between 1975 and 1978, 32 measurements between 2009 and 2013), total dissolved solids (27 measurements between 1976 and 1978, 39 measurements between 2009 and 2012), suspended sediment concentration (46 measurements between 1975 and 1978), potential of hydrogen (pH) (one measurement in 2010), and turbidity (40 measurements between 1975 and 1978), among others. For all measurements, water temperature varied from 32°F to 79.7°F (0°C to 26.5°C) with an average of 44.4°F (6.9°C). Between 2009 and 2013, water temperature varied from 32°F to 68.9°F (0°C to 20.5°C) with an average of 43.7°F (6.5°C). For all measurements, total dissolved solids ranged from 126 to 265 milligrams per liter (mg/L) with an average of 196 mg/L. Between 2009 and 2012, total dissolved solids ranged from 164 to 265 mg/L with an average of 214 mg/L. For all measurements, suspended sediment concentration varied from 2 to 504 mg/L with an average of 32 mg/L. The single pH measurement was 8.4 standard units. For all measurements, turbidity varied from 1 to 55 Jackson Turbidity Units with an average of 4.7 Jackson Turbidity Units. For 2011–2013, at this USGS gauge, USO reported average water temperature of 44.8°F (7.1°C) and average air temperature of 44.3°F (6.81°C) (TerraPower 2024-TN10896).

As part of an aquatic survey, USO performed measurements of water temperature, dissolved oxygen, pH, and specific conductance in three segments of Hams Fork River and the NFLMC on three occasions—once in October 2022, once in June 2023, and once in August 2023 (BIO-WEST 2024-TN11119). Table 3-3 summarizes the ranges of observed water quality parameters in Hams Fork River and the NFLMC. Water in Hams Fork River appeared to be a little cooler than in the NFLMC. While dissolved oxygen and pH were relatively similar in both waterbodies, specific conductance in the NFLMC was significantly greater, indicating greater concentrations of dissolved solids.

USO reported one measurement of water temperature, color, pH, biochemical oxygen demand, chemical oxygen demand, and total suspended solids for Naughton Power Plant’s circulating water (TerraPower 2024-TN10896). In addition, two measurements each in the raw water settling basin, Units 1 and 2 circulating water, and Units 1 and 2 cooling-tower waters for total dissolved solids and total suspended solids were reported. One measurement of total dissolved solids and one for total suspended solids in Naughton Power Plant discharge water were also provided. These water quality parameters do not represent ambient water quality and therefore were not considered by the review team as descriptive of the affected environment.

Table 3-3 Water Quality Measurements in the Hams Fork River and the North Fork Little Muddy Creek

Waterbody	Time	Water Temperature (°C)	Dissolved Oxygen (mg/L)	pH	Specific Conductance (µS/cm)
Hams Fork River	October 2022	7.1-10.9	9.21-10.05	8.47-8.73	441-455
Hams Fork River	June 2023	12.7-13.8	8.25-8.53	8.66-8.76	329-330
Hams Fork River	August 2023	17.9-19.6	7.35-7.90	8.38-8.51	353-388
North Fork Little Muddy Creek	October 2022	17.7-23.3	9.12-9.84	8.40-9.29	1498-1604
North Fork Little Muddy Creek	June 2023	11.3-17.4	6.89-7.51	8.50-9.13	1580-4169
North Fork Little Muddy Creek	August 2023	15.8-23.2	7.86-9.17	8.01-8.37	2507-2618

µS/cm = microsiemens per centimeter.

3.4.1.2 Environmental Impacts of Construction

Hydrologic Alterations

Preconstruction and construction activities may result in alteration of surface elevations, drainage patterns, and surface imperviousness. Altering surface elevations would result in changes to the existing surface water drainage paths. The presence of buildings would also result in alteration of surface water drainage paths. During surface grading, excavated material may be stockpiled on the site and may be used as fill. Stormwater from the construction sites that disturb five or more acres are required to be permitted by the Wyoming Department of Environmental Quality (WYDEQ) under a WYPDES Large Construction General Permit (LCGP) (WYDEQ 2024-TN11172). The LCGP requires minimization or elimination of pollutants in stormwater runoff from the construction site. As part of the LCGP, USO would be required to develop and submit a stormwater pollution prevention plan (SWPPP) no less than 30 days before starting construction activities (TerraPower 2024-TN10896). The SWPPP would identify potential sources of pollution and describe BMPs to control and minimize stormwater pollution. USO would also install sedimentation basins for collection and detention of surface runoff and allow removal of sediments before discharging stormwater offsite, eventually to the NFLMC (TerraPower 2024-TN10896). Approximately 0.5 ac (0.2 ha) within the 1-percent chance floodplain would be affected by the building activities.

The installation of transmission lines and a water pipeline between the Kemmerer Unit 1 site and the Naughton Power Plant switchyard and raw water settling basin, respectively, is expected to temporarily disturb approximately 216 ac (87.4 ha)—approximately 180 ac (73 ha) for the transmission line, approximately 36 ac (15 ha) for the water pipeline, and approximately 7 ac (3 ha) for the laydown area (the 7-ac laydown area overlaps with the anticipated utility corridors and is not cumulative to the 216 ac) (TerraPower 2024-TN10896).Alterations are expected at the locations of tower footprint and along the pipeline. USO would avoid wetlands, streams, roads, and railroads where practical, and use horizontal directional drilling to minimize unavoidable impacts to water resources. Access to the corridor for construction equipment would be at designated locations within the approved area of disturbance. Any debris and spoils would be disposed in accordance with applicable regulations.

Water Use

During building activities, surface water would be used for dust suppression, in a concrete batch plant, and for other uses (TerraPower 2024-TN10896). Surface water would be provided by the Kemmerer-Diamondville Water Treatment Plant and supplemented from the Naughton Power Plant Raw Water Settling Basin. USO estimated that the amount of water needed for these activities would be approximately 25.3 million gal (95.8 million L) over the 53-month duration of building (approximately 16 thousand gal (60,567 L) per day). USO reported that the KDWWJPB has an excess production capacity of 3.9 million gal (15 million L) per day. Therefore, sufficient water would be available for building activities without overstressing the Board's production capacity (TerraPower 2024-TN10896). During building, drinking water for the workforce would be provided by a combination of bottled water and local municipal water purified in onsite trailers.

Water Quality

Water quality of surface water resources in the vicinity of the Kemmerer Unit 1 site can be affected by building-related activities because of increased sediment in runoff, transport of pollutants like oil and grease, and contamination of surface runoff from accidental spills of other construction activity-related chemicals. As stated above, stormwater runoff from the Kemmerer Unit 1 site would be controlled and managed under a WYPDES LCGP using a set of BMPs to minimize stormwater pollution. Erosion and sediment control techniques like silt fences would be used. BMPs would also be in use to avoid leaks of oil and grease and spills of other chemicals. These measures would result in minimization of any degradation of water quality in nearby streams, floodplains, and wetlands.

Water Monitoring

USO stated that surface water monitoring would comply with the WYPDES LCGP during the building phase (TerraPower 2024-TN10896). Permit requirements for discharge from the site may include monitoring of temperature, radioactivity, volatile compounds, pesticides, metals, hydrocarbons, suspended solids, and ecological parameters. USO stated that surface water monitoring requirements would be developed as part of the permits required for building activities including the WYPDES LCGP (TerraPower 2024-TN11009). These requirements would likely include timely reporting of any exceedances and/or violations and implementation of corrective actions deemed acceptable by State of Wyoming authorities. The review team expects USO to follow all State of Wyoming permit requirements applicable to building activities.

3.4.1.3 Environmental Impacts of Operation

Hydrologic Alterations

This section describes potential impacts on the existing surface water resources from operating activities at the Kemmerer Unit 1 site. A more detailed analysis of surface water impacts due to operating activities would be conducted during the environmental review for an OL, if USO submits an OL application.

During operations of Kemmerer Unit 1, hydrologic alterations could result from plant raw water intake, plant effluent discharge, and stormwater and flood discharge from the site. As described in Section 2.6 of this EIS, the interface of the plant raw water intake with the environment occurs at the Naughton Power Plant cooling-water intake on Hams Fork River. USO has proposed no changes to the Naughton Power Plant CWIS to support Kemmerer Unit 1 because the existing capacity of the intake pumps is sufficient for combined water withdrawals of Naughton Power Plant and Kemmerer Unit 1.

Lincoln County in Wyoming requires that no damage to or backup water on roadways result from development in floodplains during a 1-hour, 1-in-25 chance storm event (TerraPower 2024-TN10896). Lincoln County land use regulations have requirements for proposed developments within areas of special flood hazard identified by FEMA (Lincoln County 2011-TN11173). No requirements are stated for developments in FEMA Zone A for which base flood elevations have not been estimated. USO estimated that alteration to hydrology because of the project would cause a 0.3 ft (0.1 m) increase in peak flood water surface elevation during a 1-in-100 chance storm event (TerraPower 2024-TN10896). However, no flood damage to roadways (i.e., U.S. Route 189) and railroads in the vicinity is expected.

The stormwater management system and plant wastewater discharge are described in Section 2.6 of this EIS. Plant effluent is combined with the stormwater outfall of the EI stormwater detention pond and spread over a rip-rap apron (TerraPower 2024-TN11009). The rip-rap apron would be located approximately 400 ft (122 m) from the NFLMC outside the 0.1-percent chance floodplain or FEMA Zone A (TerraPower 2024-TN11009). The combined EI stormwater detention pond overflow and the plant effluent discharge is expected to spread out over the rip-rap apron and quickly become shallow sheet flow with low flow velocities. The review team expects that the 0.1-percent chance floodplain would be minimally affected because of the low flow velocities.

Because the combined EI stormwater detention pond overflow and the plant effluent discharge would be spread out over the rip-rap apron, some of the discharge would have a chance to infiltrate into the soil below the apron and adjacent to it. Based on limited onsite meteorological observations and nearby weather monitoring stations, USO stated that snow accumulation and ice formation is possible from September through April and is expected between December and March (TerraPower 2024-TN11009). Because the combined plant effluent would be at temperatures above freezing, during presence of snow or ice conditions, the combined plant effluent could result in melting of ambient snow and ice over a limited area before freezing itself. During saturated soil conditions, some of the combined plant discharge could reach the NFLMC under infiltration-limited soil conditions. Because soil infiltration and refreezing would limit the amount of plant effluent reaching the NFLMC, the review team expects that the creek would be minimally affected during operations of Kemmerer Unit 1.

Water Use

The Naughton Power Plant uses an average of 4,238 gpm (16.0 m^3 per minute) of water from Hams Fork River (TerraPower 2024-TN10896). Kemmerer Unit 1 would use an average of approximately 3,689 gpm (14.0 m^3 per minute) of water withdrawn from the Naughton Power Plant raw water settling pond. The existing pumps at Naughton Power Plant's CWIS have a capacity of 8,749 gpm (33.1 m^3 per minute), which is approximately 97.5 percent of PacifiCorps' appropriations from Hams Fork River. Together, the Naughton Power Plant and Kemmerer Unit 1 could withdraw an average of 7,927 gpm (30.0 m^3 per minute) of water, which is within the capacity of the existing pumps.

Water withdrawn from the Naughton Power Plant raw water settling basin is the source for the Kemmerer Unit 1 heat rejection system, condensate makeup, potable water system, fire protection system, demineralized water system, and other miscellaneous uses (TerraPower

2024-TN10896). On average, makeup water to the cooling tower (3,508 gpm [13.3 m^3 per minute]) comprises the majority of the water withdrawn from the Naughton Power Plant raw water settling basin. Because Kemmerer Unit 1 plant water discharge is to the NFLMC, approximately 3,689 gpm (7.8 cfs) (14.0 m^3 per minute or 0.22 m^3/s) of water, on average, would be lost from Hams Fork River below the Naughton Power Plant's CWIS. This reduction in Hams Fork River flow would not affect the City of Kemmerer's drinking water supply from Kemmerer Reservoir because the reservoir is located upstream of the CWIS. Detailed information and a subsequent analysis of water use impacts during operations would be conducted during the environmental review for an OL, if USO submits an OL application.

Water Quality

During operation of Kemmerer Unit 1, water quality in surface water resources in the vicinity of the site may be affected by potential contaminants in stormwater runoff from the site, plant effluent discharge, and accidental spills of fuel, oil, and other chemicals. Stormwater discharges would be detained in onsite stormwater detention ponds to allow sediment to settle before releasing stormwater offsite. Stormwater discharge would be controlled using BMPs under a SWPPP.

Kemmerer Unit 1 would use a zero liquid radioactive waste discharge system (TerraPower 2024-TN10896). Plant effluent including cooling-tower blowdown, floor and equipment drains, and water treatment reject would be treated to remove pollutants until the WYPDES effluent discharge limitations are met. The WYPDES permit is expected to require monitoring of plant discharge constituents and parameters, reporting of exceedances and violations of discharge limits, and taking of appropriate corrective actions. The WYDEQ is also expected to review the plant effluent discharges to ensure that the discharges would be consistent with State of Wyoming water quality standards that are protective of the designated use of surface water resources.

Accidental spills of fuel, oil, and other chemicals commonly used on industrial sites are expected to be addressed in the Kemmerer Unit 1 Spill Prevention Control and Countermeasures (SPCC) Plan (TerraPower 2024-TN10896). The SPCC Plan is expected to develop and implement response measures to contain and clean up spills, dispose contaminated material appropriately, and report incidents to appropriate authorities.

The review team expects USO to obtain all required permits; use BMPs; implement response measures; contain and clean up spills; dispose contaminated material; report exceedances and violations; and take corrective actions as required by appropriate authorities. These measures would minimize water quality impacts to surface water resources. Detailed information and a subsequent analysis of water quality impacts during operations would be conducted during the environmental review for an OL, if USO submits an OL application.

Water Monitoring

USO stated that it would perform preoperational monitoring to establish a post-construction baseline for estimating the hydrologic impacts from Kemmerer Unit 1 operation (TerraPower 2024-TN10896). USO would also perform operational monitoring of water quality impacts from operation and comply with applicable permit requirements (TerraPower 2024-TN11009). As part of the WYPDES permit, WYDEQ would require water quality parameters to be monitored at specified frequencies and at designated locations on the Kemmerer Unit 1 site. The review team expects USO to develop and implement a surface water monitoring program to meet the requirements of applicable permits. Detailed information and a subsequent analysis would be conducted during the environmental review for an OL, if USO submits an OL application.

3.4.1.4 Environmental Impacts of Decommissioning

Decommissioning impacts are expected to be similar to those for construction and bounded by the analyses in the decommissioning generic EIS (NRC 2002-TN7254). Some surface water may be used during decommissioning activities for workforce potable and sanitary use and for dust suppression. Raw water needs for the plant would be significantly decreased. Stormwater runoff would continue to be managed under an industrial general permit and required BMPs. An SPCC Plan would continue addressing accidental spills of fuel, oils, and other chemicals. Plant effluent discharge to the environment would largely cease. The review team expects the decommissioning impacts to surface water resources to be minimal, and detailed information and a subsequent analysis would be conducted during the environmental review for an OL, if USO submits an OL application.

3.4.1.5 Cumulative Impacts

The past, present, and reasonably foreseeable future projects listed in Appendix E that may affect surface water resources in the region include the preconstruction for Kemmerer Unit 1, the TFF, the Naughton Power Plant and other energy projects, transmission projects, and transportation projects. The preconstruction of Kemmerer Unit 1 and the construction of the TFF may alter surface water drainage patterns, resulting in redirection of floodwaters and increased flow velocities (DOE 2025-TN11602, DOE 2024-TN11200). Impacts of these changes to surface water quality would be managed using a properly designed drainage system, developing and implementing a SWPPP, using BMPs, and complying with the requirements of the LCGP. Potential spills of fuel, oils, and other industrial use chemicals would be managed under a SPCC Plan. Hydrologic alteration from other industrial, energy, transmission, and transportation projects would be similarly permitted, controlled, and managed under applicable local, State, and Federal regulations.

The 2010 update of the Green River Basin Plan described past and present surface water use and projected surface water use for agricultural, municipal and domestic, and industrial uses (WWDC 2010-TN11169). For the high-growth scenario, future agricultural, municipal and domestic, and industrial water uses in 2055 for the basin were projected to increase approximately 7, 112, and 256 percent, respectively. Water availability in the Blacks Fork drainage, within which the Hams Fork River drainage is located, was projected to decrease 6 percent in wet years to 34 percent in dry years. However, under a scenario of moderate water availability decrease and dry hydrologic conditions, the 2010 Green River Basin Plan concluded that sufficient water will be available to meet surface water demands in 2055 under the Upper Colorado River and the Colorado River Compacts (WWDC 2010-TN11169).

3.4.1.6 Conclusions

The review team concludes that the potential direct, indirect, and cumulative impacts of the proposed action on surface water resources would be SMALL. This conclusion is based upon the above analysis and is supported by the determination that hydrologic alterations induced by surface water runoff from the Kemmerer Unit 1 site, during construction, would be controlled by implementing a SWPPP, using BMPs required under applicable permits, and complying with applicable regulations. Surface water use during construction would be a small fraction of the available excess KDWWJPB production capacity. Although future instream flow and other environmental water uses are expected to increase in the Green River Basin, these demands are planned for and would be met under applicable requirements of the Upper Colorado River Basin and the Colorado River Compacts. During the construction of Kemmerer Unit 1, the water quality of surface water resources would be protected by complying with applicable permit requirements consistent with the State of Wyoming water quality standards. Continued adherence to the SWPPP, SPCC Plan, and WYPDES permit limits would minimize water quality impacts. While future surface water availability in the Green River Basin is expected to decline, there is sufficient surface water available to meet projected future demand.

3.4.2 Groundwater

This section describes the hydrology, water use, and water quality of the potentially affected groundwater resources. To assist with evaluation of groundwater, the geology of the Kemmerer Unit 1 site and vicinity is summarized in Section 3.3 of this EIS. A description of groundwater in the Kemmerer Unit 1 region and the investigations conducted to support groundwater site characterization is provided in Section 2.2 of the ER (TerraPower 2024-TN10896) and Sections 2.5 and 2.6 of the PSAR (TerraPower 2024-TN10896). The descriptions presented here are based on information from these and other sources of publicly available hydrologic information.

3.4.2.1 Affected Environment

The Kemmerer Unit 1 site is in the westernmost extent of the Green River Basin within the larger area of the Upper Colorado River Basin aquifer system (Whitehead 1996-TN11180). This aquifer system is composed of layered sedimentary rocks, with principal aquifers in lower Tertiary-age and upper and lower Cretaceous-age rocks. Paleozoic aquifers are generally deeply buried and principally saline. Unconsolidated deposits of primarily sand and gravel located along streams and rivers are also an important groundwater resource within the basin. Groundwater resources within the Green River Basin are highly variable with the sandstone units comprising major aquifers and alluvial deposits having local development potential, generally dependent on thickness, with the potential for associated surface water depletion (WWDC 2010-TN11169). In the Kemmerer Unit 1 region, the Frontier Formation sandstone units are considered a minor aquifer (TerraPower 2024-TN10896). The Hilliard Shale is identified as a major aquitard (low permeability unit) throughout Cumberland Flats (WWDC 2010-TN11169; TerraPower 2024-TN10896). Groundwater flow in the deep bedrock aquifers is controlled by geologic structures and the presence of low permeability confining units. Recharge from precipitation occurs along bedrock outcrops on the margins of the structural basins with groundwater flowing downward within the basin and eventually discharging to streams. Groundwater flow in the shallower alluvial aquifers and within the permeable portions of weathered rock is controlled by topography. Recharge occurs directly from precipitation, with unconfined groundwater flow generally following the topography to discharge locally to springs or streams. Surface water–groundwater interactions can be dominant along stream channels with recharge occurring from streams to groundwater depending on the local water levels.

Site characterization activities at the Kemmerer Unit 1 site included soil and rock borings, geophysical testing, test pits, groundwater wells, in situ pressure and permeability testing, and groundwater monitoring (TerraPower 2024-TN10896). The 109 borings ranged in depth from about 12 to 325 ft (4 to 99 m) with a boring at the Rx Building location extending to a depth of 1,520 ft (463 m). Subsurface materials at the site include overburden soils, weathered rock, and fresh rock. The occurrence and thickness of these are summarized in Section 3.3. Groundwater wells were installed at 24 locations in multi-level clusters screened in the weathered rock and fresh rock. Upper wells were typically screened at depths between 20 and 50 ft (6.1 and 15.2 m) bgs within the highly weathered and fractured zone (TerraPower 2024-TN10896). Mid-level wells were typically screened between 45 and 85 ft (13.7 and 25.9 m) bgs. Deep wells at four locations were screened between about 100 and 150 ft (30.5 and 45.7 m) bgs. Wells were constructed with 4 in. (10 cm) polyvinyl chloride well screens (typically 10 ft [3.0 m] in length), filter packs, and bentonite seals (TerraPower 2024-TN10896). Nested piezometers were installed in the NFLMC to evaluate the vertical gradient between the stream and the underlying groundwater. Observation well and piezometer locations are shown in Figure 3-8, with OW-122 located at the center of the NI area.

Hydraulic conductivities were determined using packer tests in boreholes and slug tests in wells. The packer tests were conducted in 15 open boreholes at depths from about 25 to 50 ft (7.6 to 15.2 m) bgs, with all tested intervals in the Hilliard Shale (TerraPower 2024-TN10896). Saturated hydraulic conductivity estimates from the packer tests decreased with depth. Slug tests were successfully completed in 33 wells at depths from about 25 to 80 ft (7.6 to 34.4 m) bgs; about one-third of these were in fresh rock (TerraPower 2024-TN10896). Saturated hydraulic conductivity estimates from the slug tests did not clearly depend on depth. In addition, the range of results was similar for tests conducted in weathered rock and in fresh rock and was also similar to results from the packer tests. Saturated hydraulic conductivity was also estimated from the long-term recovery of water levels in an additional 13 wells, all but one screened in fresh rock. The depths of these wells varied from 25 to 115 ft (7.6 to 35.1 m) bgs, and saturated hydraulic conductivity estimates were significantly lower than results from the packer tests and slug tests. A summary of hydraulic conductivity results is provided in Table 3-4. Rock porosity varied from about 2 to 9 percent and was generally less than 4 percent at depths below 50 ft (15.2 m) bgs. Average porosity was 6.8 percent for completely to highly weathered rock, 6.2 percent for moderately to slightly weathered rock, and 2.8 percent for fresh rock (TerraPower 2024-TN10896).

Monthly groundwater-level monitoring began in August 2022 for all wells with data reported through April 2023; hourly groundwater levels were also recorded in 20 observation wells during July 2022 through March 2023 (TerraPower 2024-TN10896). Groundwater levels were generally steady over the period of measurement and were unresponsive to precipitation events. The piezometer measurements in the NFLMC and water levels in the nearby observation well cluster OW-185, which were 1 to 2 ft (0.3 to 0.6 m) below the creek water levels, indicate that the creek is a losing stream with water moving from the creek to groundwater. The vertical hydraulic head gradients measured in well clusters varied across the Kemmerer Unit 1 site and appear to be influenced by site topography, with groundwater flow at higher ground surface elevations having a more significant downward component. Average horizontal hydraulic head gradients were similar for the upper- and mid-level-series wells and ranged from 0.002 to 0.019 ft/ft, with an average value of 0.004 ft/ft in the southerly direction (TerraPower 2024-TN10896). Generalized flow paths for the site converge from the east and the west and are toward the south, as shown in Figure 3-8 (TerraPower 2024-TN10896). An average linear groundwater velocity of 1.44 ft/day (0.44 m/day) was estimated for the southerly direction using the maximum saturated hydraulic conductivity estimated from the slug tests in weathered rock (TerraPower 2024-TN10896). Using the geometric mean conductivity estimate from all packer and slug tests, the review team calculated a groundwater velocity of 0.07 ft/day (0.02 m/day). There is no clear discharge area for groundwater in the weathered rock of the Hilliard Shale. Given the low permeability and thickness of the formation, the potential for discharge to the underlying Frontier Formation is low. Because the Hilliard Shale is not a source of water, there is a low potential for discharge to any nearby springs or wells.

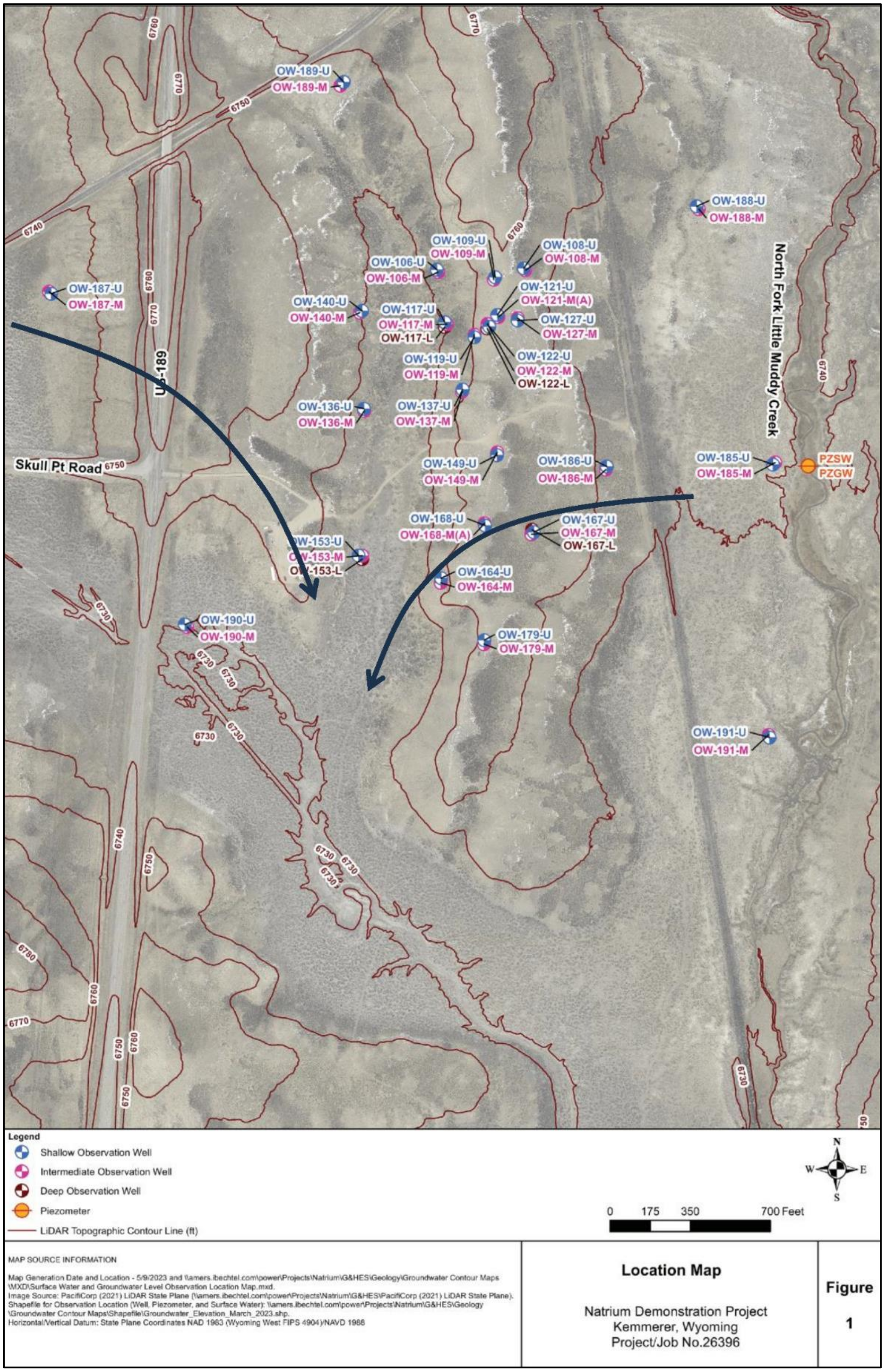

Figure 3-8 Observation Wells Installed at the Kemmerer Unit 1 Site and Generalized Groundwater Flow Paths. Adapted from: TerraPower 2024-TN10896.

Table 3-4 Saturated Hydraulic Conductivity Estimates from Borehole Packer Tests, Slug Tests, and Long-Term Recovery Tests in Wells

Test Type	Minimum (ft/d)	Maximum (ft/d)	Geometric Mean (ft/d)
Packer Tests	0.052	6.5	0.51
Slug Tests—Weathered Rock	0.0071	17	0.88
Slug Tests—Fresh Rock	0.23	96	1.44
All Packer and Slug Tests	0.0071	96	0.77
Long-term Recovery Tests	3.7×10^{-7}	5.7×10^{-4}	7.7×10^{-6}

ft/d = feet/day.
Data Adapted from PSAR Tables 2.5-28, -30 TerraPower 2024-TN10896.

Groundwater appropriation in Wyoming is generally granted as a matter of course with a valid application and proof of beneficial use (WSEO 2021-TN11181). Groundwater is used throughout the Green River Basin for irrigation, livestock, municipal, domestic, industrial, recreational, and environmental uses (WWDC 2010-TN11169). Most wells (about 90 percent) are completed at depths less than 300 ft (91 m) bgs and yield less than 25 gpm (1.6 liters per second [L/s]) (WWDC 2010-TN11169). Within Lincoln County, total groundwater withdrawals in 2015 were 13.37 Mgal/day, with about 62 percent of withdrawals for irrigation, 27 percent for public supply, 4 percent for industrial use, and 3 percent each for domestic and mining uses (Dieter et al. 2018-TN9686). Groundwater is not a planned source of water for the City of Kemmerer and future municipal supplies for the Town of Diamondville (TerraPower 2024-TN10896). The irrigation well closest to the Kemmerer Unit 1 site (active as of 2006) is north of Kemmerer in the Hams Fork River watershed (WWDC 2010-TN11169). The nearest groundwater public supply is Opal, about 13 mi (20.9 km) north of the site, with three wells at depths of about 450 ft (137.2 m) withdrawing an average of about 10 gpm (0.6 L/s) (as of 2005) (WWDC 2010-TN11169). The nearest industrial well is 1.6 mi (2.6 km) southwest of the site, which has a permitted withdrawal rate of 20 gpm (1.3 L/s) (TerraPower 2024-TN10896). The Wyoming State Geological Survey identified about 15 wells and 2 springs located within 2 mi (3.2 km) of the site, but the water rights status for these are either expired, canceled, abandoned, or the wells are used solely for monitoring (Stafford et al. 2017-TN10918). The nearest sole source aquifer area is the Eastern Snake River Plain Aquifer source area located about 50 mi (80.5 km) north of the City of Kemmerer (EPA 2020-TN8482).

Groundwater quality of the alluvial aquifers in the region is generally good, where recharge is primarily from the associated river or stream (WWDC 2007-TN10915). Bedrock aquifer quality tends to be highest near the source of recharge with increasing dissolved solids occurring along the regional groundwater flow pathways (WWDC 2007-TN10915; Whitehead 1996-TN11180). Total dissolved solids for the Frontier Formation aquifer varies from 100 to 3,000 mg/L, suitable for domestic, irrigation, and livestock uses (WWDC 2007-TN10915). Within the Green River Basin, groundwater quality in some areas can exceed standards for sulfate, chloride, fluoride, iron, manganese, and radionuclides (WWDC 2010-TN11169). Data from bedrock wells in southwestern Wyoming evaluated for a large-scale study of the quality of groundwater used for public supply showed water quality satisfied human health benchmarks (Belitz et al. 2022-TN11182).

Groundwater quality at the Kemmerer Unit 1 site was evaluated based on samples obtained from 22 monitoring wells, all sampling water from the Hilliard Shale unit. Field measurements of groundwater quality were characterized by low dissolved oxygen (most samples were anoxic, ≤0.2 mg/L), high specific conductance (≥5,750 microsiemens per centimeter [μS/cm]), and circumneutral pH (all but two samples had pH between 6.5 and 7.5) (TerraPower 2024-

TN10896: PSAR Table 2.5-32). Laboratory measurements of groundwater samples showed high total dissolved solids (>7,000 mg/L), consistent with the specific conductance measured in the field, and low nitrate levels (TerraPower 2024-TN10896). Gross alpha and gross beta radioactivity were generally below detection limits, and radium levels were below 5 picocurie per liter (pCi/L) with the exception of two samples.

3.4.2.2 Environmental Impacts of Construction

Land surface modifications during preconstruction and construction activities could affect the local distribution of infiltration and recharge on the Kemmerer Unit 1 site. Changes in local recharge patterns could result from site stormwater management. Increased infiltration would occur downgradient of the outfall for the combined discharge from the water treatment building and stormwater pond. However, any changes in recharge would be localized to the site and would affect only the shallow groundwater on the site property.

Preconstruction activities would include excavation to an elevation of 6,640 ft (2,023.9 m) NAVD 88 for the Rx Building (116 ft [35.4 m] below plant grade) and shallower excavations for other buildings. Environmental impacts from preconstruction activities were evaluated in the DOE EA for preconstruction activities (DOE 2025-TN11602). Dewatering using gravity drains and horizontal relief wells is anticipated to be needed to maintain the stability of the excavations during construction (TerraPower 2024-TN10896). The applicant estimated that the expected dewatering rate during construction would be 35 gpm (2.2 L/s) with a conservative maximum estimate of 50 gpm (3.2 L/s) with a dewatering duration of 12 months (TerraPower 2024-TN10896). Groundwater extracted for dewatering would be routed to a stormwater detention pond for eventual discharge or would be used onsite for dust control or compaction (TerraPower 2024-TN10896). Use for dust control would require an appropriation permit from the State.

Except for dewatering, no groundwater would be extracted during construction. The excavations are within the overburden and Hilliard Shale, neither of which is a source of groundwater for other uses. The expected dewatering rate is low, which limits the distance at which the effects of dewatering on groundwater levels could occur. The review team reviewed select results from the site groundwater flow model analysis (TerraPower 2025-TN11624). Results from the model indicated that excavation dewatering would lower the groundwater elevations near the NFLMC by less than 10 ft (3.0 m) and would have a minor effect (less than 10 percent) on the recharge rate from the creek to the underlying groundwater. The review team determined that the model likely overestimates the drawdown in groundwater levels along the NFLMC, underestimates drawdown east of the creek, and underestimates recharge from the creek to groundwater during dewatering. Because construction dewatering would be temporary and the affected groundwater is not used for other purposes, the review team expects the groundwater impacts of dewatering to be minor. In addition, although some portion of the dewatering flow would likely be lost to evaporation, groundwater extracted for dewatering that is discharged from the site via a stormwater detention pond would eventually be returned to either the creek or the groundwater downgradient of the stormwater outfall. This would reduce the impact of dewatering on the creek and the local groundwater levels in the Hilliard Shale.

No direct discharge to groundwater is planned during construction. Dewatering flows routed to a stormwater detention pond would be discharged under requirements described in Section 3.4.1.2 of this EIS. Spill prevention and control BMPs would be followed to minimize potential releases of equipment fuel and other nonradiological contaminants that could affect groundwater quality (TerraPower 2024-TN10896).

Groundwater monitoring was proposed by the applicant to continue during construction using existing wells or new wells installed, as needed, to replace those removed or abandoned during construction.

3.4.2.3 Environmental Impacts of Operation

This section describes potential impacts on existing groundwater resources from operating activities at the Kemmerer Unit 1 site. A more detailed analysis of impacts on existing groundwater resources from operating activities would be conducted during the environmental review for an OL, if USO submits an OL application.

Land surface modifications, stormwater management practices, and plant discharges could affect the local distribution of infiltration and recharge on the Kemmerer Unit 1 site. However, any changes in recharge would be localized to the site and would affect only the shallow groundwater on the site property. Plant building foundations would alter groundwater flow paths and groundwater levels near the buildings, but these alterations would be minor and would be negligible outside the immediate area of the plant.

No permanent dewatering of building foundations is planned, and no groundwater would be used to support plant operations. Withdrawal of water from Hams Fork River for plant use would reduce the flows in the river downstream of the intake and could have impacts on groundwater exchange with the river. These impacts would be evaluated as part of an OL application review.

No liquid radiological waste would be discharged from the plant. Small amounts of tritium may migrate into the cooling water and be discharged with the blowdown. Under a conservative assumption that 100 percent of the tritium in the steam generator migrates into the cooling water, the applicant calculated a tritium activity in the blowdown of about 40 pCi/L (TerraPower 2024-TN10896), which is below typical detection limits and likely would be indistinguishable from background. Discharges from the site, which would partially infiltrate to shallow groundwater, would be monitored for compliance with the terms of the WYPDES permit (TerraPower 2024-TN10896). Spill prevention and control BMPs would be followed during the operating period to minimize potential releases of equipment fuel and other nonradiological contaminants that could affect groundwater quality (TerraPower 2024-TN10896).

The review team anticipates that USO would institute a groundwater protection program conforming to the industry’s voluntary groundwater protection initiative (NEI 2019-TN6775) that provides for groundwater monitoring to detect inadvertent releases and prevent the movement of radionuclides offsite (TerraPower 2024-TN10896).

3.4.2.4 Environmental Impacts of Decommissioning

Decommissioning impacts are expected to be similar to those for construction and bounded by the analyses in the decommissioning generic EIS (NRC 2002-TN7254). A small amount of groundwater may be withdrawn for dewatering during building foundation removal and could be used for dust control or compaction. Stormwater would be managed to prevent erosion. Spill prevention and control BMPs would be used to minimize releases of nonradiological contaminants from the use of equipment. A more detailed analysis would be conducted during the environmental review for an OL, if USO submits an OL application.

3.4.2.5 Cumulative Impacts

The past, present, and reasonably foreseeable future projects listed in Appendix E that may affect groundwater resources in the region include Kemmerer Unit 1 preconstruction, the TFF, the Naughton Power Plant, and other energy projects, transmission projects, and transportation projects. Due to the distance of the projects listed in Appendix E from the Kemmerer Unit 1 site, only the TFF would potentially result in impacts that would be additive to the groundwater impacts of the proposed action, which are localized to the Kemmerer Unit 1 site. The TFF would require dewatering at an expected rate of about 43 gpm (2.7 L/s) during construction (DOE 2024-TN11200), but the TFF dewatering activities are expected to be completed before Kemmerer Unit 1 excavation dewatering begins (TerraPower 2024-TN10896). Because these dewatering activities are temporary and not expected to occur simultaneously, no cumulative groundwater impacts are expected. No cumulative groundwater quality impacts are expected to result from TFF construction or operation. No liquid discharges to groundwater would occur as part of TFF operations, and BMPs for spill prevention and control would be followed during construction and operation (DOE 2024-TN11200).

3.4.2.6 Conclusions

The review team concludes that the potential direct, indirect, and cumulative impacts of the proposed action on groundwater resources would be SMALL. This conclusion is based upon the above analysis and is supported by the geologic conditions at the Kemmerer Unit 1 site that isolate the plant from significant aquifers. Excavations are within low permeability rocks of the Hilliard Shale. The groundwater interacting with the plant occurs primarily within the shallow weathered portions of the shale unit, which are not used for groundwater production by any potentially affected users. In addition, although dewatering during construction would lower groundwater elevations near the excavations, these effects would be temporary and would have only a minor impact on flows in the NFLMC. No dewatering would occur during operation, and the plant would not use groundwater during operation for any purpose. Finally, operation of the plant would not involve liquid discharges to groundwater and any potential releases of tritium likely would be indistinguishable from background and would be monitored and minimized.

3.5 Aquatic Ecological Resources

3.5.1 Affected Environment

The Kemmerer Unit 1 site is located along the western side of the NFLMC in southwestern Wyoming and would use the creek for effluent discharge (TerraPower 2024-TN10896). While not located on Hams Fork, that river would provide the source water for the plant’s cooling-water system (TerraPower 2024-TN10896). The flow at the CWIS is controlled by releases from the Viva Naughton Reservoir, 18 mi (29 km) upstream. Both Hams Fork and the NFLMC flow south to join tributaries of the Green River, which eventually empties into the Colorado River in southeastern Utah. The Hams Fork River also serves as the source of drinking water for the town of Kemmerer, cooling water for the Naughton Power Plant, and for the Naughton Coal Mine.

The Hams Fork River originates in the Wyoming Range in the Bridger–Teton National Forest. It flows south–southeast for about 160 mi (258 km) before joining the Blacks Fork in Sweetwater County, Wyoming. The Blacks Fork then flows into the Green River near the Wyoming–Utah border. The river traverses a broad floodplain with shrubland and rangeland to the west and pastureland to the east. River widths range from 30 to 75 ft (9 to 23 m), with depths varying from

0.7 ft (0.2 m) up to 8 ft (2.5 m). The upstream segments are primarily cobble substrate, while the downstream segment is mainly silty substrate. While winter average high temperatures rarely get above freezing from December to February, only surface ice forms on Hams Fork River (TerraPower 2024-TN11009). The State lists Hams Fork River below Kemmerer as impaired due to elevated pH levels caused by hard rock mining discharges (WYDEQ 2020-TN10919).

The NFLMC originates west of Kemmerer and flows south past the proposed Kemmerer Unit 1 site before joining Muddy Creek and then Blacks Fork. It is classified as an intermittent stream but flows continually with effluent discharged from the Naughton Power Plant most of the year, whenever the plant is operating. The NFLMC flows through rangeland with seasonal grazing by sheep and cattle. The NFLMC is narrow, ranging from 2 to 9 ft (0.6 to 2.7 m) wide and 0.5 to 3.1 ft (0.2 to 0.9 m) deep. Vegetation includes low, weedy plants, like leafy pondweed (*Potamogeton foliosus*), and cattails along the border of the creek. In the winter (December, January, and February), the average high temperature rarely gets above freezing, and freezing is normal for portions of the creek and associated wetlands (NOAA 2024-TN11004; TerraPower 2024-TN11009). The NFLMC is designated as a Class 3B stream by the Wyoming Department of Environmental Quality (WYDEQ). Class 3B waters are intermittent and ephemeral streams that can support aquatic communities including invertebrates, amphibians, and other flora and fauna but generally do not support fish populations. Though classified as a Class 3B intermittent stream, the NFLMC enjoys a year-round water supply from the Naughton Power Plant water discharge. The NFLMC flows into Muddy Creek, which the State lists as impaired due to *E. coli*, chloride, and selenium from natural and unknown sources (WYDEQ 2020-TN10919).

3.5.1.1 Biological Communities of the North Fork Little Muddy Creek Basin and Hams Fork River

Benthic Invertebrates

Benthic invertebrates inhabit the bottom of the water column and its substrates. They include macroinvertebrates (clams, crabs, oysters, and other shellfish) as well as certain zooplankton.

USO conducted preconstruction surveys of the benthic aquatic habitats of Hams Fork River and the NFLMC in October 2022, June 2023, and August 2023 (TerraPower 2024-TN11009). Researchers collected benthic macroinvertebrates using a D-frame kick net (500 micrometer [μm] mesh) and a petite-Ponar grab sampler. In total, 70 different taxa were identified in Hams Fork River as described in Table 2.3-6 of the ER (TerraPower 2024-TN10896). The benthic information was used to calculate the Wyoming Stream Integrity Index (WSII), which was developed by the WYDEQ and used to assess stream condition based on 10 metrics (Hargett and ZumBerge 2006-TN11120). Categories of aquatic life use attainment are “full support” (>51.9 percent), “indeterminate” (34.6 to 51.9 percent), and “degraded” (<34.6 percent) (WYDEQ 2014-TN10920). The WSII average scores from Hams Fork River study segments were 40.5, 36.2, and 11.1 (TerraPower 2024-TN11009). All three sites are upstream of the dam and the intake and fall under the “indeterminate” and “degraded” aquatic life use categories. These scores are lower than all of the WSII scores (average = 52) assigned to stations in Hams Fork River by WYDEQ during the 1998 monitoring and assessment, suggesting declining habitat quality (Eddy 1998-TN10921). The WSII scores for the three sampling sites on the NFLMC were even lower, with all scores in the “degraded” aquatic life use category with average scores of 17.5 above the proposed site, 15.6 adjacent to the site, and 6.2 downstream of the site, which indicate a stressed system (TerraPower 2024-TN11009).

Fish

USO also conducted preconstruction fish surveys in October 2022, June 2023, and August 2023. Researchers collected a total of 2,034 fish from 10 species across the three segments of Hams Fork River during the benthic surveys in October 2022 using electrofishing and minnow traps (TerraPower 2024-TN11009). Small-bodied minnows and juvenile suckers dominated the collections, with 71 percent being redside shiners, 14 percent white suckers, and 6 percent longnose dace; all three species are non-native to the area. Salmonids, including rainbow trout, brown trout, and mountain whitefish, made up less than 3 percent of the total (see Table 3-5 for additional species information). Fish collected at Hams Fork River ranged in size from a 0.5 in. (12 mm) young-of-year sucker to a 21.1 in. (536 mm) brown trout (TerraPower 2024-TN11009). Spring surveys had to be delayed until June 2023 due to high stream levels, and backpack electrofishing was used instead of boat-mounted. Due to the change in collection methods, only 90 fish were caught. Researchers identified two new species: the Utah chub (nuisance species) and the native mountain sucker. These surveys are consistent with sampling completed by the Wyoming Game and Fish Department (WGFD) in 2004. WGFD biologists also collected red shiners and white suckers the most frequently, followed by longnose and speckled dace and salmonids (Gelwicks et al. 2009-TN11189).

Researchers using the same methods as for Hams Fork River collected a total of 189 fish from 7 species across the 3 segments of the NFLMC using electrofishing and minnow traps (TerraPower 2024-TN11009). Of the fish collected from the NFLMC in October 2022, almost 85 percent of them were speckled dace, longnose dace, and redside shiner. Researchers also collected small numbers of mountain suckers, white suckers, and fathead minnows (see Table 3-5 for additional species information). In June 2023, only 9 fish were collected: 7 white suckers, 1 fathead minnow, and 1 speckled dace. In August 2023, only 27 fish were collected of the following species: longnose dace, redside shiner, speckled dace, fathead minnow, and Utah chub (1 fish). In contrast to species richness in Hams Fork River, the NFLMC's species richness increased downstream closer to the confluence with the larger Little Muddy Creek.

Table 3-5 Common Fish Species in Streams Near the Kemmerer Unit 1 Site

Common Name	Species	Special Status	Hams Fork	NFLMC
redside shiner	*Richardsonius balteatus*	Non-native	Present	Present
white sucker	*Catostomus commersonii*	Invasive	Present	Present
rainbow trout	*Oncorhynchus mykiss*	Non-native	Present	-
brown trout	*Salmo trutta*	Non-native	Present	-
mountain whitefish	*Prosopium williamsoni*	-	Present	-
Utah chub	*Gila atraria*	Non-native	Present	Present
mountain sucker	*Catostomus platyrhynchus*	-	Present	Present
longnose dace	*Rhinichthys cataractae*	Non-native	-	Present
speckled dace	*Rhinichthys osculus*	-	-	Present
fathead minnow	*Pimephales promelas*	Non-native	-	Present
roundtail chub	*Gila robusta*	SGCN	-	Present
flannelmouth sucker	*Catastomus latipinnis*	SGCN	-	Unconfirmed presence

- = denotes no content in table cell; invasive = not native and causes damage to the environment or humans; NFLMC = North Fork Little Muddy Creek; SGCN = Species of Greatest Conservation Need.
Sources: WGFD 2017-TN10922; TerraPower 2024-TN10896.

WGFD biologists also surveyed the NFLMC in 2004 and 2018 and found white sucker to be most abundant (58 percent), followed by fathead minnow (17 percent), mountain sucker and redside shiners (each 9 percent), speckled dace and Utah chub (each 3 percent), and roundtail chub (<1 percent) (NRC 2002-TN7254; Gelwicks et al. 2009-TN11189; WGFD 2025-TN11223).

3.5.1.2 Important Species and Habitats

Recreationally Important Fisheries: In recent years, Hams Fork River has become a frequented location for fly fishing year-round, where the primary catch is rainbow and brown trout (WGFD 2018-TN11005). Fishermen also target cutthroat trout, mountain whitefish, splake, and tiger trout in the reservoir and river (WGFD 2024-TN10923). As an intermittent stream, the NFLMC is not considered a recreational fishing area by the State although non-native brook trout, mountain suckers, and non-native creek chubs or speckled dace can be found farther downstream where it meets Little Muddy Creek (WGFD 2024-TN10925).

State-Protected and Other Special Status Aquatic Species: The WGFD is responsible for managing birds, mammals, amphibians, and reptiles as nongame or as protected species. The WGFD also identifies Species of Greatest Conservation Need (SGCN) using the Native Species Status classification system as identified in the State Wildlife Action Plan (SWAP). The Native Species Status classification system evaluates a species' status based on factors like population, habitat, and human activity levels. Table 3-6 below shows the State-listed species that may occur near the intake and outfalls for the proposed Kemmerer Unit 1 or downstream. The NRC staff compiled this information from the ER, the WGFD, and the Wyoming Natural Diversity Database (WYNDD) (TerraPower 2024-TN10896; WGFD 2017-TN10922; WYNDD Undated-TN10962).

The SWAP also considered aquatic wildlife conservation areas, and three of these occur near the Kemmerer Unit 1 site: Upper Hams Fork drainage, Muddy Creek drainage, and Upper Blacks Fork drainage (WGFD 2017-TN10922). Muddy Creek drainage is a priority conservation area for bluehead sucker, flannelmouth sucker, and roundtail chub, while Muddy Creek, Upper Hams Fork, and Upper Blacks Fork drainages are priority conservation areas for the Colorado River cutthroat trout (WGFD 2017-TN10922).

Federally Protected Aquatic Species and Habitats: Federal agencies must consider the effects of their actions on ecological resources protected under several Federal statutes and must consult with the U.S. Fish and Wildlife Service (FWS). There are no essential fish habitats (Magnuson–Stevens Act [TN9966]), National Marine Sanctuaries (TN4482), or federally listed species or critical habitat under the National Marine Fisheries Service's jurisdiction (TN1010) located within the boundary of or in the vicinity of the Kemmerer Unit 1 site. This section describes the species and habitats that are federally protected under the Endangered Species Act (ESA) and under FWS jurisdiction. The NRC staff structured its biological assessment of these species and habitats in accordance with definitions from 50 CFR 402.12(f) (TN4312). Sections 3.6.1 and 3.7.1 define and describe the action area and no critical habitat for listed species occurs within it. Table 3-7 and Appendix G describe each ESA-protected species potentially present in the action area, assesses the potential effects of the proposed action on each species, and presents the review team's effect determination for each species.

The aquatic portion of the action area for the proposed action consists of all onsite or downstream ephemeral streams and creeks and any streams along the pipeline and transmission line corridor that may be impacted by construction activities. This includes the NFLMC and Hams Fork River, which are part of the Green River Basin.

1 **Table 3-6 State-Listed Species that May Occur Near the Kemmerer Unit 1 Site**

Common Name	Species	Status	Last Known Sighting Location and (Year)	Habitat
bluehead sucker	*Catostomus discobolus*	SGCN	Sighted in Hams Fork (1997) and LMC (2004)	Benthic fish that prefers fast-moving water of rivers or streams with a gravel bottom (USDA Undated-TN10926). Native to Green River Basin.
Colorado River cutthroat trout	*Oncorhynchus clarkii pleuriticus*	SGCN	None observed, but within known range	Fish prefers cold, clear water with natural flow fluctuations, low fine sediment levels, and complex habitats (WGFD Undated-TN10930).
flannelmouth sucker	*Catostomus latipinnis*	SGCN	Sighted in Hams Fork (2004), LMC (1995), and NFLMC (unconfirmed hybrid 2018)	Benthic fish that is found in large, fast-moving streams with riffles and backwater habitat (USDA Undated-TN10927). Native to Green River Basin.
northern leatherside chub	*Lepidomeda copei*	SGCN	Sighted in Hams Fork (1996)	Fish found in deep pools in medium-sized streams with cool water temperatures or streams with mostly riffle habitat (WGFD Undated-TN10928).
roundtail chub	*Gila robusta*	SGCN	Sighted in Hams Fork (2004) and NFLMC (2018)	Fish found in deep pools with low current in medium to large streams (WGFD Undated-TN10929). Native to Green River Basin.

LMC = Little Muddy Creek; NFLMC = North Fork Little Muddy Creek; SGCN = Species of Greatest Conservation Need.

Source: WYNDD Undated-TN10963.

2 **Table 3-7 Federally Protected Species that May Occur Near the Kemmerer Unit 1 Site**

Species	Status	Review Team Evaluation[a,b]	Review Team Conclusion[c,d]
bonytail (*Gila elegans*)	FE	Baseline Information: The bonytail is a fish native to the Colorado River Basin that has been observed in pools and eddies of mainstem rivers. They have a gray or olive-colored back, silver sides, and a white belly and is a member of the minnow family (FWS 2025-TN11006). Site Occurrence: The bonytail was extirpated from the State of Wyoming due to the construction of the Flaming Gorge Reservoir in the 1950s; per the FWS, it is not known to or believed to occur in Wyoming (WGFD 2010-TN11015; FWS 2023-TN11007). Potential Impacts: No proposed project activities would take place in or adjacent to habitat for the bonytail, which is not known to or believed to occur in Wyoming.	No Effect

Table 3-7 Federally Protected Species that May Occur Near the Kemmerer Unit 1 Site (Continued)

Species	Status	Review Team Evaluation[a,b]	Review Team Conclusion[c,d]
Colorado pikeminnow (*Ptychocheilus lucius)*	FE	Baseline Information: Colorado pikeminnow is a fish species endemic to warm-water, large rivers of the Colorado River Basin and is the largest minnow native to North America. They are long, silvery white in color, with creamy-white bellies (FWS 2025-TN11008). Site Occurrence: The Colorado pikeminnow was extirpated from the State of Wyoming due to the construction of the Flaming Gorge Reservoir in the 1950s; per the FWS, it is not known to or believed to occur in Wyoming (WGFD 2010-TN11015; FWS 2023-TN11010). Potential Impacts: No proposed project activities would take place in or adjacent to habitat for the Colorado pikeminnow, which is not known to or believed to occur in Wyoming.	No Effect
humpback chub (*Gila cypha)*	FT	**Baseline Information:** The humpback chub is a native species of the Colorado River and is only found in warm-water canyons of the Colorado River Basin, with swift turbulent water (FWS 2025-TN11011). **Site Occurrence:** If the humpback chub was ever present in the Green River Basin, it was likely a rare migrant that is now cut off by the Flaming Gorge Reservoir. Per the FWS, it is not known to or believed to occur in Wyoming (FWS 2024-TN11012). **Potential Impacts:** No proposed project activities would take place in or adjacent to habitat for the humpback chub, which is not known to or believed to occur in Wyoming.	No Effect
razorback sucker (*Xyrauchen texanus)*	FE	**Baseline Information:** The razorback sucker is native only to the warm-water portions of the Colorado River Basin of the southwestern U.S. Razorback sucker are found throughout the basin in both lake and river habitats but are most common in backwaters, floodplains, flatwater river sections, and reservoirs (FWS 2025-TN11013). **Site Occurrence:** The razorback sucker was extirpated from the State of Wyoming due to the construction of the Flaming Gorge Reservoir in 1950s; per the FWS, it is not known to or believed to occur in Wyoming (WGFD 2010-TN11015; FWS 2023-TN11014). **Potential Impacts:** No proposed project activities would take place in or adjacent to habitat for the razorback sucker, which is not known to or believed to occur in Wyoming.	No Effect

Table 3-7 Federally Protected Species that May Occur Near the Kemmerer Unit 1 Site (Continued)

Species	Status	Review Team Evaluation[a,b]	Review Team Conclusion[c,d]

FE = Federally Endangered; FT = Federally Threatened; FWS = U.S. Fish and Wildlife Service.
(a) All species in this table were identified as potentially occurring within the action area via FWS Information for Planning and Consultation (IPaC) reports (FWS 2025-TN11675).
(b) Applicable generic impacts considered, along with species-specific factors: (1) habitat loss, degradation, disturbance, or fragmentation and associated effects and (2) behavioral changes resulting from preparation and other site construction activities.
(c) The effect determinations for federally listed species are made in accordance with the language and definitions specified in the FWS and NMFS Endangered Species Consultation Handbook (FWS and NMFS 1998-TN1031).
(d) Conclusions address proposed project impacts.

The native fish community of the Green River Basin in Wyoming, which the NFLMC and Hams Fork River are part of, includes at least three of the four federally endangered species listed in Table 3-7. Historically, the Colorado pikeminnow and razorback sucker inhabited the fast flowing, large river habitats in the canyon reaches of the Green River Basin, downstream of the Wyoming–Utah border (WGFD 2010-TN11015). These areas are now submerged under Flaming Gorge Reservoir. Both species likely migrated seasonally to the Wyoming stretch of the Green River. There is no definitive record of the humpback chub ever existing in the Green River Basin in Wyoming (WGFD 2010-TN11015). If it was ever present, it was likely a rare migrant from the steep canyon sections of the Green River in Utah, now also inundated by Flaming Gorge Reservoir. The native chub community of Wyoming's Green River Basin once included the bonytail; however, it was likely uncommon upstream of the steep canyon sections near the Utah border (WGFD 2010-TN11015).

By the 1950s and 1960s, water pollution severely impacted the Green River Basin's fish populations. Raw sewage and industrial effluent polluted the river downstream all the way to Utah. This degradation, combined with habitat loss due to the construction of Flaming Gorge Reservoir, eliminated any suitable big river habitats in Wyoming and blocked fish populations below the reservoir from migrating upstream (WGFD 2010-TN11015). The endangered bonytail, Colorado pikeminnow, and razorback sucker were completely extirpated from Wyoming by 1970 (WGFD 2010-TN11015; FWS 2023-TN11007, FWS 2023-TN11010, FWS 2023-TN11014). Since these four federally protected fish species no longer occur in the Green River Basin, they are not considered further.

<u>Invasive and Nuisance Species</u>: Aquatic invasive species (AIS) are organisms that are not native and cause significant harm to an ecosystem when introduced (WGFD 2024-TN10931). For the purposes of this discussion, nuisance species are non-native species that alter the environment but do not rise to the level of invasive.

The Wyoming Aquatic Invasive Species Act of 2010 enabled the WGFD to implement the Wyoming AIS Program to prevent, control, contain, monitor, and eradicate AIS from State waters. The 2010 Wyoming AIS Management Plan serves as the framework for this three-part strategy, which is (1) outreach and education, (2) increasing boater awareness of AIS threats and inspection of watercraft to prevent and intercept high-risk watercraft that may be transporting AIS, and (3) monitoring waters to allow for early detection and rapid response to any new AIS populations in the State (WGFD 2010-TN10932).

The most recent SWAP lists invasive species as a high threat to aquatic organisms in the State because they compete with, prey on, hybridize with, or otherwise negatively impact native species (WGFD 2017-TN10922). Of particular concern and immediate threat are the white sucker, burbot, and brook trout. White suckers were found in Hams Fork River and the NFLMC during preapplication surveys conducted in 2022 and 2023 by USO and can be found throughout the larger Green River Basin. The two other invasive species that could be present are curly pondweed (*Potamogeton crispus*) and the New Zealand mudsnail (*Potamopyrgus antipodarum*), although there are no current reports of either in Hams Fork River or the NFLMC.

3.5.2 Environmental Impacts of Construction

DOE analyzed terrestrial and aquatic ecological impacts from preconstruction activities for Kemmerer Unit 1 in Section 3.3.1.2 of its preconstruction EA and concluded that the impacts would be minor (DOE 2025-TN11602). The text below addresses aquatic impacts from the totality of building Kemmerer Unit 1, including both preconstruction and construction activities. Impacts on the aquatic ecosystem from building Kemmerer Unit 1 would mainly be associated with impacts to the NFLMC and the Muddy Creek basin from building a new raw water line, a new water discharge line, and the stormwater management system, which includes an underground stormwater network, sewer holes, catch basins, detention ponds, discharge outfalls, and rip-rap aprons (TerraPower 2024-TN11009). Also, streams onsite or in the transmission line corridor could be impacted by soil-disturbing activities that lead to soil erosion during site preparation and the building of Kemmerer Unit 1. In addition, there could potentially be impacts to streams or other water bodies when building the new water pipeline and transmission line.

3.5.2.1 Site and Vicinity

Construction activities could introduce runoff and sediment to streams on the Kemmerer Unit 1 site. The site is drained by several ephemeral streams or dry washes that fill with water after heavy rain events and drain into the NFLMC, which runs the full length of the eastern side of the site. While the dry washes do not contain aquatic life, altering them during construction could introduce sediment into the NFLMC, which they drain into.

While onsite disturbance would alter the natural flow of water runoff on the site, USO would be required to obtain approval under WYPDES LCGP for Storm Water Discharges (Permit WYR100000). This permit requires that pollutants and sediment in stormwater runoff be minimized or eliminated. To meet requirements under the WYPDES LCGP, USO would have to submit an SWPPP to WYDEQ at least 30 days before site work begins. The SWPPP would identify sources of stormwater pollution and identify BMPs that USO would use to minimize impacts. BMPs usually include erosion and sediment control measures (City of Casper 2004-TN10933; IDEQ 2020-TN10934; MDT 2016-TN10935; NDDH 2001-TN10936).

USO would have to plan and complete construction activities in accordance with WYDEQ and EPA regulations. Any impacts are expected to be temporary, and additional mitigation beyond the actions identified above with regards to the WYPDES and the SWPPP is not warranted.

The NFLMC, though classified as a Class 3B intermittent stream, receives year-round water supply from the Naughton Power Plant water discharge, which allows it to support an array of macroinvertebrate and fish species. While no Federal or State-listed species were found during the 2022 to 2023 preconstruction sampling, the SGCN-listed roundtail chub was collected in samples taken as recently as 2018. Wyoming surface water quality standards require that waters of the State must be free from substances for both point source and nonpoint source discharges.

USO does not plan to construct any structures or discharge water within 400 ft (122 m) of the NFLMC. The stormwater management system, as described in Section 3.4.1.2, includes an underground network of manholes, catch basins, detention ponds, discharge outfalls, and rip-rap aprons underlain with a filtration layer (TerraPower 2024-TN11009). No structures are anticipated to be built in or along the wetlands or the creek.

3.5.2.2 Offsite Areas

Hams Fork River: Kemmerer Unit 1 would get its raw water from the Naughton Power Plant, which has an existing CWIS located in Hams Fork (TerraPower 2024-TN10896). The existing intake structure and pumps have the capacity from the design intake flow needed to supply water to Kemmerer Unit 1, and no changes or construction are anticipated to the intake at Hams Fork (TerraPower 2024-TN11009).

Macro-corridors: A cooling-water supply pipeline and two transmission lines would connect Kemmerer Unit 1 to the existing Naughton Power Plant to leverage the existing water supply and electrical infrastructure. The pipeline and transmission lines would share a common corridor from Kemmerer Unit 1 and diverge just southwest of the Naughton Power Plant. The water pipeline would extend north–northwest to the Naughton Power Plant Raw Water Settling Basin, and the transmission lines would extend north–northeast to the Naughton Power Plant switchyard (TerraPower 2024-TN10896).

Unimproved dirt tracks would provide access roads during the construction phase and for ongoing transmission line maintenance and would be routed to avoid sensitive resources such as waterways. Vacant but previously disturbed areas around Naughton Power Plant and Kemmerer Unit 1 would be used for equipment staging and material laydown. Additional construction staging areas may need to be established along the transmission corridor and would be determined during the construction phase. USO has committed to ensuring that staging areas are placed in locations that are not near waterways or prone to erosion (TerraPower 2024-TN10896).

The proposed design for the raw water intake pipeline calls for the installation of approximately 6 mi (9.7 km) of pipe that would follow the transmission line ROW most of the way. The raw water supply pipeline would be built under up to six small streams using horizontal directional drilling instead of open trenching methods to avoid direct impacts on the streams and stream banks. Horizontal directional drilling involves boring under the stream for the pipe, causing minimal disturbance to the stream, unlike open trenching, which would require extensive digging of stream banks and stream bottoms. This approach reduces the volume of excavated material and decreases the risk of soil being washed into the stream. There would still be disturbed areas on either side of the streams where the drilling equipment is set up, and it is possible that some disturbed soil would be carried into the stream by stormwater runoff. USO would implement State-required SWPPP BMPs to reduce this risk (TerraPower 2024-TN11009).

Transmission lines would be installed as overhead powerlines, spanning streams and wetlands, which are part of or drain to the NFLMC. Due to the relatively level terrain and low-growing vegetation, large-scale clearing and grading are not expected. Limited clearing and grading would be necessary at tower sites and possibly for temporary access roads and staging areas. Heavy equipment used for erecting towers and stringing conductors could damage vegetation and increase soil erosion into nearby streams. USO would implement required SWPPP BMPs to protect soil stockpiles from the elements and limit erosion and sedimentation (TerraPower 2024-TN10896, TerraPower 2024-TN11009). USO would also develop a spill prevention plan to reduce the likelihood of a petroleum or hazardous material spill occurring and impacting nearby aquatic communities.

3.5.2.3 Important Species and Habitats

As discussed in Section 3.5.1.2, the review team considers it unlikely that federally listed aquatic species occur within the project area (WGFD 2010-TN11015). As such, the review team has determined that constructing Kemmerer Unit 1 would not affect any federally listed aquatic species.

Five State-listed SGCN could occur in the vicinity of the Kemmerer Unit 1 site. The bluehead sucker, flannelmouth sucker, Northern leatherside chub, roundtail chub, and Colorado River cutthroat trout all have known ranges that overlap with the project area (see Table 3-2). Two of them, the roundtail chub and what is thought to be flannelmouth sucker × white sucker hybrids, have been observed in the Hams Fork River or the Little Muddy Creek drainage basin in the last 20 years.

The roundtail chub is native to the Colorado River Basin and Green River Basin (which includes Hams Fork River, the NFLMC, and Little Muddy Creek). Once common, they now occupy about 45 percent of their historic range in the Colorado River Basin and occur in low numbers throughout the Green River Basin in Wyoming (WGFD Undated-TN10929). Adults can grow up to 20 in. (51 cm) long and are found in pool-riffle habitats and streams with low current velocities. They feed on a variety of invertebrates, aquatic plants, and detritus (USDA Undated-TN10939). Spawning takes place in spring and early summer when adhesive, demersal eggs are deposited over gravel in deeper pools and runs (WGFD Undated-TN10929). WGFD lists the effects of water development and habitat degradation caused by dewatering and loss of connectivity as threats to the roundtail chub.

The flannelmouth sucker is also native to the Colorado River Basin and Green River Basin (which includes Hams Fork River, the NFLMC, and Little Muddy Creek). Flannelmouth sucker × white sucker hybrids are suspected to occur in the NFLMC; biologists collected two such individuals during 2018 sampling. The WGFD reports that the only remaining genetically pure flannelmouth suckers occur in the upper Bitter Creek far from the Kemmerer Unit 1 site (WGFD Undated-TN10938).

Construction activities are expected to be continuous on the site from spring 2025 through the end of 2029, overlapping with the spring and summer spawning of the roundtail chub. As the primary threat to the roundtail chub is dewatering and loss of connectivity, it is likely that impacts to its spawning are more likely to occur due to Naughton Power Plant operations and changes in discharges from that plant to the NFLMC than from the proposed action. Construction activities at the Kemmerer Unit 1 site would comply with recommendations from the WGFD for BMPs to reduce impacts to aquatic resources, which are included in the site's SWPPP (TerraPower 2024-TN11009; Tetra Tech 2024-TN11128; W. Schultz 2024-TN11038).

3.5.2.4 Mitigation

The review team expects that two major forms of reasonably foreseeable mitigation would be implemented by USO to address impacts on aquatic ecological resources. First, USO has designated a footprint of disturbance that avoids encroachment into aquatic habitats to the maximum extent possible, limiting disturbance to a few small ephemeral streams and ponds on the Kemmerer Unit 1 site and perpendicular crossings of streams traversed by the water pipeline and transmission line. Second, USO would implement BMPs to minimize soil erosion and minimize sedimentation into ephemeral streams, the NFLMC, and other aquatic habitats in the affected area. These BMPs would be required by the State and would have to meet State requirements under the LCGP from the WYPDES. USO has not proposed any further monitoring of aquatic ecological resources. Because of the limited physical disturbance of aquatic habitats and USO's commitment to use BMPs to minimize erosion and sedimentation, the review team does not anticipate that further monitoring would be required by Federal, State, or other regulatory agencies (TerraPower 2024-TN11009).

3.5.3 Environmental Impacts of Operation

This section describes potential impacts on the existing aquatic ecosystems from operating activities at the Kemmerer Unit 1 site. A more detailed analysis of impacts on the existing aquatic ecosystems would be conducted during the environmental review for an OL, if USO submits an OL application. The review team's analysis of the potential impacts on the aquatic ecosystems, biota, and State-listed species from operation activities at the Kemmerer Unit 1 site is based on USO's ER (TerraPower 2024-TN10896), the review team's observations at the site, discussions with and information provided by TerraPower and the State of Wyoming, and peer-reviewed articles or other documents. The review team considered operational activities that could have a potential to affect aquatic species and habitats, including the operation of the intake and discharge. Potential effects from intake operation include water withdrawal and consumption, as well as entrainment and impingement of aquatic biota. Potential effects from discharge operation on the aquatic habitats in the reservoir include thermal discharges, cold shock, and physical changes resulting from scouring and chemical discharges.

3.5.3.1 Site and Vicinity

During operations, the review team expects that USO would continue to manage impacts to onsite streams in a manner similar to that described in Section 3.5.2.1 using BMPs required by the SWPPP under the WYDEQ. The primary concerns related to aquatic resources during operations include water withdrawal and consumption, specifically, flow rate and whether there is ample water to operate the facility without a detrimental impact to the aquatic organisms living in Hams Fork River and the Green River Basin. Kemmerer Unit 1 would require makeup water to replace water lost to evaporation and drift at the MDCT. Smaller amounts of water would also be required for service water, demineralized water, fire protection, potable water, and other domestic uses. Based on an estimated average withdrawal rate of 3,689 gpm (14.0 m^3 per minute) and maximum withdrawal rate of 5,270 gpm (20.0 m^3 per minute) for Kemmerer Unit 1 operation (TerraPower 2024-TN10896), operations would remove 11.7 cfs (0.33 m^3/s) or 2.9 to 39.3 percent from the Hams Fork River, depending on the time of year.

The EPA has developed regulations that address water withdrawals and intake flow restrictions for new facilities that produce electric power (40 CFR Part 125-TN254). These regulations implement Section 316(b) of the CWA. These regulations provide limits on the total design intake flow for all cooling-water intake structures. The limits depend on the type of waterbody in which the intake structure is located. For facilities that withdraw from a freshwater river or stream, the regulations limit the total design intake flow to no more than 5 percent of the mean annual flow.

3.5.3.2 Offsite Areas

The only potential offsite aquatic impacts during operations would be from maintaining the overhead transmission line corridor described in Section 2.2 and increased water demand at the Naughton Power Plant intake in Hams Fork River, already discussed in Section 3.5.2.3. Maintenance of the transmission line ROW would be regulated by the National Pollutant Discharge Elimination System (NPDES)/WYPDES permit that would be obtained by USO prior to operation.

3.5.3.3 Important Aquatic Species and Habitats

As discussed in Section 3.5.1.2, the review team considers it unlikely that federally listed aquatic species including the bonytail, Colorado pikeminnow, razorback sucker, or humpback chub, which are reported to be extirpated from the State of Wyoming since the 1970s, could occur in the project area (WGFD 2010-TN11015). The review team has determined that operating Kemmerer Unit 1 would not affect any federally listed aquatic species.

The NFLMC, notwithstanding its 3B Surface Water Classification, supports a reasonably diverse fish community, including one Wyoming SGCN, the roundtail chub. USO would have to comply with Wyoming's Surface Water Quality Standards, which include (Chapter 1, Section 32) specific protections for aquatic communities: "Class 1, 2, and 3 waters of the state must be free from substances, whether attributable to human induced point source discharges or nonpoint source activities … which will adversely alter the structure and function of indigenous or intentionally introduced aquatic communities" (WYDEQ 2024-TN11170). As the primary threats to the roundtail chub are dewatering and loss of connectivity, it is likely that impacts are more likely to occur due to Naughton Power Plant operations and changes in discharges from that plant to the NFLMC. USO would also be required to submit an SWPPP with BMPs, including those suggested by WGFD to protect aquatic resources, to WYDEQ with its application for a WYPDES (W. Schultz 2024-TN11038). These BMPs should minimize impacts to the NFLMC's aquatic communities. Federally and State-listed aquatic species that occur under the transmission lines would be protected by the BMPs discussed previously in Section 3.5.2.4.

A more detailed analysis of impacts on aquatic resources due to operations would be conducted during the environmental review for an OL, if USO submits an OL application.

3.5.4 Environmental Impacts of Decommissioning

This section describes the environmental impacts associated with the termination of operations and the decommissioning of Kemmerer Unit 1 at a future date. All operating nuclear power plants will terminate operations and be decommissioned when a decision is made to cease operations. The overall impact depends on the decommissioning activity. The greatest potential decommissioning impact on protected species is associated with the dismantling of the nuclear plant, including intake and discharge structures. Many activities that could affect ecological resources during decommissioning are the same types of activities that occur during reactor construction (see Section 3.5.2). Impacts resulting from decommissioning a nuclear power plant are analyzed in the decommissioning generic EIS (NRC 2002-TN7254) and would be assessed as part of the environmental review for an OL, if USO submits an OL application.

3.5.5 Cumulative Impacts

The cumulative analysis considers other past, present, and reasonably foreseeable future actions potentially affecting aquatic resources, as described in Appendix E.

Section 3.5.1 describes some of the past activities that have already affected the waters in the Green River Basin. These activities include the impoundment of Hams Fork River and the creation of the Flaming Gorge Reservoir, which cut off migration routes of several aquatic species including the endangered bonytail, Colorado pikeminnow, razorback sucker, and humpback chub, which are now all extirpated from the State of Wyoming. The dams have segmented aquatic habitat in the Green River Basin, altered water temperatures, changed sedimentation rates, and altered flow regimes. This has affected habitats in the area and in turn has resulted in the loss of diversity and species richness (WGFD 2010-TN11015). The fish populations in the Green River Basin (including Hams Fork River and the NFLMC) have changed considerably as a result of human activities (e.g., impoundment of the river and introduction of invasive non-native species).

The 2017 Green River Basin SWAP lists water development and altered flow regimes as a high threat to the basin and drought and climate change as moderate threats (WGFD 2017-TN10922). Water development can threaten native species but allow some introduced species to thrive, including those stocked for sport fishing. Human development often simplifies natural systems, which can favor species with generalized and broad habitat requirements. For instance, the Lake Trout fishery thrives due to deep water and forage production in human-made bodies of water. Stable stream flow releases from dams and plant outfalls with relatively low peak flows and high base flows sustain productive sport fisheries like the Green River Basin. Drought and climate change can lead to lower water levels and increased water temperatures, reduce the habitat available to fish and other aquatic wildlife, and be detrimental to the health and reproductive success of aquatic species.

Ongoing and future projects that have or could affect aquatic resources include the preconstruction activities for Kemmerer Unit 1, the new TFF being constructed on the Kemmerer Unit 1 site, and the expected retirement of Naughton Power Plant in 2036. The TFF is being built on 35 ac (14 ha), 433 ft (132 m) west of the NFLMC. There are no aquatic resources within the Kemmerer Unit 1 preconstruction area or within the TFF construction footprint, but there could be indirect impacts from construction to water quality and aquatic communities if disturbed soils are carried into the NFLMC with stormwater runoff. However, stormwater and erosion control BMPs are required as a condition of the Wyoming LCGP, with an approved SWPPP from WYDEQ expected to minimize these impacts.

Currently, effluent from Naughton Power Plant is discharged into the NFLMC north of the Kemmerer Unit 1 site. Under normal circumstances, Naughton Power Plant's effluent comprises most of the water flow in the NFLMC. When Naughton Power Plant stops operating in 2036, its discharge to the NFLMC would also cease. As observed in 2023 by biologists sampling aquatic communities, the NFLMC was reduced to a series of puddles when the Naughton Power Plant's water was diverted to replace a pump; the same is expected to occur when Naughton Power Plant ceases operations (TerraPower 2024-TN11009). Without Naughton Power Plant's discharge, benthic organisms in the affected section of the NFLMC would die over time. Most fish in this area would move downstream to areas with maintained flow or become trapped in puddles where they would be unlikely to survive unless rainfall and spring melt raises the water levels and allows escape. Since Kemmerer Unit 1 would withdraw its makeup water from Hams Fork River and not the NFLMC, the lack of water in the NFLMC would not impact its operations. The loss of benthic organisms and some fish in the dewatered section would harm aquatic life in the NFLMC's upper reaches but is unlikely to have a significant long-term effect on aquatic communities downstream.

Various streams and creeks crossed by the proposed route for the water pipeline and transmission lines connecting Kemmerer Unit 1 to Naughton Power Plant are all part of the NFLMC and the Little Muddy Creek basin. In addition to building and operating these lines for the Kemmerer Unit 1 project, other energy projects planned for the area could result in additional construction and releases of toxins or industrial contaminants from planned projects like wind turbine projects, a soda ash refinery, and mining. As discussed in Section 3.5.2, the potential impacts during construction and operation would be minimal because the risk of impacts to aquatic resources is reduced by the implementation of required SWPPP BMPs, first under the LCGP and then under the WYPDES. None of the other past, present, and reasonably foreseeable future actions are expected to impact offsite streams and creeks beyond those already discussed.

The review team notes that although the aquatic habitats in the vicinity of the Kemmerer Unit 1 site have been subjected to destabilizing impacts from past activities, especially those from operation of the Naughton Power Plant, the incremental contribution from the proposed action, including building, operating, and decommissioning the proposed reactor, would be minimal.

3.5.6 Conclusions

The review team concludes that the potential direct, indirect, and cumulative impacts of the proposed action on aquatic resources would be SMALL. This conclusion is based upon the above analysis and is supported by USO’s design to minimize the footprint of disturbance and plans to implement appropriate BMPs to minimize sedimentation, erosion, and other disturbances to ponds, streams, and creeks. Although work on the water pipeline and transmission lines would span over or below offsite waterways, any impacts that would occur would be temporary and largely controlled by BMPs.

3.6 Terrestrial Ecological Resources

3.6.1 Affected Environment

3.6.1.1 Site and Vicinity

The Kemmerer Unit 1 site and vicinity lie within the Wyoming Basin Ecoregion (EPA Level III Ecoregion 18) and its subdivision, the Rolling Sagebrush Steppe (EPA Level IV Ecoregion 18a) (TerraPower 2024-TN10896). The EPA characterizes the Wyoming Basin Ecoregion as an arid intermontane basin interrupted by hills and low mountains (Chapman et al. 2004-TN10940). Dominant vegetation types are grasslands and shrublands. Major land uses include livestock grazing and mining. The Rolling Sagebrush Steppe ecoregion is semiarid and consists of rolling plains with hills, cuestas, mesas, and terraces and has a continental climate with cold winters and mild summers (Chapman et al. 2004-TN10940). Lower elevation vegetation is mostly sagebrush steppe, with Wyoming big sagebrush (*Artemisia tridentata wyomingensis*), silver sagebrush (*Artemisia cana*), black sagebrush (*Artemisia nova*), rabbitbrush (*Ericameria nauseosa*), western wheatgrass (*Pascopyrum smithii*), needle-and-thread grass (*Hesperostipa comata*), and Sandberg bluegrass (*Poa secunda*) as common species. Frequent fires have replaced some of the sagebrush habitats with European annual grasslands. The review team conducted an independent analysis of terrestrial habitats in and around the site (Appendix F).

About 99 percent of the 290 ac (117.4 ha) Kemmerer Unit 1 site consists of shrub/scrub communities, based on 2023 land cover types (Appendix F, Table F-1). Based on 2023 LANDFIRE data (Appendix F, Table F-2), shrub/scrub communities consist of big sagebrush shrubland and steppe, salt desert scrub, low sagebrush shrubland and steppe, greasewood shrubland, western riparian woodland and shrubland, desert scrub, and introduced upland vegetation shrub. The big sagebrush shrubland is interspersed with ephemeral and intermittent streams and ephemeral, depressional wet areas that generally occur within the greasewood flat vegetation type (TerraPower 2024-TN10896).

National Wetland Inventory (NWI) features occur within the Kemmerer Unit 1 site and vicinity and are similar to those delineated in the field (Appendix F). Wetland delineators evaluated onsite waterbodies and wetlands (TerraPower 2024-TN10896) in 2022 according to standard protocols. They identified and mapped all waterbodies based on the presence of an Ordinary High-Water Water Mark and assessed flow duration according to the Streamflow Duration Assessment Method (Nadeau et al. 2015-TN11220). They delineated wetlands during the growing season, assessing them for the occurrence of hydrophytic vegetation, hydric soils, and wetland hydrology according to U.S. Army Corps of Engineers delineation protocols (USACE 1987-TN2066, USACE 2008-TN10941) and evaluated the functional assessment of delineated wetlands using the Montana Wetland Assessment Method (Berglund and McEldowney 2008-TN10942).

The wetland delineators documented 7.1 ac (2.9 ha) of a singular Palustrine Emergent wetland along the floodplain of the NFLMC (TerraPower 2024-TN10896). Dominant species are as described in the wetland delineation report (Tetra Tech 2023-TN11124). The wetland functional rating for this wetland is Category III (moderate suitability for wildlife and adequate aquatic habit for fish). They also delineated four stream segments in the southern portion of the site: one perennial stream (the NFLMC) and three ephemeral streams. The portion of the NFLMC bordering the site appears to have perennial flow, according to field observations from June–October 2022 (TerraPower 2024-TN10896). Additional stream lengths and a small human-constructed pond, located in the southern and western portions of the site, were not documented as features in the delineation (Tetra Tech 2023-TN11124). According to the ER, “no jurisdictional determination has been submitted, nor is one anticipated. All features would be assumed jurisdictional and a preconstruction notification for stream crossing impacts would be submitted under Nationwide Permit 14….”

Biologists conducted multiple terrestrial surveys and analyses to document the habitat conditions and species on the Kemmerer Unit 1 site and vicinity (TerraPower 2024-TN10896). They compiled a list of regionally occurring special status species, evaluated their potential for occurring onsite and offsite, conducted field surveys to evaluate terrestrial habitats, searched for raptor nests, and compiled species lists for observed wildlife species. The applicant’s Terrestrial Visual Encounter Survey (TerraPower 2024-TN10896) supported the LANDFIRE categorization of the site as dominated by sagebrush habitat types. The ER presents a list of wildlife species (or their sign) observed on the site, in offsite areas, and in the surrounding landscape (TerraPower 2024-TN10896). For the site, this list includes 8 mammals, 35 birds, 1 amphibian (boreal chorus frog; *Pseudacris maculata*), and 1 invertebrate (clouded sulphur; *Colias philodice*).

<u>Offsite Areas</u>

Offsite areas include the macro-corridors, which would contain the transmission line and water supply pipeline (TerraPower 2024-TN10896). The applicant conducted terrestrial analyses and field surveys as described above for the site, surveying the macro-corridors area of approximately 511 ac (206.8 ha). Land cover and habitats present within the surveyed corridor area are similar to those of the site (Table F-1 and Table F-2). Wildlife observed within the macro-corridors are similar to those of the site (TerraPower 2024-TN10896). Mule deer (*Odocoileus hemionus*) and elk (*Cervus canadensis*) signs were also observed within the macro-corridors.

The source for the perennial stream and wetlands within the macro-corridors is water flowing from Kemmerer Mine and Naughton Power Plant ponds (TerraPower 2024-TN10896). The wetland delineation documented approximately 10 ac (4.0 ha) of Palustrine Emergent wetlands within the macro-corridors. This included four wetlands in the transmission macro-corridor, three in the water macro-corridor (two of which are the same wetlands located within the transmission macro-corridor), and five in the collocated macro-corridor. Dominant species are Baltic rush, foxtail, common reed (*Phragmites australis*), Nuttall's alkali grass (*Puccinellia nuttalliana*), Rocky mountain glasswort (*Salicornia rubra*), sagebrush (*Artemisia* spp.), sedges (*Carex* spp.), and Utah arrowgrass (*Triglochin concinna*). Each of the 10 wetlands' functional rating is Category III (moderate suitability for wildlife and adequate aquatic habitat for fish). All are highly disturbed because of the surrounding industrial land use and livestock grazing. Approximately five streams, one isolated wetland, and additional wetland extensions represented in the NWI dataset were not delineated. One NWI wetland in the transmission macro-corridor was delineated as a ditch. Five ephemeral, two intermittent, and five perennial streams (one being the NFLMC) were delineated in the macro-corridors. The ER stated that "multiple aquatic features within and along the water and electrical macro-corridors associated with Naughton Power Plant are potentially isolated, non-jurisdictional features. The NFLMC, its tributaries, and associated wetlands are potentially jurisdictional under the Clean Water Act" (TerraPower 2024-TN10896).

3.6.1.2 Important Species and Habitats

Section 2.3.1.4 of the ER (TerraPower 2024-TN10896) identifies and characterizes terrestrial species protected under Federal and State regulations. These analyses cover species listed or proposed to be listed as threatened or endangered under the ESA (Table 3-8), species designated with State-protected status, eagles protected under the Bald and Golden Eagle Protection Act (TN1447), and migratory birds protected under the Migratory Bird Treaty Act (MBTA) (TN3331). Important terrestrial habitats include any wildlife sanctuaries, refuges, preserves, or habitats identified by State or Federal agencies as unique, rare, or of priority for protection; wetlands and floodplains; and land areas identified as critical habitat for species listed by the FWS as threatened or endangered and other habitats of known or indicated interest (NRC 2024-TN10251). The applicant conducted terrestrial surveys, which are documented in the Terrestrial Visual Encounter Surveys (Tetra Tech 2023-TN11605). The survey area is presented in Figure 2.3-1 of the ER (TerraPower 2024-TN10896).

Correspondence with the WGFD (W. Schultz 2024-TN11038) indicated that the project area proposed for development is within the distribution of 68 SGCN. Golden eagle nests have been observed within 1 mi (1.6 km) of the project area. WGFD recommended targeted surveys for some SGCN birds: nesting raptors, mountain plover (*Anarhynchus montanus*), other migratory birds, and two SGCN mammals: pygmy rabbit (*Brachylagus idahoensis*) and white-tailed prairie dog (*Cynomys leucurus*). WGFD recommended minimizing habitat disturbances to protect three SGCN reptiles and amphibians: great basin spadefoot (*Brachylagus idahoensis*), northern leopard frog (*Lithobates pipiens*), and greater short-horned lizard (*Phrynosoma hernandesi*).

<u>Federally Listed Species</u>

The action area for purposes of assessing impacts to federally listed resources under the ESA is defined as all areas that could be directly or indirectly affected by a Federal action and may include areas beyond the immediate area of the action (50 CFR Part 402-TN4312). For the present Federal action, the review team defined the action area as the Kemmerer Unit 1 site and the offsite macro-corridors, including the land covers and terrestrial habitats described in Section 3.6.1.1, plus a 6 mi (9.7 km) radius around the proposed reactor to reflect possible indirect effects on habitats in the surrounding landscape.

The applicant accessed the FWS Information for Planning and Consultation (IPaC) database in June 2022 (TerraPower 2024-TN10896) to identify federally listed species and habitats for purposes of preparing the ER. The applicant conducted a desktop review of the likelihood of species occurrence for three species based on its IPaC review: the threatened yellow-billed cuckoo (*Coccyzus americanus*), the threatened Ute's ladies'-tresses (*Spriranthes diluvialis*), and the proposed for listing as threatened monarch butterfly (*Danaus plexippus*). The applicant conducted field surveys in 2022 and 2023 for monarch butterflies (TerraPower 2024-TN10896). Surveyors did not find any monarch butterflies or milkweed (*Asclepias* spp.), the larval host for the monarch butterfly. Surveyors did not find any Ute's ladies'-tresses. The applicant concluded that no habitat for yellow-billed cuckoo occurred within the action area, because the riparian woodlands required for nesting and foraging (Halterman et al. 2016-TN10943) are not present. The applicant also concluded that potential habitat for Ute's ladies'-tresses and monarch butterfly are not present.

The NRC staff conducted a desktop review of the Kemmerer Unit 1 action area, using Section 2.3.1.4 of the applicant's ER (TerraPower 2024-TN10896), Section 3.3.1.1 of DOE's EA for preconstruction (DOE 2025-TN11602), available scientific literature and studies, and other publicly available information. In addition, an ecologist from the NRC staff visited the site for familiarization purposes on July 16–17, 2024. The NRC staff accessed the IPaC database independently on April 18, 2024 (FWS 2024-TN11193) and April 10, 2025 (FWS 2025-TN11675), and the IPaC reports identified the same three species as were identified by the applicant plus two additional species (the threatened North American Wolverine [*Gulo gulo luscus*] and the proposed for listing as endangered Suckley's cuckoo bumblebee [*Bombus suckleyi*]) as having the potential to occur within the action area. The applicant concluded that there is no suitable habitat for the North American Wolverine in the action area due to the lack of prominent mountain ranges to which the species is primarily restricted (TerraPower 2024-TN10896). Because the FWS proposed the listing of the Suckley's cuckoo bumblebee as endangered (89 FR 102074-TN11623) on December 17, 2024, the applicant has not conducted surveys for this species. No critical habitat for any species overlaps with the action area. The NRC staff's evaluation of ESA-listed or -proposed-to-be-listed species that could occur within the action area and its effect determinations for those species are presented Table 3-8. Complete analyses for these federally protected species are presented in Appendix G.

Table 3-8 Federally Protected Terrestrial Species Evaluated for the Proposed Kemmerer Unit 1

Common Name	Species	Potential to Occur	Current Federal Status[(a)]	NRC Effect Determination[(b)]
Yellow-billed cuckoo	*Coccyzus americanus*	Yes	FT	NLAA
North American Wolverine	*Gulo gulo luscus*	Yes	FT	NLAA
Ute's ladies'-tresses	*Spiranthes diluvialis*	Yes	FT	NLAA
Monarch butterfly	*Danaus plexippus*	Yes	PFT	NLAA
Suckley's cuckoo bumblebee	*Bombus suckleyi*	Yes	PFE	NLAA

(a) Indicates protection status under the Endangered Species Act. FT = federally threatened; PFE = proposed for Federal listing as endangered; PFT = proposed for Federal listing as threatened.
(b) The NRC staff makes its effect determinations for Federally listed species in accordance with the language and definitions specified in the FWS and National Marine Fisheries Service Endangered Species Consultation Handbook (FWS and NMFS 1998-TN1031). NLAA = may affect, but not likely to adversely affect.

State-Protected Species

The applicant queried WYNDD's species occurrence database, which showed that 59 SGCN could potentially occur in the project vicinity (TerraPower 2024-TN10896). Based on applicant field surveys of the area shown in ER Figure 2.3-1, a total of 16 SGCN species were determined to occur in and around the Kemmerer Unit 1 site. SGCN species, habitat descriptions, and recommendations for minimizing project effects in Section 2.3.1-4 of the ER (TerraPower 2024-TN10896) and WYFG 2024 (W. Schultz 2024-TN11038) are incorporated here by reference.

The applicant analyzed WGFD-designated crucial pronghorn habitat and found that the site and the majority of the macro-corridors lie within the crucial winter, yearlong pronghorn range (TerraPower 2024-TN10896). In 2022 and 2023, adult male and female pronghorn were observed on the site and the macro-corridors (TerraPower 2024-TN10896).

The applicant analyzed greater sage-grouse habitat requirements and WGFD-designated habitats (TerraPower 2024-TN10896). The project is within the known range of greater sage-grouse in Wyoming but not within the designated core population area (Whitford 2015-TN10945). The sage-grouse core population area is approximately 0.5 mi (0.8 km) east of the site and 2.0 mi (3.0 km) from the macro-corridors. The Kemmerer Unit 1 site is 4.2 mi (6.8 km) to the west of the nearest known occupied lek (breeding area), and the macro-corridors are 3.7 mi (5.9 km) east of the nearest known occupied lek.

Many of the 13 avian species designated SGCN are dependent on sagebrush-steppe habitat, with three of these (Brewer's sparrow, sage thrasher, and greater sage-grouse) considered sagebrush-obligate (TerraPower 2024-TN10896). Additionally, the white-tailed prairie dog is a designated SGCN due to its essential role in the sagebrush-steppe ecosystem (TerraPower 2024-TN10896).

Burrowing owls nest underground and can be difficult to detect, requiring specialized surveys. A pair of burrowing owls were observed in 2023 in the surrounding area of the site, within proximity to the macro-corridors, nesting in a white-tailed prairie dog burrow (TerraPower 2024-TN10896).

Eagles and Migratory Birds

The Bald and Golden Eagle Protection Act (TN1447) extends regulatory protections to the bald eagle (*Haliaeetus leucocephalus*) and the golden eagle (*Aquila chrysaetos*). The Act prohibits anyone without a permit from the Secretary of the Interior from "taking" bald eagles or golden eagles, including their parts, nests, or eggs. The MBTA makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale any migratory bird or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued under Federal regulations (Migratory Bird Treaty Act of 1918-TN3331). The FWS (TerraPower 2024-TN10896) recommended conducting eagle and raptor nest surveys for 2 mi (3 km) around the project area, with 1 year of seasonal nest surveys occurring before project construction begins. WGFD (TerraPower 2024-TN10896) recommended surveys for nesting raptors (within 1 mi [1.6 km] of the project area), surveys for mountain plover (within 0.25 mi [0.4 km] of the project area), and clearance surveys for migratory birds within 72 hours before disturbance during nesting season.

Golden eagle, prairie falcon, and red-tailed hawk nests have been observed within 1 mi (1.6 km) of the project area (TerraPower 2024-TN10896). Based on field surveys in 2022 and 2023, the applicant presented a list of wildlife known to occur onsite, offsite, and in the surrounding landscape (TerraPower 2024-TN10896). Nearly all of these are protected by the MBTA (excluding greater sage-grouse and non-native bird species). Bald eagles were observed in the surrounding area only, and golden eagles were observed within the macro-corridors and surrounding area.

The applicant's IPaC review (TerraPower 2024-TN10896) indicated that six Birds of Conservation Concern (FWS 2021-TN8740) could be present onsite or in the macro-corridors: black rosy-finch (*Leucosticte atrata*), Cassin's finch (*Carpodacus cassinii*), golden eagle, rufous hummingbird (*Selasphorus rufus*), western grebe (*Aechmophorus occidentalis*), and willet (*Tringa semipalmata inornata*). Field surveys documented the presence of willets on the site and surrounding landscape, golden eagles in the macro-corridor and surrounding landscape, and western grebes in the surrounding landscape (TerraPower 2024-TN10896).

Important Terrestrial Habitats

Important terrestrial habitats include any wildlife sanctuaries, refuges, preserves, or habitats identified by State or Federal agencies as unique, rare, or of priority for protection; wetlands and floodplains; and land areas identified as critical habitat for species listed by the FWS as threatened or endangered and other habitats of known or indicated interest (NRC 2018-TN6006). According to the ER (Section 2.1.1.3), two national wildlife refuges (NWRs) occur within the region: Cokeville Meadows NWR (24 mi [39 km] from the site) and Seedskadee NWR (33 mi [53 km] from the site), as does the Fossil Butte National Monument (approximately 12 mi [19 km] from the site). No designated critical habitat for terrestrial species occurs within the Kemmerer Unit 1 site or macro-corridors (FWS 2025-TN11675).

Important habitats in and around the Kemmerer Unit 1 site include the sagebrush habitats, streams, and onsite or offsite wetlands. The site and macro-corridors lie within areas designated as crucial winter, yearlong range for pronghorn (TerraPower 2024-TN10896) (see Figure 3-9). Mule deer (WGFD 2021-TN10946), moose (WGFD 2021-TN10947), and elk (WGFD 2021-TN10948) have designated crucial ranges within 9 mi (14.5 km) of the site (TerraPower 2024-TN10896). No pronghorn or mule deer migration corridors (State of Wyoming 2020-TN11194) overlap with the site or macro-corridors (TerraPower 2024-TN10896). There are core areas (Whitford 2015-TN10945) for greater sage-grouse about 0.5 mi (0.8 km) from the site and 2 mi (3 km) from the macro-corridors. The Commissary Ridge Raptor Migration Route (HWI 2019-TN10949), known as a major migration area for hawks, owls, and falcons, is located approximately 1 mi (1.6 km) from the site (TerraPower 2024-TN10896). Mountains to the west and to the south support core wolverine habitat (FWS 2023-TN11618).

Invasive Species

Invasive species are non-native organisms whose introduction causes or is likely to cause economic or environmental harm or harm to human, animal, or plant health (Executive Order 13751, 81 FR 88609-TN8375). Executive Order 13112 (64 FR 6183-TN4477) directs Federal agencies to not authorize, fund, or carry out actions likely to cause or promote the introduction or spread of invasive species unless the Federal agency determines that the benefits of the action clearly outweigh the harm from invasive species and that all feasible and prudent measures to minimize risk of harm are taken (64 FR 6183-TN4477). The State of Wyoming has designated 36 species as "noxious weeds" and an additional 6 species and groups as "noxious pests" (WWPC 2015-TN11197), 4 of which are known to occur in southwest Wyoming: grasshoppers (insects of sub-order Caelifera), mole crickets (*Anabrus simplex*), prairie dogs (*Cynomys* sp.), and ground squirrels (Sciuridae family) (TerraPower 2024-TN10896).

Invasive plants are a threat to sagebrush-shrubland ecosystems since they reduce the quality of wildlife habitat and increase the likelihood of wildfire (Crist et al. 2023-TN11668). Correspondence with WGFD indicated that three invasive annual grasses pose the most significant threat: cheatgrass (*Bromus tectorum*), medusahead (*Taeniatherum caput-medusae*), and ventenata (*Ventenata* spp.) (TerraPower 2024-TN10896).

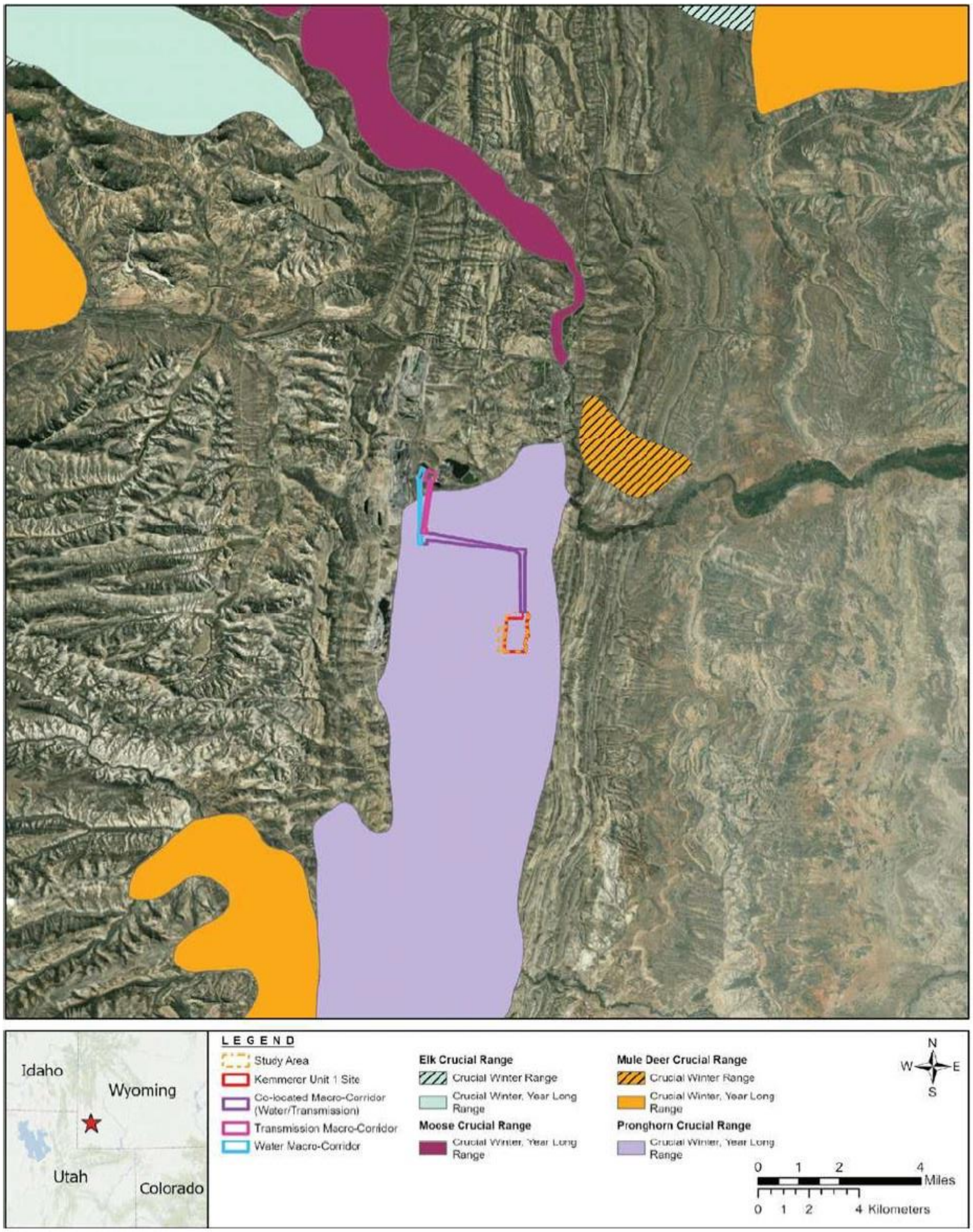

Figure 3-9 Extent of Kemmerer Unit 1 Site, Macro-Corridors, and Crucial Ranges of Elk, Moose, Mule Deer, and Pronghorn. Source: TerraPower 2024-TN10896.

3.6.2 Environmental Impacts of Construction

DOE analyzed terrestrial ecological impacts of preconstruction activities from building Kemmerer Unit 1 in Section 3.3.1.2 of its preconstruction EA and concluded that these impacts would be minor (DOE 2025-TN11602). That EA evaluated terrestrial ecological impacts only from preconstruction work at the site involving the disturbance of approximately 165 ac (66.8 ha) of terrestrial habitat on the site. It did not consider impacts from disturbing an additional area of approximately 53 ac (21.4 ha) on the site for construction or from temporarily disturbing approximately 216 ac (87.4 ha) of terrestrial habitat within the macro-corridors to build new transmission and water lines. The text below addresses terrestrial ecological impacts from the totality of building Kemmerer Unit 1, including preconstruction and construction, involving a combined permanent disturbance of approximately 218 ac (88.2 ha) of terrestrial habitat on the site and a temporary disturbance of216 ac (87.4 ha) within the macro-corridors.

The applicant provided details about the impacts of proposed preconstruction and construction activities in Section 4.3.1 of the ER (TerraPower 2024-TN10896), including schedules, permits, and BMPs; and clearing, grading, dewatering, management of excavated soils and construction wastes, placement of foundations, and constructing buildings and infrastructure (TerraPower 2024-TN10896). WYDEQ (2021-TN11224) requires an LCGP for stormwater discharges from any clearing, grading, or excavation project disturbing at least 5 ac (2 ha) that may or may not be contiguous, when part of a larger common development plan. Construction operators who obtain this permit must prepare a SWPP detailing potential pollution sources and proposed BMPs used to prevent stormwater contamination. Construction activities would be scheduled to minimize impacts to ground-nesting birds as is feasible (TerraPower 2024-TN10896). If infeasible to schedule construction activities outside of nesting periods, the applicant would conduct nest clearing surveys 72 hours before proposed ground disturbance, as requested by WGFD (TerraPower 2024-TN10896; W. Schultz 2024-TN11038).

The construction of Kemmerer Unit 1 would result in the permanent disturbance of a total of approximately 218 ac (88.2 ha) of terrestrial habitat on the site (TerraPower 2024-TN10896). This includes approximately 139 ac (56.2 ha) of intermountain basin big sagebrush shrubland and approximately 79 ac (31.9 ha) of greasewood flats. The entire 218 ac (88.2 ha) would be cleared of vegetation and converted to industrial use, with no plans to revegetate or restore the temporarily disturbed areas. In the ER (TerraPower 2024-TN10896), the applicant has stated that it may place geotextiles and gravel over disturbed soils in unpaved areas within the site, leaving those areas permanently unvegetated.

In addition, approximately 36 ac (15 ha) of offsite habitat would be temporarily disturbed to build a new water supply pipeline to connect Kemmerer Unit 1 to the existing raw water settling basin at the Naughton Power Plant (TerraPower 2024-TN10896). Approximately 180 ac (72.8 ha) of offsite habitat would also be temporarily disturbed to build two new transmission lines to connect Kemmerer Unit 1 to the Naughton Power Plant's substation. Seven ac (2.8 ha) within the anticipated 216 ac (87.4 ha) would be temporarily disturbed for laydown and pulling the lines at the end of the line segments. The applicant has stated that it would avoid wetlands and streams as practicable and use construction techniques such as horizontal directional drilling to minimize impacts that cannot be avoided (see Section 2.2).

The temporarily disturbed offsite land would be revegetated after installation of the new facilities. To minimize the threat of invasive species colonizing disturbed offsite areas, the applicant plans to follow WGFD recommendations of cleaning vehicles and equipment prior to movement to a new location (TerraPower 2024-TN10896). The applicant plans to revegetate disturbed areas within the macro-corridors with native grasses, forbs, and shrubs, using a strategy developed and detailed in the SWPPP required by the LCGP. The applicant would monitor the revegetated area for invasive species and remove them when discovered. WYDEQ (WYDEQ 2021-TN11224) requires continued coverage for stormwater discharge until a construction site is finally stabilized, which is defined as construction sites without permanent structures to be revegetated with perennial vegetation to a uniform 70 percent of natural background cover.

Construction noise and vibrations can affect wildlife. Estimated construction equipment sound levels are expected to range from 74–95 A-weighted decibels (dBA) at 50 ft (15 m) (TerraPower 2024-TN10896). When many construction machines operate simultaneously, noise levels can be as high as 100 dBA at 100 ft (30 m) from the sources (TerraPower 2024-TN10896), but noise attenuates over short distances. The applicant has proposed measures and controls to reduce construction noise, including staggering work schedules of noisy machinery and using noise dampeners and noise control equipment (TerraPower 2024-TN10896).

Birds and bats might be injured or killed by collision with tall buildings, structures such as meteorological towers, transmission towers and lines, or equipment such as construction cranes. Multiple construction cranes would be temporarily present onsite to construct the steam generator building, water treatment building, and other buildings (TerraPower 2024-TN10896). In addition to the already existing meteorological tower onsite (guyed, unlit, 200 ft [60 m] above ground level [AGL]) (TerraPower 2024-TN11009), additional tall buildings and structures would be added to the site and corridors (TerraPower 2024-TN10896). Proposed tall buildings would range from 70 ft (21 m) AGL to 150 ft (46 m) AGL, and transmission towers would be approximately 90 ft (27 m) AGL (TerraPower 2024-TN10896). The applicant proposed two 345 kV transmission lines that are 6 mi (10 km) long. Using an estimate of 6 structures per mi (6 structures per 1.6 km) for 345 kV transmission lines (TransWest 2023-TN11628), the review team estimates that 72 transmission towers would be added to the landscape between the reactor building and its substation when both lines are completed. Birds nesting on power line towers and poles during construction have a greater risk of collisions, because nesting birds have more flights close to power lines (APLIC 2006-TN794). Large birds, particularly raptors, owls, and corvids (crows/ravens), nest on power line towers and poles in arid and semiarid landscapes like the site and the macro-corridors. The applicant would follow applicable Federal and State regulatory requirements and Avian Power Line Interaction Committee (2012-TN6779) guidelines to reduce negative impacts to birds when designing and installing the proposed transmission lines and structures (TerraPower 2024-TN10896).

Terrestrial wildlife moving across the site could be killed or injured by collision with machinery and vehicles. However, while collisions could result in loss of individuals, traffic mortality rarely limits population size (Forman and Alexander 1998-TN2250). Because of the abundance of similar terrestrial habitat surrounding the site and the macro-corridors, most mobile individuals could be expected to avoid areas of heavy vehicular use and instead move through areas of undisturbed habitat.

The applicant submitted a Notice of Intent for an LCGP to WYDEQ (TerraPower 2024-TN11129), which contains a SWPP, erosion control plan, clearing and grubbing plan, a construction facilities plan, and soil erosion and sediment control details. The applicant plans to work with regulatory agencies to design fences, transmission lines, and corridors to minimize impacts to wildlife and would adhere to permit requirements, nest clearing protocols, and BMPs for onsite and offsite construction, noise, vehicle traffic, and human activities.

3.6.3 Environmental Impacts of Operation

This section describes potential impacts on terrestrial ecological resources from operating activities at the Kemmerer Unit 1 site and macro-corridors. A more detailed analysis would be conducted during the environmental review for an OL, if USO submits an OL application. The analysis of the potential impacts on the terrestrial ecosystems, biota, and State-listed species from operations of Kemmerer Unit 1 is based on the applicant's ER (TerraPower 2024-TN10896), along with the review team's independent analyses of terrestrial habitats and species (Section 3.6.1, Appendix F, Appendix G).

Potential impacts on terrestrial ecological resources from operations would be similar to but less than those described for construction. No additional terrestrial or wetland habitat would be physically disturbed by operations. Noise generation would affect wildlife as described above for construction, but noise generation would be from quieter sources than heavy duty construction equipment. Operational impacts on terrestrial ecological resources would result primarily from landscaping and facility maintenance, operations noise, and potential collisions with vehicles, fences, transmission lines, buildings, and other tall structures. USO would use BMPs for landscaping, herbicide application, and stormwater management. Offsite utility corridor vegetation management would occur on a cycle determined by vegetation needs and regional experience (TerraPower 2024-TN11009).

Terrestrial biota may be exposed to radionuclides from direct contact, inhalation, or ingestion of food or soil. DOE Standard 1153-2019 (DOE 2019-TN6817) provides methods, models, and guidance that can be used to characterize radiation doses to terrestrial and aquatic biota exposed to radioactive material. The following DOE guidance dose rates are the levels below which no adverse effects to resident populations are expected: riparian animal: 0.1 radiation-absorbed dose per day (rad/day) (0.001 grays per day (Gy/day)); terrestrial animal: 0.1 rad/day (0.001 Gy/day); terrestrial plant: 1 rad/day (0.01 Gy/day); aquatic animal: 1 rad/day (0.01 Gy/day). The NRC requires nuclear power plants to maintain a radiological environmental monitoring program (REMP) in accordance with NRC regulations. REMP monitoring confirms that radiation is below regulatory limits, and any exceedances are detected and addressed. More information about human and biota responses to radiation can be found in Section 3.10.1.

Terrestrial vegetation in the vicinity of nuclear power plant cooling towers would be exposed to increased humidity and freezing vapor plumes or to deposition of drift particulates and water droplets. However, most of these impacts would only affect terrestrial vegetation located onsite, in relatively close proximity to the towers. The MDCTs would be only approximately 39 ft (12 m) tall and equipped with drift eliminators (TerraPower 2024-TN10896). The height of the towers and the drift eliminators are expected to limit the extent of plumes and deposition. Icing may occur when temperatures are below freezing. The predicted maximum salt deposition in any season is 0.25 kg/ha/month (TerraPower 2024-TN10896), which is below the rate recognized by the NRC to generally not cause leaf damage to plants (1–2 kg/ha/month) (NRC 2007-TN614). The area of highest predicted deposition is approximately 4,900 ft (1,500 m) south of the cooling towers. The NRC staff would assess the impacts of operations in more detail as part of the environmental review of an OL, if USO submits an OL application.

3.6.4 Environmental Impacts of Decommissioning

This section describes the environmental impacts associated with the termination of operations and the decommissioning of Kemmerer Unit 1 at a future date. All operating nuclear power plants will terminate operations and be decommissioned when a decision is made to cease operations. The overall impact depends on the decommissioning activity. Many activities that could affect ecological resources during decommissioning are the same types of activities that occur during reactor construction (see Section 3.6.2).

The review team expects that land disturbance during decommissioning would take place mostly within already developed lands within the 218 ac (88.2 ha) onsite area occupied by the Kemmerer Unit 1 facilities but may require storage of debris or equipment in adjoining areas of previously disturbed soils elsewhere on the site. The review team also expects that noise generated during decommissioning may involve intermittent generation of higher noise levels than during operation as buildings and structures are demolished, with effects on wildlife as described above for construction. Additionally, the review team expects that decommissioning impacts on ecological resources on the site would be bounded by the analyses in the decommissioning generic EIS (NRC 2002-TN7254). The NRC staff would assess the impacts of decommissioning in more detail as part of the environmental review of an OL, if USO submits an OL application.

3.6.5 Cumulative Impacts

Appendix E to this EIS identifies past, present, and reasonably foreseeable projects that could cumulatively contribute to the environmental effects of the proposed Federal action. As described in Appendix E, the preconstruction of Kemmerer Unit 1 and the construction of the TFF are two projects that would affect terrestrial ecological resources. Kemmerer Unit 1 preconstruction would permanently alter 165 ac (66.7 ha) of vegetation and wildlife habitat. TFF construction would permanently disturb approximately 17.5 ac (7.1 ha) of shrub/scrub rangeland and temporarily disturb an additional 14.5 ac (5.9 ha) adjacent to the Kemmerer Unit 1 site. Much of the site clearing, excavating, grading, and filling activities from these and other development projects noted in Appendix E would have similar effects to habitats, small mammals and reptiles, and birds and bird nesting as described for the NRC-authorized construction of Kemmerer Unit 1. Nesting surveys and timing of vegetation clearing to avoid nesting season would be carried out to minimize impacts (TerraPower 2024-TN10896).

Each year, approximately 7,600 vehicles collide with big game in Wyoming (WGFD 2024-TN11198). The Wyoming Department of Transportation (WYDOT) plans a Habitat Connectivity Corridor over a 30 mi (48.2 km) stretch of U.S. Route 189, beginning in 2025 and ending in 2028 (DOE 2025-TN11602). Project plans include several underpasses, an overpass, and high barrier wildlife fencing from the junction of U.S. Route 189/Interstate 80 north on U.S. Route 189 to just north of the TFF property. WYDOT estimates that this project would eliminate 80 to 90 percent of big game collisions along this stretch of U.S. Route 189 (WGFD 2024-TN11199). The review team does not expect that any of the actions considered here would interfere with the proposed action.

3.6.6 Conclusions

The review team concludes that the potential direct, indirect, and cumulative impacts of the proposed action on terrestrial ecological resources would be MODERATE. This conclusion is based upon the above analysis and reflects the permanent conversion of approximately 218 ac (88.2 ha) on the site and approximately 118 ac (47.7 ha) of the temporarily disturbed 216 ac within the macro-corridors of a naturally vegetated habitat (mostly sagebrush steppe and greasewood flat) to industrial uses and the introduction of permanent hazards to wildlife, such as transmission towers, electrical conductors, and other tall structures, as well as vehicular traffic and industrial noise into a formerly wild area without those features. Additional minor impacts include temporary disturbance to wetlands within the macro-corridors, location of facilities within pronghorn crucial winter, yearlong range (TerraPower 2024-TN10896), and effects determinations of NLAA for terrestrial species that are federally listed as endangered or threatened or that are proposed for listing under the ESA (see Appendix G). The applicant plans to adhere to required site permits and BMPs for the construction of Kemmerer Unit 1 and offsite infrastructure, which would help reduce impacts.

3.7 Historic and Cultural Resources

This section describes the context and impacts from the proposed action to historic and cultural resources at the Kemmerer Unit 1 site and associated utility corridors by reviewing the current affected environment, background cultural history for southwestern Wyoming, identified historic properties, and consultation and by evaluating construction, operation, decommissioning, and cumulative impacts.

3.7.1 Affected Environment

Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA) (54 U.S.C. § 306108-TN4839), requires Federal agencies to consider the effects of their undertakings on historic properties. Historic properties are defined as resources eligible for listing in the National Register of Historic Places (NRHP). The criteria for eligibility are listed in 36 CFR 60.4 (TN1682) and include (1) association with significant events in history; (2) association with the lives of persons significant in the past; (3) embodiment of distinctive characteristics of type, period, or construction; and (4) sites or places that have yielded, or may be likely to yield, important information in history or prehistory. In accordance with 36 CFR 800.8(c) (TN513), the NRC complies with its NHPA Section 106 obligations through the NEPA process (42 U.S.C. § 4321-TN8608). Here, issuance of a CP for the construction of Kemmerer Unit 1, and the associated electrical transmission and water lines, constitutes the NRC’s Federal undertaking under NHPA Section 106 that could potentially affect historic properties. A detailed description of these activities is provided in Chapter 2 and represents the Federal action being evaluated as it pertains to historic and cultural resources.

3.7.1.1 Area of Potential Effects

The area of potential effects (APE) for this undertaking is the geographic area or areas within which the undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist (36 CFR 800.16(d)) (TN513). The direct APE includes all project areas where USO expects ground disturbance and building activities to occur, including laydown areas (Figure 3-10), while the indirect APE encompass a 5 mi (8 km) buffer surrounding the direct APE where ground disturbance activities would not occur, but where visual and auditory effects may occur (Figure 3-11) (see TerraPower 2024-TN10896, TerraPower 2024-TN11212). It is important to note that a direct effect under the NHPA can occur within the direct APE (e.g., ground disturbance) or within the indirect APE (e.g., visual impact)—the use of direct and indirect when defining the APE only relates to the type and character of project activities within those locations, not the scale of the potential effect of those activities (National Parks Conservation Association v. T.T. Semonite 2019-TN11206).

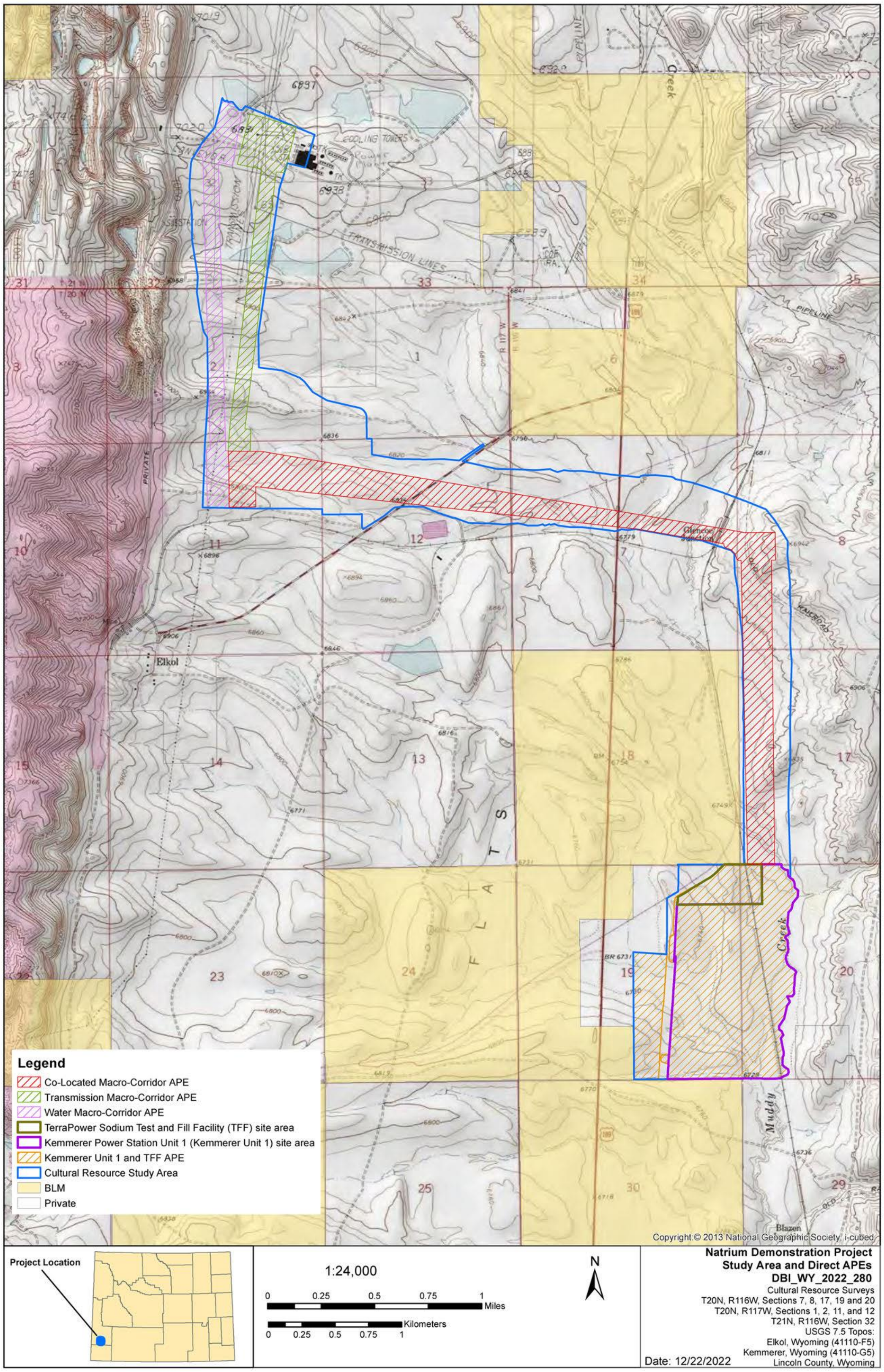

Figure 3-10 The Direct Area of Potential Effects for the Kemmerer Unit 1 Project. Source: TerraPower 2024-TN10896.

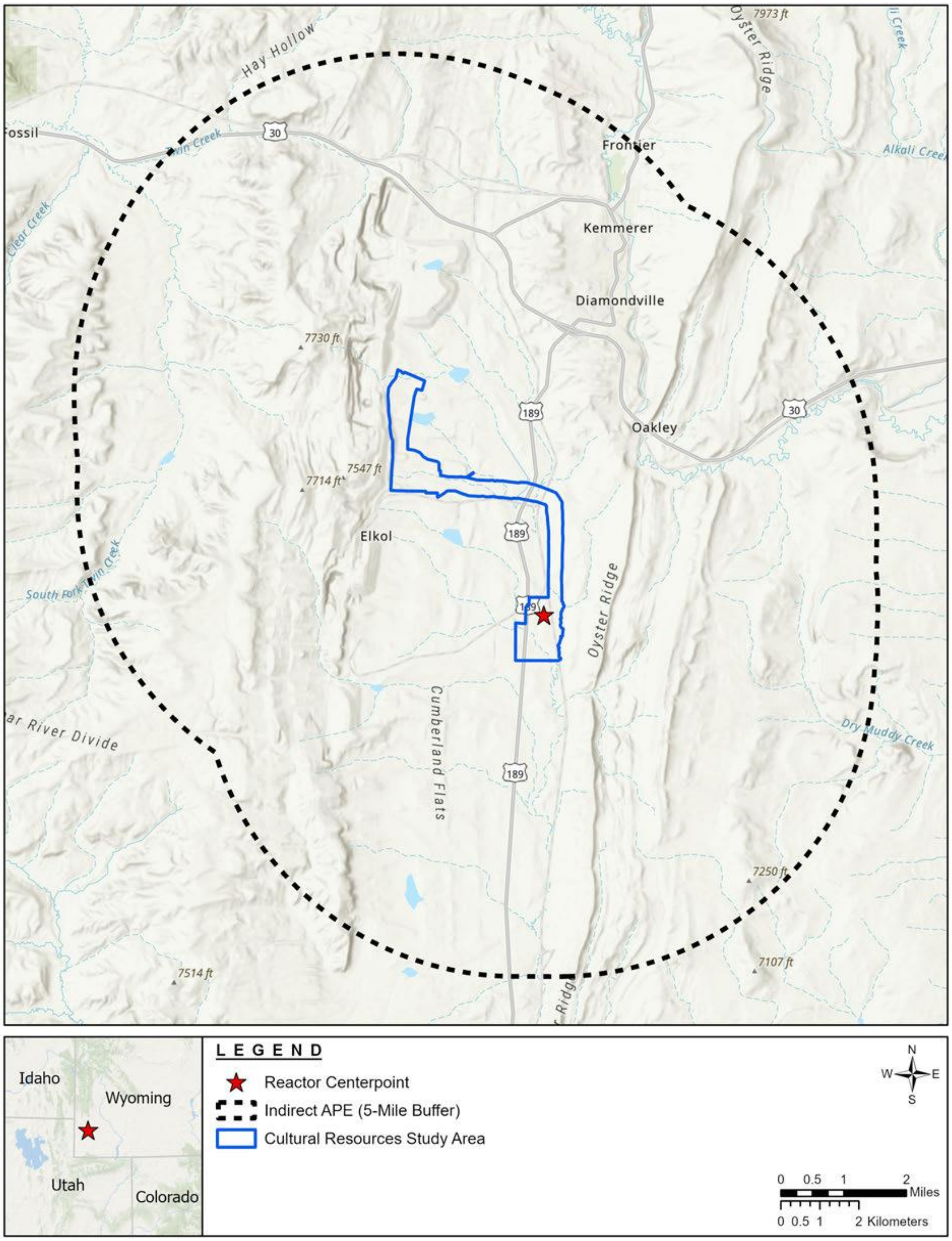

Figure 3-11 The Indirect Area of Potential Effects for the Kemmerer Unit 1 Project. Source: TerraPower 2024-TN10896.

For this undertaking, the direct APE includes the approximately 290 ac (117.4 ha) Kemmerer Unit 1 site, a 5.7 mi (9.2 km) long transmission line corridor, and a 6 mi (9.7 km) long water line corridor, totaling 887 ac (359 ha) (TerraPower 2024-TN10896). The utility corridors largely follow an overlapping trajectory between Kemmerer Unit 1 and the Naughton Power Plant to the northwest before separating near their utility connect points at the Naughton Power Plant. The indirect APE for this undertaking includes a buffered 5 mi (8 km) radius around the direct APE and encompasses 47,081 ac (19,053 ha) (TerraPower 2024-TN10896).

The location of ground-disturbing construction activities at Kemmerer Unit 1 includes areas previously evaluated by DOE as part of its recent TFF construction and Kemmerer Unit 1 preconstruction environmental reviews (DOE 2024-TN11200, DOE 2025-TN11602). For example, preconstruction activities at Kemmerer Unit 1 occurred in an area that fully overlaps with this Federal undertaking and action; however, a portion of the APE for the TFF construction's permanent power transmission line (to the west of Kemmerer Unit 1) is excluded from the APE described above, as it is outside the scope of this EIS (see DOE 2025-TN11641; Tetra Tech 2025-TN11642). Furthermore, the cultural resources survey (TerraPower 2025-TN11629) completed in support of this Federal undertaking and action evaluated a larger area than the APE (as that term is defined above) to provide project coverage for potential changes in utility corridor routes and design. This larger area was termed the "study area" and is described in further detail below.

3.7.1.2 Cultural Background

Archaeological, ethnographic, and historic documentation support a record of human habitation and use of southwestern Wyoming and this general region of the intermountain west of North America for over 12,000 years (uncalibrated radiocarbon years before present) (TerraPower 2025-TN11629). The Wyoming State Historic Preservation Office (SHPO) follows a broad framework for describing and subdividing the cultural history and chronology of past human activities within the State (Table 3-9). These cultural-chronological periods are defined based on the material attributes present within archaeological sites dating to specific periods; for example, the presence of diagnostic worked stone tools (i.e., Clovis and/or Western Stemmed) and associated animal bones (e.g., now extinct bison) helps characterize aspects of the physical evidence for "Paleoindian" or First Peoples in the landscape nearly 12,000 years ago. This section briefly reviews and describes each of these periods (Table 3-9) with an emphasis on the cultural periods that are represented by the archaeological record in the project area. Supporting descriptions and references for this cultural chronology are incorporated by reference from the reported titled *A Class III Cultural Resource Inventory for TerraPower, LLC's Natrium Demonstration Project, Lincoln County, Wyoming* (TerraPower 2025-TN11629, TerraPower 2024-TN10896) and the Wyoming Comprehensive Statewide Historic Preservation Plan (WY SHPO Undated-TN11202).

Table 3-9 The Cultural-Chronological History of Wyoming

Period	Date
Paleoindian (First Peoples)	11,700–8,000 years before present
Early Archaic	8,000–5,000 years before present
Middle Archaic	5,000–2,500 years before present
Late Archaic	2,500–1,500 years before present
Late Prehistoric (Late Precontact)	1,500–200 years before present
Protohistoric/Contact	230–150 years before present
Historic-Present	150 years to present

Sources: TerraPower 2025-TN11629; WY SHPO Undated-TN11202.

The Paleoindian period in Wyoming is represented by diagnostic archaeological evidence of large lanceolate-type projectile points (e.g., Clovis projectile points) and animal kill sites, primarily of now extinct bison. There are few stratified Paleoindian archaeological sites in Wyoming, but recent research highlights that Paleoindian hunter-gatherer groups exhibited complex environmental adaptations within this landscape, including mining red ocher and modifying animal bones to create bone needles, both nearly 12,000 years ago (Pelton et al. 2022-TN11204, Pelton et al. 2024-TN11203). Hunter-gatherers were highly mobile during the Paleoindian period and lived in a habitat that was rapidly shifting from glacial to non-glacial conditions. This is evidenced through the change in animal exploitation during the Paleoindian period, which began with a focus on large-sized game (e.g., mammoths and bison), but eventually transitioned to a focus on bison and then other smaller sized game during the Archaic.

The exact transition between the Paleoindian period and the Archaic period (which is subdivided into three broad eras) occurred gradually and does not exhibit a dramatic shift. Environmental conditions during the Archaic period largely match the environmental conditions known today, especially following the extinction of large-sized animals after the Paleoindian period. Hunter-gatherers were still highly mobile during the Archaic period but began exploiting a much larger range of plant and animal foods. New technological adaptations occurred during this period, including the manufacture of smaller sized projectile points (i.e., side-notched types). Archaeological excavations support that Archaic period hunter-gatherers began living in longer-term residential sites during this period. Mass kills of modern bison continued to occur but included activities like rabbit drives for jackrabbits and cottontails.

During the Late Prehistoric period, Indigenous peoples in Wyoming adapted their projectile points once again and traded or received ceramic pottery from adjacent regions (especially the Missouri River Basin, Great Basin, and Colorado Plateau). Bison hunting continued to be an important aspect of hunting and mobility, and groups began to expand in population and aggregate within regions of Wyoming. At the end of this period and the beginning of the Protohistoric period, Indigenous peoples in Wyoming had not yet made contact with Western Europeans inhabiting portions of North America, but they did acquire the horse through trade networks. Some evidence of metal working (introduced through trade) also occurs during this period.

The transition between the Protohistoric period and the Historic period in Wyoming occurred in approximately 1800–1850 Anno Domini (AD)/Common Era (CE). The Historic period that follows is typically divided into pre-territorial, territorial, World War II, post-World War II, and modern contexts (among others). This is the era when Wyoming experienced an influx of Western European settlers, beginning with early explorers and fur trappers. The railroad first crossed Wyoming in 1868 (as part of the Transcontinental Railroad) and brought with it ranching and stock-raising. Mining, homesteading, and tourism also developed during this period. Historic ethnographic evidence also points to extensive Native American use of the landscape throughout this period (TerraPower 2024-TN10896).

Within Lincoln County and the Kemmerer Unit 1 direct and indirect APEs, there is evidence of human adaptation and exploitation of the landscape extending back throughout all these major periods of activity and change in the State of Wyoming.

3.7.1.3 Identified Historic and Cultural Resources

Through a review of relevant cultural resource surveys and reports (e.g., TerraPower 2024-TN10896, TerraPower 2025-TN11629) and Wyoming archaeological site files (archived in WyoTrack; WY SHPO 2025-TN11207), there are a total of 30 archaeological sites within the direct APE and, cumulatively, there are a total of 324 archaeological sites within the indirect

APE. As noted in the ER, there are also numerous other cultural resource surveys that occurred throughout portions of the APE extending back to the 1980s (TerraPower 2024-TN10896).

Direct Area of Potential Effects

Most recently, USO contracted with Tetra Tech, Inc. between 2022 and 2024 to conduct a series of archaeological surveys of the Kemmerer Unit 1 site and associated facilities. These involved a combination of pedestrian, shovel test, and auger probe test surveys per Wyoming State archaeological standards. Tetra Tech, Inc. focused on a cultural resource "study area" for the basis of its research. This study area was larger than the identified direct APE for this Federal undertaking and action and allowed for the survey to occur over a broader area in case USO project activities or designs shifted over time (i.e., archaeological survey coverage would still exist for the project).

As part of DOE's previous NHPA Section 106 compliance efforts, Tetra Tech, Inc. completed a series of archaeological survey reports—all within the study area—that were focused on specific NHPA undertakings and NEPA actions: seismic testing and the TFF (comprising two different surveys; DOE 2024-TN11200) and Kemmerer Unit 1 preconstruction activities (DOE 2025-TN11602). As part of this Federal undertaking and action, Tetra Tech, Inc. also conducted an archaeological survey for Kemmerer Unit 1 and the associated utility corridors (TerraPower 2024-TN10896; TerraPower 2025-TN11629). This report was included as part of USO's ER and was later revised and updated in 2024 (TerraPower 2024-TN11212).

These archaeological surveys and reports documented a total of 30 archaeological sites within the direct APE (Table 3-10). Only three of these archaeological sites are eligible for listing in the NRHP under criteria A (segments 3 and 4 of 48LN2697) and D (48LN740 and 48LN8940). One segment of the historic Cumberland Branch of the Oregon Short Line Railroad was determined as non-contributing to the overall site's eligibility (WY SHPO 2025-TN11630). A portion of the now ineligible Hams Fork Lithic Landscape is also present within the APE.

Table 3-10 Archaeological Sites Located within the Direct Area of Potential Effects of Kemmerer Unit 1

Site Number	Site Type	National Register of Historic Places Eligibility
48LN740	Multicomponent prehistoric artifact scatter with fire-cracked rock, historic artifact scatter and camp	Eligible
48LN798	Prehistoric lithic scatter	Ineligible
48LN799	Historic sheepherder camp	Ineligible
48LN2335	Prehistoric camp	Ineligible
48LN2697_3	Historic section of the Cumberland Branch of the Union Pacific Railroad	Eligible (contributing segment)
48LN2697_4	Historic section of the Cumberland Branch of the Oregon Short Line	Eligible (non-contributing segment)
48LN2939	Prehistoric camp	Ineligible
48LN8940	Prehistoric artifact scatter	Eligible
48LN8941	Prehistoric artifact scatter with features	Ineligible
48LN8942	Prehistoric artifact scatter with feature	Ineligible

Table 3-10 Archaeological Sites Located within the Direct Area of Potential Effects of Kemmerer Unit 1. Source: TerraPower 2024-TN10896 and TerraPower 2025-TN11629. (Continued)

Site Number	Site Type	National Register of Historic Places Eligibility
48LN8953	Historic artifact scatter	Ineligible
48LN8954	Prehistoric artifact scatter with feature	Ineligible
48LN8955	Prehistoric artifact scatter with feature	Ineligible
48LN8956	Prehistoric artifact scatter with feature	Ineligible
48LN8957	Prehistoric artifact scatter with feature	Ineligible
48LN8958	Prehistoric artifact scatter with feature	Ineligible
48LN8959	Prehistoric and historic artifact scatter with feature	Ineligible
48LN8960	Prehistoric artifact scatter	Ineligible
48LN8961	Prehistoric artifact scatter with features	Ineligible
48LN8964	Prehistoric artifact scatter with features	Ineligible
48LN8965	Prehistoric and historic artifact scatter	Ineligible
48LN8966	Prehistoric artifact scatter	Ineligible
48LN8968	Prehistoric artifact scatter	Ineligible
48LN8971	Prehistoric artifact scatter with feature	Ineligible
48LN8972	Prehistoric and historic artifact scatter with features	Ineligible
48LN8973	Prehistoric and historic artifact scatter	Ineligible
48LN8974	Prehistoric artifact scatter with feature	Ineligible
48LN8975	Prehistoric feature	Ineligible
48LN8976	Prehistoric and historic artifact scatter with feature	Ineligible
48LN8977	Prehistoric to historic artifact scatter and isolate	Ineligible

Source: TerraPower 2024-TN10896 and TerraPower 2025-TN11629.

Two eligible archaeological sites identified within the direct APE include 48LN740 and 48LN8940.

Characterized through survey, artifact survey, and shovel testing, 48LN740 is a large multicomponent artifact scatter with features (TerraPower 2025-TN11629). The site includes evidence of worked stone tools—projectile points and bifaces—as well as heat-altered rock, debitage, and a variety of visible surface features. The projectile points include a variety of types and fragments that date between 3,500–700 years old. Archaeological features at the site included a bison wallow and numerous thermal features. Several historic artifacts were also noted during surface survey. These artifacts and features suggest that the site was visited repeatedly as a residential camp site between the Early Archaic to the Late Prehistoric periods. The Wyoming SHPO concurred that the site (outside of the portions that are within the U.S. Route 189 ROW) is eligible under criterion D for listing in the NRHP by letter dated February 12, 2025 (WY SHPO 2025-TN11630).

A similar identified site was 48LN8940, which is also a multicomponent artifact scatter with features (TerraPower 2025-TN11629). Surface survey and auger probe testing indicated that the site was represented by stone tools, debitage, heat-altered rock, and thermal features. One diagnostic projectile point provided a bracketed date range between 2,000–1,500 years old. Several historic artifacts were also identified on the surface. Archaeological evidence from 48LN8940 also suggests that it functioned as a temporary residential camp site during the Late Archaic period. The Wyoming SHPO concurred that the site is eligible under criterion D for listing in the NRHP by letter dated February 12, 2025 (WY SHPO 2025-TN11630).

Indirect Area of Potential Effects

As part of cultural resource surveys between 2022 and 2024, Tetra Tech, Inc. completed a visual impact (viewshed) assessment for archaeological sites and other historic and cultural resources within a 5 mi (8 km) buffer of the direct APE (TerraPower 2024-TN10896, TerraPower 2025-TN11629). This indirect APE included a total of 324 known historic and cultural resources, including the 30 archaeological sites identified within the direct APE.

The visual analysis followed Appendix C of the Wyoming SHPO and Bureau of Land Management Standards (WY SHPO 2025-TN11208). Using a viewshed analysis, this assessment identified which historic properties could potentially result in a visual impact from project activities (i.e., building construction). Tetra Tech, Inc. conducted this geographic information system analysis using a 33 ft (10 m) grid resolution digital elevation model over the entire indirect APE. To represent the local sagebrush-steppe vegetation community, 3.3 ft (1 m) were added to the bare earth elevations to model baseline conditions, and the analysis also used a structure height of 125 ft (38 m) above ground surface for all buildings and transmission lines. Using this information, the geographic information system analysis then identified which cultural resources within the indirect APE were entirely visible, which were partially visible, and which were not visible. Assessment of this visual context followed the Bureau of Land Management's visual contrast rating system (BLM 1986-TN6403). This process resulted in the identification of nine visually sensitive cultural resources within the indirect APE (Table 3-11); however, one site was not possible to assess in the field given its location on private property (48LN317). Visual reference models are provided in both TerraPower 2024-TN10896 and TerraPower 2025-TN11629 supporting this documentation.

Table 3-11 Visually Sensitive Archaeological Sites Located within the Indirect Area of Potential Effects

Site Number	Site Type	National Register of Historic Places Eligibility
48LN317	Prehistoric rock art with artifact scatter and fire-cracked rock	Eligible
48LN773	Multicomponent rock cairns	Eligible
48LN1272	Historic Glencoe Mine	Eligible
48LN1273	Historic mine	Eligible
48LN2327_14	Historic Oregon Shortline Railroad	Eligible
48LN2739_1	Historic Kemmerer-Cumberland Highway	Eligible
48LN4011	Multicomponent prehistoric artifact scatter with features and historic Glencoe townsite	Eligible
48LN4026	Historic Blazon Railroad Spur	Eligible
48LN4428	Historic Glencoe townsite	Eligible

Sources: TerraPower 2024-TN10896 and TerraPower 2025-TN11629.

While this visual impact evaluation within the indirect APE identified nine sites that would be visible from the Kemmerer Unit 1 project and related transmission line corridors, none of the archaeological sites would incur an adverse visual effect. This was largely due to the presence of existing visual impacts within the viewshed, including from the Naughton Power Plant, mines, existing infrastructure, and in some cases previous demolition and reclamation. The Wyoming SHPO concurred that there would be no adverse visual effect by letter dated February 12, 2025 (WY SHPO 2025-TN11630).

3.7.1.4 Traditional Cultural Properties and Landscapes

Previous cultural resource surveys located within the direct and indirect APEs (Kemmerer Unit 1, electrical transmission and water lines, and immediate environs) in 2022 and 2024 by Tetra Tech, Inc. identified historic properties and other cultural resources, but did not identify any traditional cultural properties or traditional cultural landscapes (TerraPower 2025-TN11629). Ongoing consultation by the NRC staff has not resulted in the identification of any additional traditional cultural properties or landscapes at the time of publishing this EIS; however, NHPA Section 106 consultation is ongoing.

3.7.1.5 Consultation Record

The following provides a description and summary of the NHPA Section 106 consultation efforts completed to date by the NRC staff for this Federal undertaking and action. For a detailed record of all consultation correspondence, see Appendix C.

During the preparation of USO's ER, non-governmental engagement between USO and several Indian Tribes and the SHPO occurred (TerraPower 2024-TN10896). Government-to-government consultation also occurred between Indian Tribes, the SHPO, the Advisory Council on Historic Preservation (ACHP), and DOE as part of the previous TFF construction and Kemmerer Unit 1 preconstruction environmental reviews (DOE 2024-TN11200, DOE 2025-TN11602).

Between June 12 and June 15, 2024, the NRC initiated NHPA Section 106 consultation and NEPA scoping via a hard-copy and digitally mailed letter to the SHPO and the ACHP (NRC 2024-TN11631) and 30 federally recognized Indian Tribes (NRC 2024-TN11633). By email dated September 13, 2024, the Ponca Tribe of Nebraska notified the NRC staff that they would defer consultation on the Kemmerer Unit 1 project to other affiliated Indian Tribes. Accordingly, the NRC staff removed the Ponca Tribe of Nebraska from its list of consulting Tribes for the undertaking (Ponca Tribe 2024-TN11632). Following these initial correspondences, the NRC staff also transmitted follow-up email messages and conducted telephone calls to ensure that Indian Tribes formally received the NHPA Section 106 initiation and NEPA scoping letter correspondence and to provide opportunities for Tribal representatives to ask questions. This correspondence began in summer 2024 and is ongoing.

During this NHPA Section 106 initiation and NEPA scoping period, the NRC staff also held a virtual and an in-person scoping meeting in Kemmerer, Wyoming, on July 16, 2024 (NRC 2024-TN11137). Several comments were received relating to historic and cultural resources, including requests to conduct consultation with Indian Tribes and the SHPO.

By digitally transmitted letter dated July 19, 2024, the Northern Arapaho Tribe also stated their interest in participation and/or consultation for the Kemmerer Unit 1 project and specifically noted that there are one or more cultural resources, eligible historic properties, and a high probability of properties of religious and cultural significance within the APE (NATHPO 2024-TN11638).

Based on conversations with multiple Indian Tribes, concerns were also generally expressed about traditional ecological knowledge, traditional properties (including botanical resources), and the NHPA Section 106 regulatory review for this project.

On September 24, 2024, the NRC staff facilitated a nonpublic, virtual Tribal information meeting regarding Kemmerer Unit 1. Representatives from all of the 29 federally recognized Indian Tribes that the NRC staff had previously contacted were invited to attend and participate. This meeting focused on providing an overview of the project, the NHPA Section 106 process for the undertaking, and then-current information on project activities (NRC 2024-TN11639).

On February 4 and 5, 2025, the NRC staff transmitted a hard-copy and digitally mailed letter to the SHPO, the ACHP, and the 29 federally recognized Indian Tribes identifying potential adverse effects to historic properties within the Kemmerer Unit 1 APE (see Appendix C). This letter and associated electronic mail correspondence also included an invitation for Tribal representatives to participate in a non-public, virtual information session regarding the adverse effects and current project activities for Kemmerer Unit 1 scheduled for February 25, 2025.

By letter dated February 12, 2025, the SHPO concurred with the Class III archaeological survey report and the potential for adverse effects (WY SHPO 2025-TN11630). The ACHP also responded by letter dated February 18, 2025, acknowledging the notification of adverse effects and potential next steps (ACHP 2025-TN11640).

On February 25, 2025, the NRC staff facilitated the nonpublic, virtual Tribal information meeting. Representatives from the 29 federally recognized Indian Tribes were invited to attend and participate. This meeting focused on providing an updated overview of project information available at that time, and a description of the potential adverse effects (NRC 2025-TN11676). The meeting also discussed the plan for an NRC-facilitated site visit in spring or summer 2025. By digitally transmitted letter dated February 26, 2025, the Northern Arapaho Tribe stated that there are one or more cultural resources, eligible historic properties, and a high probability of properties of religious and cultural significance within the APE (NATHPO 2025-TN11669).

By digitally transmitted letter dated March 12, 2025, the Comanche Nation stated that the location of the Kemmerer Unit 1 project had been cross referenced with the Comanche Nation site files, and an indication of “No Properties” had been identified (Comanche Nation 2025-TN11643).

USO provided additional information regarding its plan for archaeological testing at sites 48LN740 and 48LN8940 and for potential avoidance of adverse effects by letter dated March 4, 2025 (TerraPower 2025-TN11644). Subsequently, on March 24, 2025, the NRC staff sent letters to the SHPO and the 29 federally recognized Indian Tribes requesting consultation on the testing plan for these two sites (NRC 2025-TN11645, NRC 2025-TN11683).

3.7.2 Environmental Impacts of Construction

Construction of Kemmerer Unit 1 and the utility corridor would occur in an area with known historic and cultural resources as well as archaeological sites eligible for listing in the NRHP. Construction activities would involve vegetation clearance, land grading, utility installation, and facility construction throughout the site (see Section 2.5). These construction activities have the potential to cause an adverse effect to two archaeological sites: 48LN470 and 48LN8940 (NRC 2025-TN11646; WY SHPO 2025-TN11630). However, by letter dated March 4, 2025, USO informed the NRC of its intent to avoid these potential adverse effects and that this process would involve additional archaeological testing in spring and summer 2025 (TerraPower 2025-TN11644). The results of the additional archaeological testing will inform the NRC's NHPA Section 106 determination. If the NRC staff determines that adverse effects will occur, then the NRC staff will work with consulting parties to execute a memorandum of agreement (MOA) to resolve the adverse effects. NHPA Section 106 consultation is ongoing.

3.7.3 Environmental Impacts of Operation

Since this current environmental review is for the proposed action of whether to issue a CP for Kemmerer Unit 1, the NRC staff will assess, evaluate, and mitigate potential historic and cultural resource impacts in the APE related to the operation of Kemmerer Unit 1 as part of the NRC staff's review of an OL, if USO submits an OL application. That potential future review would establish direct and indirect APEs for the Federal undertaking and action of whether to issue an OL for Kemmerer, Unit 1. Since the NRC staff identified the potential for adverse effects as a result of the construction of Kemmerer Unit 1, a possible future MOA between the NRC and consulting parties may include stipulations for cultural resource procedures that focus on inadvertent discovery of archaeological sites and cultural materials. USO's adherence to such procedures stipulated in any future MOA are relevant to the possible future operation of Kemmerer Unit 1 since these procedures would remain valid through the term of any OL. Therefore, while there are potential impacts to historic and cultural resources during the operation of Kemmerer Unit 1 (e.g., TerraPower 2024-TN10896), those impacts would be evaluated during the separate NEPA and NHPA review of an OL, and USO would continue to follow potential cultural resource procedures put in place as part of this CP review. NHPA Section 106 consultation is ongoing.

3.7.4 Environmental Impacts of Decommissioning

Decommissioning impacts are expected to be similar to those for construction, and the range of potential historic and cultural resources issues identified in Section 4.3.14 of the Decommissioning generic GEIS (NRC 2002-TN7254) remain bounding for Kemmerer Unit 1. Decommissioning activities typically involve the use of heavy equipment to remove buildings, roadways, and other structures within the APE, but the APE is not anticipated to change during decommissioning, and all known potential adverse effects would be resolved during the CP phase, if they occur. Therefore, the review team does not expect any additional adverse effects to occur during decommissioning of the site but would review and make a determination following the submission of an OL application, if one is submitted by USO. USO would continue to follow its cultural resource procedures for protection of any inadvertent discoveries during decommissioning.

3.7.5 Cumulative Impacts

Appendix E of this EIS identifies past, present, and reasonably foreseeable future projects that could cumulatively contribute to the environmental effects of the proposed Federal action. For the cumulative impacts analysis of historic and cultural resources, the region of interest is the APE. Key past, present, and reasonably foreseeable future actions in the vicinity of Kemmerer Unit 1 that may affect historic and cultural resources include the ongoing construction of the TFF (DOE 2024-TN11200), preconstruction activities at the Kemmerer Unit 1 site (DOE 2025-TN11602), and potentially other related reasonably foreseeable projects that are adjacent to the direct APE for this undertaking, but would likely occur within the indirect APE (e.g., conversion of the Naughton Power Plant from coal to natural gas). Ground disturbance would occur as part of activities associated with the TFF construction and work to prepare the Kemmerer Unit 1 site; ground disturbance has the greatest possibility to affect historic and cultural resources. However, both the TFF and the preparation of the Kemmerer Unit 1 site are separate undertakings under the NHPA and have been independently evaluated by DOE under Section 106 of the NHPA. The SHPO concurred that these projects would have no adverse effect under NHPA Section 106, and these projects also have procedures in place to protect historic and cultural resources if they are inadvertently discovered during ground disturbance activity (DOE 2024-TN11200, DOE 2025-TN11602). All future projects subject to the NHPA would also receive independent evaluation under Section 106 of the NHPA.

3.7.6 Conclusions

For the purposes of the NEPA analysis, the review team concludes that the potential direct, indirect, and cumulative impacts of the proposed action on historic and cultural resources would be MODERATE to LARGE. This conclusion is based upon the above analysis and is supported by: (1) the NRC’s ongoing consultation with the SHPO, the ACHP, and 29 federally recognized Indian Tribes, (2) the potential for adverse effects to eligible historic properties, and (3) the known presence of historic and cultural resources within and immediately adjacent to the direct APE. This NEPA impact determination may change to MODERATE if USO is able to avoid adverse effects to archaeological sites 48LN740 and 48LN8940 or if the adverse effects are resolved through the execution of an MOA.

For the purposes of the NHPA Section 106 determination, the NHPA Section 106 consultation is ongoing.

3.8 Socioeconomics

3.8.1 Affected Environment

This section describes the socioeconomic conditions near the Kemmerer Unit 1 site, including population and economy of the region, infrastructure, and public services. Currently, 92 percent of Naughton Power Plant employees live in three counties, 67 percent in Lincoln County, 21 percent in Uinta County, and 4 percent in Sweetwater County. Based on where Naughton Power Plant workers reside, the socioeconomic region of influence (ROI) includes Lincoln, Uinta and Sweetwater Counties. The largest cities in each of these counties are Kemmerer/Diamondville (Lincoln County), Evanston (Uinta County), and Green River and Rock Springs (Sweetwater County).

Population

Table 3-12 presents population and percent growth from 2000 to 2050 for Lincoln, Uinta, and Sweetwater Counties. During the last two decades, Lincoln County experienced a small increase in population while Uinta and Sweetwater Counties experienced a small decline in population. Based on population projections for 2030 through 2050, Lincoln County would continue to experience small growth while Uinta and Sweetwater are expected to continue to decline in population.

Table 3-12 Population and Percent Growth in the Kemmerer Unit 1 Site's Three-County Socioeconomic Region of Influence

Metric	Year	Lincoln County Population	Lincoln County Percent Change	Uinta County Population	Uinta County Percent Change	Sweetwater County Population	Sweetwater County Percent Change	ROI Population	ROI Percent Change
Recorded	2000	14,573	-	19,742	-	37,613	-	71,928	-
Recorded	2010	18,106	2.2	21,118	0.7	43,806	1.5	83,030	1.4
Recorded	2020	19,581	0.8	20,450	-0.3	42,272	-0.4	82,303	-0.1
Projected	2030	21,049	0.7	20,012	-0.2	41,610	-0.2	82,671	0.0
Projected	2040	22,626	0.7	19,583	-0.2	40,958	-0.2	83,168	0.1
Projected	2050	24,322	0.7	19,164	-0.2	40,317	-0.2	83,803	0.1

ROI = region of influence.
"-" denotes no entry in table cell.
Source: TerraPower 2024-TN10896.

Transient Population

Lincoln, Uinta, and Sweetwater Counties experience seasonal population increases. There are two hotels, three motels, and four RV parks within a 10 mi (16 km) radius of the Kemmerer Unit 1 site. The venue with the largest number of visitors is the annual 2 day Oyster Ridge Music Festival at 1,000 per day (TerraPower 2024-TN10896). Transient populations generate demand for temporary housing and services in the area. Based on the U.S. Census Bureau's (USCB's) 2018–2022 American Community Survey 5-Year Estimates (USCB 2023-TN11213), 1,505 seasonal housing units are located in the three-county socioeconomic ROI.

Migrant Farm Workers

Migrant farm workers are individuals whose employment requires travel to harvest agricultural crops, particularly fruit and vegetables, throughout the U.S.

Table 3-13 below presents information about migrant and temporary farm labor (i.e., working fewer than 150 days) in the ROI. According to the 2022 Census of Agriculture (USDA 2024-TN112), 465 farm workers were hired to work for fewer than 150 days and were employed on 193 farms in the ROI. Fifteen farms in the ROI reported hiring a total of 45 migrant workers.

Table 3-13 Migrant Farm Workers and Temporary Farm Labor in the Kemmerer Unit 1 Socioeconomic Region of Influence

County	Number of Farms with Hired Farm Labor	Number of Farms Hiring Workers for Less Than 150 days	Number of Farm Workers Working for Less Than 150 days	Number of Farms Reporting Migrant Farm Labor	Total Migrant Workers Reported
Lincoln	143	115	243	8	37
Uinta	79	56	173	2	(D)
Sweetwater	33	22	49	5	8
ROI	255	193	465	15	45[(a)]

ROI = region of influence.
"(D)" signifies that data has been withheld to protect the confidentiality of individual farms or operations.
(a) The withheld data for Uinta was not included in the ROI total.
Source: Table 7. Hired farm Labor—Workers and Payroll: 2022 (USDA 2024-TN11215).

Regional Economic Characteristics

According to the USCB's 2018–2022 American Community Survey 5-Year Estimates, the educational services, and healthcare and social assistance industry represented the largest employment section in the socioeconomic ROI, followed by retail trade (USCB 2023-TN11025). The civilian labor force in the three-county ROI was 42,252 persons, representing about 14 percent of the total Wyoming labor force, and the number of individuals employed was 40,381 (USCB 2023-TN11025). The economic region labor force is concentrated in Sweetwater County, which accounts for 53 percent of the total, followed by Lincoln and Uinta Counties with 24 and 23 percent, respectively. Estimated income information for the socioeconomic ROI is presented in Table 3-14. Census data indicates that people living in Lincoln, Uinta, and Sweetwater Counties had a median household income higher than the State average.

Table 3-14 Estimated Income Information for the Kemmerer Unit 1 Socioeconomic Region of Influence, 2018–2022, 5-Year Estimates

Metric	Lincoln County	Uinta County	Sweetwater County	ROI	Wyoming
Median household income (dollars)[a]	83,033	78,164	79,375	79,968[b]	72,495
Per capita income (dollars)[a]	38,245	32,955	40,268	37,949[c]	39,547

ROI = region of influence.
(a) In 2022 inflation-adjusted U.S. dollars.
(b) Weighted average by household numbers in Lincoln, Uinta, and Sweetwater Counties.
(c) Weighted average by the populations in Lincoln, Uinta, and Sweetwater Counties.
Source: USCB 2023-TN11025.

According to the USCB's 2018–2022 American Community Survey 5-Year Estimates, the unemployment rates in Lincoln County, Uinta County, and Sweetwater County were 2.6, 3.4, and 5.7 percent, respectively. Comparatively, the unemployment rate in the State of Wyoming during the same time period was 3.8 percent (USCB 2023-TN11025).

Housing and Community Services

Housing

Table 3-15 lists the total number of occupied and vacant housing units, vacancy rates, and median values in the three-county ROI. Based on USCB's 2018–2022 American Community Survey 5-year Estimates, there are 37,620 housing units in the ROI, of which 31,550 are occupied. The median value of owner-occupied housing units in the ROI is $258,000. The homeowner vacancy rate is approximately 1.4 percent (USCB 2023-TN11217).

Table 3-15 Housing in the Kemmerer Unit 1 Socioeconomic Region of Influence, 2018–2022, 5-Year Estimates

Housing Characteristic	Lincoln County	Uinta County	Sweetwater County	ROI
Total housing units	9,591	8,831	19,198	37,620
Occupied housing units	7,629	7,586	16,335	31,550
Total vacant housing units	1,962	1,245	2,863	6,070
Percent total vacant	20.5	14.1	14.9	16.1

Table 3-15 Housing in the Kemmerer Unit 1 Socioeconomic Region of Influence, 2018–2022, 5-Year Estimates (Continued)

Housing Characteristic	Lincoln County	Uinta County	Sweetwater County	ROI
Owner-occupied units	**6,056**	**5,914**	**11,982**	**23,952**
Median value (dollars)	$325,500	$224,800	$240,300	$258,000[(a)]
Owner vacancy rate (percent)	1.7	1.3	1.2	1.4[(b)]
Renter-occupied units	1,573	1,672	4,353	7,598
Median rent (dollars/month)	818	790	899	860[(c)]
Rental vacancy rate (percent)	1.8	5.9	17.4	10.7[(b)]

(a) Weighted average by owner-occupied units in Lincoln, Uinta, and Sweetwater Counties.
(b) Weighted average by total housing units in Lincoln, Uinta, and Sweetwater Counties.
(c) Weighted average by occupied units paying rent in Lincoln, Uinta, and Sweetwater Counties.
Source: USCB 2023-TN11217.

Education

The Lincoln County School District #1, which is closest to the Kemmerer Unit 1 site, has 3 schools with a total of 633 students (TerraPower 2024-TN10896). All schools have additional capacity and a student/teacher ratio below the State recommended 16:1. Uinta County School District #1, which includes Evanston, has 8 public schools, with an enrollment of 2,716 students. Two of 4 elementary schools in Evanston are over 90 percent of capacity (TerraPower 2024-TN10896).

Public Water Supply

There are 3 major water suppliers in the ROI, KDWWJPB, the City of Evanston, and the Green River, Rock Springs, Sweetwater County Joint Powers Water Board. All use surface water with the exception of the City of Evanston, which uses both surface water and groundwater. KDWWJPB serves 3,600 residents and has 3.9 million gallons per day of excess production capacity (TerraPower 2024-TN10896). There is excess capacity in all the major water supply systems in the ROI. There are four major wastewater treatment plants in the ROI. Kemmerer and Diamondville Wastewater Treatment Plant serves a population of 3,300–3,600 and has an excess capacity of less than 0.3–0.75 million gallons per day (TerraPower 2024-TN10896). The plant is in need of upgrades and replacements, but the system’s excess capacity is limited by aged infrastructure and severe inflow and infiltration. Funding has been procured to help alleviate the inflow and infiltration issues.

Tax Revenues

In FY 2021, property taxes were the largest source of revenues at $7,271,821 or 26.6 percent of total revenues in Lincoln County. Sales and use taxes were the third largest source at $6,150,208. In Kemmerer, sales and use taxes are by far the largest source of revenues, accounting for $1,689,508 or 42 percent of total revenues (TerraPower 2024-TN10896).

Several tax revenue categories would be affected by the construction and operation of Kemmerer Unit 1. Among those are sales and use taxes on construction- and operations-related purchases and personal purchases made by project-related workers, real property taxes related to the construction and operation of the plant, and real property taxes paid by in-migrating project-related workers.

Local Transportation

The 50 mi (80 km) region is served by one interstate highway, U.S. highways, State and county roads, and freight rail lines. The roadways providing access to the Kemmerer Unit 1 site for commuters, deliveries, and shipments are State Road 412, U.S. Route 30, U.S. Route 189, and I-80. Plant workers and deliveries would access the site via an entrance from U.S. Route 189. The characteristics, classifications, and carrying capacity of these roadways at Level-of-Service (LOS) C are presented in Table 3-16 (TerraPower 2024-TN10896).The LOS designation is an ordinal scale with “A” (free flow) being the best LOS and “F” (forced or breakdown flow) being the worst (TRB 2000-TN9065). The Annual Average Daily Traffic counts for 2021 and 2022 recorded near the site are presented in Table 3-17 (TerraPower 2024-TN10896).

Table 3-16 Road Characteristics and Classifications at the Kemmerer Unit 1 Site

Roadway	Functional Class	Description	Capacity at LOS C as Annual Average Daily Traffic
State Road 412	Rural Minor Arteria	2-lane undivided	-
U.S. Route 30	Rural Principal Arterial—Other	2-lane undivided	29,300
U.S. Route 189	Rural Minor Arterial—Other	2-lane undivided	29,300
I-80	Rural Principal Arterial—Interstate	4-lane divided	53,900

LOS = Level-of-Service.
LOS C = stable flow, at or near free flow (TRB 2000-TN9065).
“-” denotes no data in table cell.

Table 3-17 Annual Average Daily Traffic Counts Near the Kemmerer Unit 1 Site

Roadway and Location	Annual Average Daily Traffic Volume Estimates for 2021	Annual Average Daily Traffic Volume Estimates for 2022
U.S. Route 30 west of U.S. Route 189 at Kemmerer	1,575	1,510
U.S. Route 30 east of U.S. Route 189 junction to Wyoming 240 at Opal	2,135	2,047
U.S. Route 189 north of U.S. Route 30 at Diamondville-Kemmerer	4,218	4,059
U.S. Route 189 at U.S. Route 30 junction south to County Road 304 West to Elkol	1,041	1,001
U.S. Route 189 south of County Road 304 to junction with WY 412	1,636	1,574
U.S. Route 189 at Lincoln-Uinta County Line	1,135	1,102
U.S. Route 189 interchange with I-80	1,135	1,102
U.S. Route 189/I-80 at Evanston East interchange	8,052	7,805
U.S. Route 189/I-80 at WY 412 interchange (Carter-Mountain View)	6,837	6,670

The WYDOT plans for FYs 2024 to 2029 indicate that there is to be no new construction or alignment for U.S. Route 189 (WYDOT 2023-TN11216).

3.8.2 Environmental Impacts of Construction

The impact analysis of construction on employment is based on information that the applicant provided in Table 3.3-8 and Figure 3.3-4 in the ER (TerraPower 2024-TN10896). An estimated 1,632 construction workers would be required at the peak of Kemmerer Unit 1 construction in 2028. Given the relatively small number of construction workers residing in the ROI, low unemployment rate, and specialized skills required to construct the nuclear facility, it is expected that 95 percent of the construction workforce (1,550 workers) could migrate into the ROI. Approximately 40 to 80 operation workers would also be onsite during peak construction.

The economic stimulus generated by the creation of new jobs in the ROI would in turn create additional jobs through the “multiplier effect.” The Bureau of Economic Analysis RIMS II multiplier for construction workers is 0.3994, which means for every construction job created, 0.3994 jobs are created (TerraPower 2024-TN10896). At peak construction, 1,550 construction jobs could create 619 additional jobs.

In 2021, there were 1,892 unemployed people in the socioeconomic ROI with most residing in Sweetwater County. It’s assumed that 25 percent (473 workers) of the 1,892 local unemployed people could fill the indirect jobs, while the remaining 146 of the 619 total indirect jobs could be filled by in-migrating workers. This brings the total in-migrating workforce—those holding direct and indirect jobs—to 1,696 people (TerraPower 2024-TN10896).

This analysis assumes that approximately 37 percent of the in-migrating construction workers and 80 percent of the in-migrating indirect workforce could relocate with their families (TerraPower 2024-TN10896). Using the average family size of 3.2 in the ROI (USCB 2023-TN11648), the total of in-migrating workers without families (1,009 people) and the in-migrating workers plus their families (2,198 people) would equal a total in-migrating population increase of 3,207 people into the ROI. It is estimated that 41 percent of all the 3,207 in-migrating population (i.e., 1,315) would reside in Lincoln County, while 32 percent (1,026) and 28 percent (866) of the population would reside in Uinta County and Sweetwater County, respectively (TerraPower 2024-TN10896). This number would represent a 6.2 percent increase in the projected 2030 population of Lincoln County, a 5.1 percent increase in the projected 2030 population of Uinta County, and a 2.1 percent increase in the projected 2030 population of Sweetwater County.

Table 3-18 provides an analysis of the number of housing units required during the construction of Kemmerer Unit 1 at peak, based on the following assumptions (TerraPower 2024-TN10896):

- 95 percent of the construction workforce would migrate into the 3-county region: 1,550 construction workers
- 24 percent of the estimated indirect workforce would migrate into the region: 146 workers
- 37 percent of construction workers would bring families
- 50 percent of construction workers not bringing families would share housing units
- none of the indirect workers would share housing units

Table 3-18 Total Housing Units Required for Kemmerer Unit 1 Workforces During Construction Peak

Workforce/Housing Units Needed	Numbers Estimated
Construction (95 percent in-migration)	1,550
Indirect workforce	146
Construction workers with no family (63.2 percent)	980
Construction workers who share (50 percent of those with no families)	490
Estimated number of units construction workers would occupy (2 workers/unit)	245
Construction workers who don't share (50 percent of those with no families)	490
Construction workers with families (36.8 percent)	570
Indirect workers (will not share)	146
Total units required	**1,451**

Based on these assumptions, during peak construction, in-migrating workers could require an estimated total of 1,451 housing units. Considering the current 1,070 vacancy rental housing units in the three-county ROI (USCB 2023-TN11649), and the construction of more than 1,500 new housing units in Kemmerer and Diamondville (TerraPower 2024-TN10896), there is enough housing to accommodate the construction workforces during the construction of the Kemmerer Unit 1 project.

Construction-related activities, purchases, and workforce expenditures would generate sales and property taxes, and other sources of revenue. Increased tax revenue would be a benefit to the region. Potential property tax estimates were estimated in the following manner. First, the socioeconomic ROI counties' historical property tax levies for the 10-year period between 2011 and 2021 were examined. The growth rates were then applied to actual 2021 levies to project levies for the final year of construction. Lastly, the plant's property tax payments were compared to the total property tax revenue in Lincoln County. Notably, these estimates do not reflect negotiated tax arrangements, such as payments-in-lieu of taxes or other plant valuation agreements with the plant's taxing jurisdictions or the State. At the time of this EIS, no such arrangements have been made. The estimated property tax bill by the final year of Kemmerer Unit 1 construction could be approximately $12.2 million (Table 3-19). This could result in an over 30 percent increase in Lincoln County's property tax revenue.

Table 3-19 Kemmerer Unit 1 Property Tax Payment Comparison, Final Year of Construction

Lincoln County Property Tax Revenue in 2011	Lincoln County Property Tax Revenue in 2021	Average Annual Percent Change, 2011–2021	Final Construction Year–2029 (Projection)	Kemmerer Unit 1 Property Tax Payment, Final Construction Year	Kemmerer Unit 1 Property Tax Payment as Percent of 2029 County Levy Projection
$59,402,602	$47,190,727	-2.1	$39,262,685	$12,195,298	31.1

Source: TerraPower 2024-TN10896.

The 6-month peak average number of construction workers is approximately 1,650 (TerraPower 2024-TN10896). Assuming 2 weekday shifts with staggered start times (825 workers per shift), a 5 percent carpooling rate, and 95 truck deliveries per day, the Kemmerer Unit 1 project traffic impact study estimates that there would be approximately 3,300 additional daily vehicle trips during peak construction on U.S. Route 189. This includes commuting trips and delivery trips. Of these, an estimated 980 trips could occur during the morning peak hour (6:00–7:00 a.m.), with another 980 trips during the evening peak hour (5:00–6:00 p.m.) (Jorgensen 2024-TN11122).

Additional vehicles could lead to a noticeable increase in traffic flow on U.S. Route 189. During peak construction, traffic impacts could reach LOS D (i.e., approaching unstable flow, TRB 2000-TN9065) both north and south of the site, during morning and evening peak hours (Jorgensen 2024-TN11122). Improvements to U.S. Route 189 would be installed per WYDOT-approved design and traffic management controls and mitigation would be implemented as required by WYDOT (TerraPower 2024-TN10896).

3.8.3 Environmental Impacts of Operation

The operation of Kemmerer Unit 1 would require approximately 250 operations workers. Approximately 90 percent of the operations workers are assumed to migrate into the three-county ROI, resulting in an estimated 230 in-migrating operation workers (TerraPower 2024-TN10896).

For every new Kemmerer Unit 1 operations job, an estimated additional 1.8559 indirect jobs would be created in the three-county ROI, which means that the 230 jobs would create an additional 427 indirect jobs, for a total of 657 new jobs in the economic region.

According to the USCB's 2018–2022 American Community Survey 5-Year Estimates, the economic region has approximately 40,400 employed workers (USCB 2023-TN11025). Therefore, 657 additional workers could represent an approximate 2 percent increase in regional employment.

This analysis assumes that operations workers would bring their families. Therefore, in a bounding analysis, using the average family size in the ROI of 3.2, 230 in-migrating Kemmerer Unit 1 operations workers could bring approximately 500 family members. Based on this, the three-county ROI population could increase by up to 730 people (Kemmerer Unit 1 workers and family members combined) during facility operations. For example, it is estimated that up to 70 percent (511), 20 percent (146), and less than 5 percent (37) of this population could reside in Lincoln County, Uinta County, and Sweetwater County, respectively (TerraPower 2024-TN10896). In addition, this number could represent a 2.3 percent increase in the projected 2030 population of Lincoln County and a less than 1 percent increase in the projected 2030 population of Uinta County. Across the ROI, there would be sufficient housing to accommodate the Kemmerer Unit 1 operations workforce given current vacancy housing and new housing construction.

The estimated annual property tax revenue generated during Kemmerer Unit 1 operation could be approximately $7.5 million. This could result in an approximately 20 percent increase in projected Lincoln County property tax levies in the first year of operation (Table 3-20).

Table 3-20 Kemmerer Unit 1 Property Tax Payment Comparison, First Year of Operation

Lincoln County Property Tax in 2011	Lincoln County Property Tax in 2021	Average Annual Percent Change, 2011–2021	Final Construction Year–2030 (Projection)	Kemmerer Unit 1 Property Tax Payment, Final Construction Year	Kemmerer Unit 1 Property Tax Payment as Percent of 2030 County Levy Projection
$59,402,602	$47,190,727	-2.1	$38,271,680	$7,500,000	19.6

Source: TerraPower 2024-TN10896.

Of the 250-person operations workforce, 190 workers are expected to be assigned to the weekday day shift while 25 workers are expected to be assigned to the weekday night shift. The traffic study estimated that there could be 384 additional daily vehicle trips (i.e., 344 commuting trips plus 40 delivery trips) on U.S. Route 189 during the operation of Kemmerer Unit 1, assuming 20 percent carpooling for commuting (Jorgensen 2024-TN11122). Taking into consideration a 1.2 percent annual growth factor to forecast the traffic volumes, the results for U.S. Route 189 traffic impacts were estimated to be up to LOS C north of the site and up to LOS B south of the site for the 40-year period of the full operation for Kemmerer Unit 1 (Jorgensen 2024-TN11122).

During outages, the number of vehicles traveling to and from the site could increase by 500 per day for 12 to 18 days (TerraPower 2024-TN10896). The disruption to the quality of traffic could be noticeable but would be of short duration. Operations-related traffic could impact traffic flows during peak commuting hours with lesser impacts at non-peak hours.

A more detailed analysis of socioeconomic impacts due to Kemmerer Unit 1 operation would be conducted during the environmental review for an OL, if USO submits an OL application.

3.8.4 Environmental Impacts of Decommissioning

Decommissioning would involve heavy haul traffic amounting to a small increase over baseline traffic, which could be absorbed into overall traffic volume and would not be noticeable. In addition, the socioeconomic impact of decommissioning activities at Kemmerer Unit 1 would be bounded by the analyses presented in Section 4.3.12 of the decommissioning generic EIS (NRC 2002-TN7254), which concludes that socioeconomic impacts would not be detectable.

3.8.5 Cumulative Impacts

As described in Appendix E, there are 10 other projects slated to begin near the Kemmerer Unit 1 site that could result in additional in-migrating workers, depending on the actual start date of these projects. Impacts to the local economy from increased employment and economic stimulus from taxes and wages would be minimal to significant and beneficial. During peak commuting hours, U.S. Route 189 could decrease from LOS A to LOS C and D near the site entrance; therefore, traffic impacts could be noticeable.

3.8.6 Conclusions

The review team concludes that the potential direct, indirect, and cumulative socioeconomic impacts of the proposed action would be MODERATE to LARGE. Most of the socioeconomic impacts would occur during peak construction (18–24 months) when the influx of workers to the ROI would lead to a noticeable population increase in the relatively small, sparsely populated

ROI. Beneficial impacts of new tax revenue would occur after the peak construction period and would not be available as potential mitigation for adverse impacts during that period.

3.9 Public and Occupational Health

3.9.1 Radiological Human Health

The following section addresses the potential public and occupational health effects from radiological sources.

3.9.1.1 Affected Environment

The population and area within 50 mi (80 km) of Kemmerer Unit 1 are considered to be the extent of the affected environment. Kemmerer Unit 1 would be constructed at a location with no existing operational or shutdown nuclear facilities onsite or within 50 mi (80 km) of the site. Current sources of background radiation are stated in the ER as:

- cosmic (66 millirems [mrem])
- internal (40 mrem)
- terrestrial (556 mrem, 46 from terrestrial and 510 from radon)

With natural radiation identified as the primary source of background, the estimated dose from background at the Kemmerer Unit 1 location is 662 mrem (TerraPower 2024-TN10896). This is higher than the average in the U.S. of 310 mrem per year due to the increased elevation (higher exposure to cosmic radiation) and terrestrial sources (higher than average radon emissions).

There are additional potential sources of radiation to the general public from human-made sources. These are stated in Section 2.9.1.1 of the ER (TerraPower 2024-TN10896) as:

- nuclear medicine sources (average 300 mrem)
- consumer products (13 mrem on average and 0.03 mrem from Naughton Power Plant)
- miscellaneous occupational exposure (0.5 mrem)
- miscellaneous industrial exposure (0.3 mrem)
- exposure to nuclear weapons testing fallout (1 mrem)

The additional sources are specific to an individual and are not expected to apply to all individuals. For example, if a person does not undergo a procedure that uses nuclear medicine, then their dose would be much closer to the baseline annual dose from natural background estimated to be 662 mrem.

3.9.1.2 Environmental Impacts of Construction

Radiological impacts from construction of Kemmerer Unit 1 are described in ER Section 4.9 (TerraPower 2024-TN10896). At certain times during construction, TerraPower or a byproduct device licensee contracted by TerraPower would also receive, possess, and use specific radioactive byproduct material in support of construction activities such as soil compaction testing and radiography. Such devices utilizing byproduct material are required to be controlled by the device's licensee for very specific uses under controlled conditions. The dose to construction workers from byproduct material is expected to have a negligible contribution to their annual dose. There are no operating or shutdown nuclear facilities near the site, and no gaseous and/or liquid effluents released from nuclear facilities during construction.

3.9.1.3 Environmental Impacts of Operation

The annual dose limits for members of the public are provided in 10 CFR 20.1301 (TN283), specifically, 10 CFR 20.1301(a), which limits dose to 100 mrem/yr total effective dose equivalent. This dose limit is inclusive of limits stated in 40 CFR Part 190 (TN739) Subpart B limiting annual dose to 25 mrem to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ of any member of the public as the result of exposures to planned discharges of radioactive materials, radon and its daughters excepted, to the general environment from uranium fuel cycle operations and to radiation from these operations.

Radiological health environmental impacts during operation of Kemmerer Unit 1 are discussed in Section 5.9 of the ER (TerraPower 2024-TN10896). Potential emission sources include release of gaseous and liquid effluents and direct exposure from emitted radiation. Section 5.9.1 of the ER (TerraPower 2024-TN10896) describes exposure pathways to the public, workers, and nonhuman biota near the site. Pathways include direct exposure, inhalation, and consumption of meat, dairy, and vegetables produced near Kemmerer Unit 1. The ER states in Section 5.9.2.1 (TerraPower 2024-TN10896) that during operation of Kemmerer Unit 1, there would be no liquid effluent releases from the NI and the liquid releases from the EI would be limited to trace amounts and any liquid releases would be indistinguishable from background.

3.9.1.3.1 Occupational Dose

Section 5.9.4 of the ER states, “The annual occupational dose to operational workers, including outage activities, will be provided as the design develops.” The occupational doses to plant workers must comply with 10 CFR Part 20 (TerraPower 2024-TN10896). The NRC staff would confirm this at the OL stage of the licensing process should USO submit an OL application.

3.9.1.3.2 Doses to Members of the Public

Estimates of doses to members of the public from radiological gaseous emissions for both the NI and the EI were completed. Using information contained in Tables 5.9-1, 5.9-2, 5.9-3, and Table 5.9-4 of the ER, estimates of annual dose at certain locations were generated using the GASPAR code[1] (TerraPower 2024-TN10896). This analysis combined atmospheric dispersion and deposition factors values specific to the release point’s location relative to receptor locations to estimate annual dose. Besides the annual dose limits in 10 CFR 20.1301 and 40 CFR Part 190 (TN739), USO also compared the annual radiological effluent doses from the sodium-cooled Natrium reactor at Kemmerer Unit 1 to 10 CFR Part 50 (TN249), Appendix I, which identifies design objectives and limiting conditions for an LWR to meet the “As low as is Reasonably Achievable” criterion. These limits are for all pathways exposure from liquid effluents (3 mrem to the body and 10 mrem to a specific organ) and from gaseous effluents (5 mrem to the body and 15 mrem to skin).

[1] The GASPAR code is a computer program used by the NRC staff to perform environmental dose analyses for releases of radioactive effluents from nuclear power plants into the atmosphere. The analyses estimate radiation dose to individuals and population groups from inhalation, ingestion, and external-exposure pathways.

The representative maximally exposed individuals (MEI) were chosen to represent an individual at the TFF (to represent a co-located worker), at the Exclusion Area Boundary (EAB) (to represent a member of the public), and at the nearest residence. As stated in the ER, the distance to each is 0.08 mi (0.13 km) to the TFF, 0.19 mi (0.3 km) to the EAB, and 2.8 mi (4.5 km) to the nearest residence. These distances are measured from the reactor center point (TerraPower 2024-TN10896). Additionally, the nearest vegetable garden and dairy animal were also at the nearest residence. Meat animals were located at the EAB.

Table 3-21 and Table 3-22 show the estimated doses to the MEI compared to limits stated in 10 CFR Part 50 (TN249), Appendix I (Table 3-21) and 40 CFR Part 190 (TN739) (Table 3-22). These tables are reproduced from Table 5.9-6 and Table 5.9-7 of the ER (TerraPower 2024-TN10896). USO estimates a maximum direct dose of 1 mrem/yr and maximum total body dose of 4.73 mrem/yr. The estimated maximum individual organ doses is 4.73 mrem/yr dose to liver, kidney, and thyroid; and of 4.74 mrem/yr dose to lungs. (TerraPower 2024-TN10896). The estimates shown in Table 3-21 and Table 3-22 represent the highest potential value for a member of the public, including those onsite at the TFF.

Table 3-21 Dose to Maximally Exposed Individual Compared to Limits in 10 CFR Part 50 Appendix I

Type of Dose	Annual Dose Site	10 CFR 50 Appendix I Limit
Gamma Air (mrad)	1.19	10
Beta Air (mrad)	9.79×10^{-1}	20
Total Body (mrem)	7.96×10^{-1}	5
Skin (mrem)	1.63	15
Maximum Organ from Iodine and Particulates (mrem)	4.74	15

Table 3-22 Estimated Annual Dose Compared to Limits in 40 CFR Part 190

Type of Dose	Gaseous	Direct	Total	Limit
Total Body (mrem/yr)	4.73	1.00	5.73	25
Thyroid (mrem/yr)	4.73	0.00	4.73	75
Other Organ—Lung (mrem/yr)	4.74	0.00	4.74	25

The preliminary analysis provided in the CP application indicates that the applicant would meet the applicable dose criteria, however, the calculations would be updated and refined at the OL stage should USO submit an OL application.

3.9.1.3.3 Doses to Nonhuman Biota

Surrogate biota were used by USO to estimate the potential radiation impacts to nonhuman biota that could inhabit or transit the area within the EAB. This method is appropriate as no unique or specific animals reside with the site that require specific evaluation. Surrogates for aquatic and terrestrial biota were modeled. Land-dwelling biota were modeled to be within the EAB at the TFF. The doses to nonhuman biota were estimated by USO and provided in Table 5.9-9 of the ER (TerraPower 2024-TN10896). These are summarized in Table 3-23.

Table 3-23 Dose to Representative Nonhuman Biota at the Kemmerer Unit 1 Site

Biota	Gaseous Dose (mrad/yr)	Total Body Dose (mrad/d)	IAEA/NCRP Dose Guidelines for Biota (mrad/d)[(a)]
Fish/Invertebrates/ Algae	0.00	0.00	1,000
Muskrat/Raccoon/ Heron/Duck	7.76×10^{-1}	1.94×10^{-3}	100

(a) International Atomic Energy Agency (IAEA)/National Council on Radiation Protection and Measurements (NCRP) biota dose guidelines (IAEA 1992-TN712; NCRP 1991-TN729).

Because there are no continuous liquid releases and any expected releases would be indistinguishable from background, the zero values for aquatic species from Kemmerer Unit 1 are representative of a zero liquid discharge facility. Terrestrial species are expected to be exposed to similar effluents as humans, including ground, plume, inhalation, and vegetable ingestion. Doses to terrestrial species were modeled using representative assumptions for humans, including material residence times and distance to the ground. Together this amounts to a maximum dose of 1.93×10^{-3} mrad per day which sums to a total of 0.776 mrad per year. This is significantly lower than the dose guideline of 100 mrad per day (IAEA 1992-TN712; NCRP 1991-TN729).

3.9.1.3.4 Radiological Environmental Monitoring

The radiological affected environment from Kemmerer Unit 1 is described in Section 2.9 of the TerraPower ER (TerraPower 2024-TN10896). The ER describes the radiological environmental monitoring program (REMP) designed for Kemmerer Unit 1. The REMP is constructed using NEI 07-09A, "Generic FSAR Template Guidance for Offsite Dose Calculation Manual (ODCM) Program Description" (NEI 2009-TN5890), and Regulatory Guide 4.1, Revision 2, "Radiological Environmental Monitoring for Nuclear Power Plants," to comply with the requirements of 10 CFR 20.1302 (TN283). The REMP will include (TN283):

- the number and location of sample collection points and measuring devices, and the pathway sampled or measured
- sample size, sample collection frequency, and sampling duration
- type and frequency of analysis
- general types of sample collection and measuring equipment

The site would start environmental monitoring at least 2 years before operation of Kemmerer Unit 1 to determine background baseline levels. REMP monitored pathways for Kemmerer Unit 1 would include inhalation, ingestion, and direct radiation. The routes of exposure and sampling mediums are identified using an annual land use census.

The REMP monitoring sites are arranged in several groups. There is an inner circle of onsite thermoluminescent dosimeters, with one in each meteorological sector. An outer circle of dosimeters is situated about 5 mi (8 km) from the reactor center. Additionally, there are six special interest locations and two control locations (TerraPower 2024-TN10896). Particulates and airborne iodine would be monitored near the site boundary where the estimated highest annual average ground-level deposition would occur, as well as in a nearby community with the highest potential annual average deposition. An additional control location is situated in the least common wind direction and would also be monitored.

3.9.1.4 Environmental Impacts of Decommissioning

The ER describes the requirements for the post-shutdown decommissioning activities report, including that it be submitted within two years of the permanent cessation of plant operations. The regulations for decommissioning are specified in 10 CFR 50.82 and are applicable to all reactor designs. The decommissioning generic EIS (NRC 2002-TN7254) also considers the decommissioning of high-temperature gas-cooled reactors and fast breeder reactors. The Kemmerer Unit 1 reactor is a sodium-cooled fast reactor, which design is not specifically included in the decommissioning generic EIS; however, the decommissioning of Fermi Unit 1, which had a similar sodium-cooled design, has been assessed and is included in Supplement 1 of the decommissioning generic EIS. This assessment is expected to be applicable to Kemmerer Unit 1 because “Previous or anticipated decommissioning activities at the [fast breeder reactor] or [high-temperature gas-cooled reactor] have not and are not expected to result in occupational or public doses that are different from those found at other nuclear facilities” (NRC 2002-TN7254).

The key differences between Fermi Unit 1 and Kemmerer Unit 1 are that Kemmerer Unit 1 has a higher thermal output of 840 MWt (TerraPower 2024-TN10896) versus Fermi Unit 1 at 200 MWt and a tertiary sodium energy storage system incorporated into the design. However, the higher thermal power is still bounded by light-water reactors, which frequently are 3,000 to 3,400 MWt (NRC 2024-TN10161). The tertiary sodium energy storage system is not part of the Fermi Unit 1 design.

Upon the permanent cessation of Kemmerer Unit 1 operations, all radioactive material would be transferred to various types of storage containers based on the type of material (e.g., sodium coolant, molten salts, spent Natrium fuel, radioactive material from decontamination operations) and shipped to licensed disposal sites or appropriately stored onsite (e.g., in an independent spent fuel storage installation [ISFSI] for spent Natrium fuel). While some trace amounts of tritium could be expected to diffuse out of such storage containers, radiation area monitoring would continue to ensure safe storage of the radioactive material until it is removed from the site or placed in a specifically designed and certified dry cask storage system, if necessary. The decommissioning generic EIS discusses the expected radiological impacts that could occur during the decommissioning of a large LWR (i.e., a 1,130 MWe pressurized-water reactor or a 1,100 MWe boiling-water reactor), including the appropriate practices to minimize radiological exposure to workers, and finds that impacts would be small and that no additional mitigation measures are likely to be sufficiently beneficial to be warranted (NRC 2002-TN7254).The decommissioning generic EIS also discusses sodium coolant as it relates to the Fermi Unit 1 200-MWt reactor. The Kemmerer Unit 1 Natrium reactor uses similar sodium coolant technology in the primary and intermediate loops, whereas the Natrium reactor uses a tertiary salt loop to transfer heat from the NI to the EI as stated in Section 6.3.1 of the ER (TerraPower 2024-TN10896). While this system has never been decommissioned, the review team expects that the impacts would be similar to those described in the decommissioning generic EIS for the Fermi Unit 1 reactor. The Natrium reactor is smaller than a LWR but the review team expects that the impacts would be similar to or less than the radiological human health impacts stated in the decommissioning generic EIS, Supplement 1, Table 6-1 (NRC 2002-TN7254).

3.9.1.5 Cumulative Impacts

The list of current and proposed projects and facilities in Appendix E includes no nuclear facilities near the site that would have additional radiological impacts.

3.9.1.6 Conclusions

The review team concludes that the potential direct, indirect, and cumulative impacts of the proposed action on radiological human health would be SMALL. This conclusion is based upon the above analysis and is supported by the lack of use of radiological materials during construction activities and the lack of operating or shutdown nuclear facilities near the site.

3.9.2 Nonradiological Human Health

This section addresses the potential nonradiological public and occupational health effects of the proposed action, including chemical hazards, biological hazards, electromagnetic fields, and physical hazards, such as noise.

3.9.2.1 Affected Environment

This section describes the affected environment at the Kemmerer Unit 1 site and vicinity. It describes additional baseline public and occupational health conditions that could be affected by the construction, operations, and decommissioning of the proposed facility. See Section 3.1 for information on land use and visual resources, Section 3.2 for information on air quality resources, Section 3.4 for information on water resources, Section 3.8 for information on socioeconomic resources, and Section 3.11 for information on nonradiological waste impacts. Each of these sections provide information in the affected environment subsection that would be pertinent to nonradiological human health.

The nearest residence is approximately 2.8 mi (4.5 km) from the site and 1.5 mi (2.4 km) from the closest point along the macro-corridor (TerraPower 2024-TN10896). Approximately 3,100 people live within 10 mi (16 km) of the Kemmerer Unit 1 site (TerraPower 2024-TN10896). The applicant noted that a 2021 investigation of reported past and present use of hazardous substances, materials, and petroleum products at the site was conducted as part of a Phase 1 Environmental Site Assessment and no recognized environmental conditions were identified (TerraPower 2024-TN10896). There are no Federal, State, or county noise restrictions for this site and there are no planned noise studies or noticeable preexisting noise sources, other than traffic from U.S. Route 189, County Road 325, and the Union Pacific railroad spur (TerraPower 2024-TN10896).

3.9.2.2 Environmental Impacts of Construction

This section describes the potential nonradiological public and occupational health effects of construction activities. Construction activities generate noise, dust, and gaseous emissions that could affect public and worker health. Public health impacts from construction activities could also include fugitive dust and gaseous emissions (TerraPower 2024-TN10896).

Construction workers are at risk from accidents and occupational hazards typical of any construction site when building and installing new facilities. Construction accidents (e.g., falls, electric shock, asphyxiation, and burns), trenching hazards, and exposure to noise generated by heavy earth-moving equipment are also possible. In 2023, the U.S. Bureau of Labor Statistics reported that the national incidence rate for nonfatal occupational injuries and illnesses for the heavy and civil engineering construction industry was 1.9 per 100 full-time workers and that the rate for the nuclear electric power generation industry was 0.2 per 100 full-time workers (BLS 2024-TN11032). The Wyoming incidence rate for nonfatal occupational injuries and illness for the construction industry was 2.2 per 100 full-time workers for 2023 (BLS 2023-TN11033).

Occupational hazards are managed through compliance with Occupational Safety and Health Administration (OSHA) regulations. According to the Memorandum of Understanding between the NRC and OSHA (NRC 2013-TN10165), plant conditions that result in an occupational risk, but do not affect the safety of licensed radioactive materials, are under the statutory authority of OSHA rather than the NRC. Federal regulations governing occupational noise are found in 29 CFR Part 1910 (TN654) and 40 CFR Part 204 (TN653). The regulations in 29 CFR Part 1910 deal with noise exposure in the construction environment, and the regulations in 40 CFR Part 204 generally govern the noise levels of construction equipment. Construction would comply with the OSHA noise exposure and hearing protection regulations adopted by the Wyoming Department of Workforce Services (TerraPower 2024-TN10896). Mitigation measures, such as noise control on equipment, personal protective equipment, and staggered activities, would help maintain noise within OSHA standards. Table 4.11-1 of the ER describes a summary of measures and controls to limit onsite adverse impacts during construction (TerraPower 2024-TN10896). The applicant reported that noise from construction equipment at the Kemmerer Unit 1 site would include that from earth-moving machinery, trucks, generators, and hand tools with peak noise levels as detailed in ER Table 3.3.5, with pile driving at 95 dBA being the loudest. The construction industry regulations are found in 29 CFR Part 1926 and general industry regulations are found in 29 CFR Part 1910. Additionally, construction activities and operations for the transmission and water supply lines that fall within the Kemmerer Mine permit boundary would be subject to the Mine Safety and Health Administration standards found in 30 CFR Part 77 (TerraPower 2024-TN10896). Per ER Section 4.8.1, construction workers and onsite personnel will receive training and personal protective equipment to minimize the risk of potentially harmful exposure or accidents and emergency first-aid care will be available. The applicant plans to reduce or eliminate occupational physical hazards through implementation of safety practices, training, and physical control measures (TerraPower 2024-TN10896).

A construction air permit from the WYDEQ will be required, while diesel generators, propane heaters, and a concrete batch plant will be permitted through the WYDEQ. The applicant estimates air emissions from construction of the facility would be below 100 tons per year (TPY) for SO_2 and VOC (TerraPower 2024-TN10896), and above 100 TPY for PM_{10}, CO, and NO_x (TerraPower 2024-TN10896). Air emissions are discussed further in Section 3.2.

Portable toilets would be provided, as there is no municipal infrastructure for the discharge of sanitary waste. Section 4.10.2 of the ER (TerraPower 2024-TN10896) provides information on the impacts of liquid waste generated during construction activities and the plan for its onsite and offsite treatment. Construction activities would produce several types of liquid waste, including groundwater from dewatering activities, stormwater runoff, sanitary waste, vehicle oil and grease, and various other treatment chemicals. The applicant would obtain a Temporary Dewatering Permit and a WYPDES LCGP for dewatering and stormwater activities. An SPCC Plan would address management of fuel and lubricants to minimize accidental spills. Petroleum products and industrial chemicals would be stored and used only in the designated areas with spill containment equipment (TerraPower 2024-TN10896). The review team assumes that during construction activities hazardous chemicals will be used and stored according to threshold limits established by OSHA in Appendix A to 29 CFR 1910.119 (TN654). Nonradiological wastewater treatment is discussed further in Section 3.10.

Construction activities also have the potential to affect members of the public. Table 4.11-1 of the ER (TerraPower 2024-TN10896) lists a summary of measures and controls to limit offsite adverse impact during construction. An SPCC Plan would be implemented to train workers for spill response and to ensure that spill control equipment is available, thus eliminating any adverse offsite effects. Construction debris and other solid waste would be subject to waste reduction, recycling, and waste minimization practices (TerraPower 2024-TN10896). Noise to members of the public from construction activities would decrease with distance.

3.9.2.3 Environmental Impacts of Operation

A summary of potential nonradiological public and occupational health hazard impacts from operations is provided to ensure that a complete environmental review of the Kemmerer Unit 1 life cycle is assessed. A detailed analysis of the impacts of operation of Kemmerer Unit 1 would be provided during the environmental review of the application for an OL should USO submit one to the NRC. The analysis below provides a summary of possible operational impacts from chemical hazards, biological hazards, electromagnetic fields, and physical hazards.

Chemicals would be used in industrial processes and maintenance activities. The applicant has stated that operations would be conducted under a comprehensive industrial safety program, including adhering to regulations and standards established by OSHA for personal protective equipment (29 CFR 1910.132) (TN654), eye and face protection (29 CFR 1910.133) (TN654), and respiratory protection (29 CFR 1910.134) (TN654). The applicant estimates that air emissions associated with facility operations would fall below the 100 TPY for all criteria pollutants (TerraPower 2024-TN10896). See Section 3.2 of this EIS for more information. The applicant explains in ER Section 3.4.3.2.1 that Kemmerer Unit 1 would include various stacks and vents associated with plant operations for nonradioactive gaseous waste from the diesel generator and auxiliary boiler. Gaseous emissions from equipment associated with the plant auxiliary system would be regulated under the applicable WYDEQ permit.

Although the temperature increase from the plant's thermal discharge is not yet determined, the discharge would comply with WYDEQ standards and the WYPDES permit limits, including thermal discharge units. Stormwater discharges would be monitored as required by a WYPDES permit (TerraPower 2024-TN10896). See Section 3.4 for details regarding water resources.

Nuclear power plant workers can also be exposed to disease-causing microorganisms (also referred to as etiological agents) from enteric pathogens (such as *Salmonella* spp. and *Pseudomonas aeruginosa*), bacteria (such as *Legionella* spp.), thermophilic fungi, and free-living amoeba (such as *Naegleria fowleri* and *Acanthamoeba* spp.) through cleaning or performing maintenance activities of the cooling system or any water system in general. As described in Section 2.5, the cooling-tower basin at Kemmerer Unit 1 is expected to store water, which could potentially provide ideal environments for the growth of these organisms. Additionally, these microorganisms are known to occur in many types of freshwater bodies such as lakes, rivers, and thermally polluted effluents from power plants throughout the U.S. and proliferate during warm summer months (CDC 2017-TN5146; Visvesvara et al. 2007-TN4907; Yoder et al. 2010-TN5009). From 1962 to 2021, the Centers for Disease Control and Prevention reported 154 cases of primary amebic meningoencephalitis (PAM—a disease caused by *N. fowleri*) in the U.S. (CDC 2022-TN11027); with no reported cases in Wyoming during the period from 1962–2015 (CDC 2016-TN11028); however, in early 2024, it was detected in Grand Teton National Park during a sampling event (Barnhart et al. 2024-TN11029). In 2022, the Wyoming Department of Health reported that there were 27 occurrences of cryptosporidiosis, with none occurring in Lincoln County (WDH 2022-TN11030). Cyanobacterial bloom advisories did occur for Lake Viva Naughton, 18 mi (30 km) upstream of the Naughton Power Plant CWIS, in 2021 and 2023 (WYDEQ 2025-TN11031). Public exposure to these microorganisms from nuclear power plant operations is not generally of concern because exposure is confined to cooling towers, related components, and equipment, which are typically within the protected area of the site and not accessible to the public. However, discharge from Kemmerer Unit 1 will be from the EI to rip-rap extending from the stormwater pond about 300–400 ft (91.4–121.9 m) west of the NFLMC, which would be publicly accessible (see Figure 2-2). Discharge temperature, quantity, and types of pollutants would be regulated through the State of Wyoming via a WYPDES permit.

Operation of power transmission systems generates both electric and magnetic fields, referred to collectively as electromagnetic fields (EMFs). Occupational workers and the public can be exposed to EMFs through exposure to electrical sources associated with power transmission systems, including switching stations (or substations) on the site and transmission lines connecting the plant to the regional electrical distribution grid. Transmission lines operate at a frequency of 60 hertz (60 cycles per second), which is considered to be an extremely low frequency. In comparison, television transmitters have frequencies of 55 to 890 megahertz (MHz), and microwaves have frequencies of 1,000 MHz and greater (NRC 1996-TN288). At the Kemmerer Unit 1 site, new 230 kV lines would be installed with the new switch yard added. The review team has reviewed scientific literature on chronic effects of EMF on human health and found that the scientific evidence regarding the acute or chronic effects of EMF exposure on human health does not conclusively link EMF exposure to adverse health impacts (NRC 1999-TN8080).

Additionally, occupational workers and members of the public could be exposed to electric shock from transmission lines or electrical equipment needed to support the facility. The applicant committed to control such effects by conformance with the National Electric Safety Code (TerraPower 2024-TN10896). Noise at the Kemmerer Unit 1 site from operations would affect occupational workers and nearby members of the public. Operation of equipment at the proposed site would generate noise typical of industrial activities, but most equipment generating noise would be enclosed within buildings such as the Rx Building, auxiliary building, and maintenance and storage building, which would minimize outdoor noise generation. The applicant states in ER Section 5.8.2 that operation of some outdoor equipment such as transformers, generators, loudspeakers, and cooling towers would produce noise. The mechanical draft cooling towers would be the loudest with sound levels of about 60 dBA at 500 ft (152.4 m) and 50 dBA at 1,600 ft (487.7 m). For the occupational worker, impacts from noise will be controlled according to OSHA regulations. The applicant would comply with OSHA noise exposure and hearing protection regulations. Mitigation measures such as noise control on equipment and use of personal protective equipment would help maintain noise levels within OSHA standards. For members of the public during operation, noise levels would be below 60 dBA at the site boundary and would attenuate to ambient levels before reaching the nearest resident. Kemmerer Unit 1 would be expected to operate in compliance with all Federal, State, and local safety and health regulations (TerraPower 2024-TN10896).

3.9.2.4 Environmental Impacts of Decommissioning

The review team expects that nonradiological occupational and public safety and health impacts from decommissioning Kemmerer Unit 1 would be bounded by the analyses reported for physical, chemical, ergonomic, and biological hazards in Section 4.3.10 of the decommissioning generic EIS (NRC 2002-TN7254), which concluded that these impacts would not be detectable.

3.9.2.5 Cumulative Impacts

Appendix E identifies past, present, and reasonably foreseeable future projects that could cumulatively contribute to the environmental impacts of the proposed action. Past, present, and foreseeable projects in the geographical area of interest could contribute to the cumulative impacts for nonradiological public and occupational health in a way similar to the construction activities at the Kemmerer Unit 1 site. Key past, present, and reasonably foreseeable actions that could affect nonradiological public and occupational health (e.g., noise, dust, or exhaust emission) due to construction in the region, such as the solar and wind energy projects, would not be close enough for public or occupational workers to experience cumulative impacts. However, construction activities for the TFF, the Naughton Power Plant conversion, the U.S. Route 189 road construction activities, and the U.S. Route 30 road alignment would be performed in accordance with Federal, State, and local regulations and, therefore, significant cumulative impacts from the construction of these projects would not be expected. The U.S. Route 189 intersection construction would be completed before beginning construction activities for Kemmerer Unit 1, and construction of the TFF would be completed before peak construction activities at Kemmerer Unit 1 (TerraPower 2024-TN10896). Based on its analysis of past, present, and reasonably foreseeable future projects and their impacts to nonradiological public and occupational health, the review team concludes that cumulative impacts would be minimal, and the impacts from the proposed action would not incrementally contribute to this impact.

3.9.2.6 Conclusions

The review team concludes that the potential direct, indirect, and cumulative nonradiological human health impacts of the proposed action would be SMALL. This conclusion is based upon the above analysis and is supported by the applicant's plans to reduce the potential for nonradiological occupational and public health hazards through implementation of safety practices, training, and physical control measures (TerraPower 2024-TN10896) for the construction of Kemmerer Unit 1.

3.10 Nonradiological Waste Management

3.10.1 Affected Environment

Chapter 2 of this EIS describes facility utilities and waste systems. Section 3.1 provides a description of the Kemmerer Unit 1 site and its surrounding vicinity. Potential types of nonradioactive wastes expected to be generated, handled, and disposed of include construction debris, spoils, stormwater runoff, sanitary waste, dust, and air emissions. The applicant states that nonradioactive wastes would be managed in accordance with applicable Federal, State, and local laws and regulations and permit requirements, such as the Resource Conservation and Recovery Act (TN1281), NPDES permit, or OSHA. A waste minimization program would be implemented that uses material control, process control, waste management, and recycling to reduce waste (TerraPower 2024-TN10896).

3.10.2 Environmental Impacts of Construction

Nonradiological waste hazards may arise from normal emissions, discharges, and solid waste during construction of the proposed project, as well as from accidental releases in solid, liquid, or gaseous forms. As described in Section 4.10 of the ER (TerraPower 2024-TN10896), construction activities related to the proposed project could result in construction debris, municipal waste, spoils, stormwater runoff, sanitary waste, dust, other air emissions, used oils and lubricants from heavy equipment maintenance, and other hazardous chemicals.

Solid nonradiological waste would include waste from construction debris from excavation and land clearing, general waste storage, metal waste, and equipment waste. The Kemmerer landfill on County Road 345 is expected to serve as the primary waste collection site during construction and operation of the proposed project (TerraPower 2024-TN11009). Section 4.10 of the ER states that construction debris created by excavation and land clearing will be either recycled or disposed offsite to a licensed facility. Construction waste will be collected using approved receptacles and recycled where possible. The applicant estimates that the site would generate three 40 yard (36.6 m) dumpsters of general trash per week. Metal waste from various building materials will also be recycled. Material collected in two metal dumpsters will be sent for recycling twice a week. Equipment waste generated from onsite construction vehicles and used hazardous materials would be disposed of according to Federal, State, and local permitting and regulatory requirements. Management of solid waste would involve waste reduction efforts, recycling, and BMPs during all phases of the project (TerraPower 2024-TN10896).

Typical liquid nonradiological waste produced during construction activities would include used fuels, oils, solvents, paints and stains, and other chemicals which would be stored and disposed of according to applicable regulations, such as through the Resource Conservation and Recovery Act and OSHA. Surface water and groundwater have the potential to be affected due to construction activities at the Kemmerer Unit 1 site and would be managed in accordance with NPDES general permit and local requirements. The most common liquid waste would be human waste, which would be managed with portable toilets and restroom trailers. The applicant estimates that 80 portable toilets would be needed at peak times and that sanitary waste would be disposed of every other working day by licensed subcontractors. Additionally, restroom trailers with septic tank would be available for workers' use (TerraPower 2024-TN10896). Construction and commissioning water would be reused when possible or treated before disposal (TerraPower 2024-TN10896).

Construction activities and equipment would generate dust and air emissions. Table 4.10-1 of the ER lists major equipment that would be used during construction. Air quality impacts would be minimized by using water trucks for dust suppression, covering stockpiles, and complying with Wyoming Air Quality Standards and Regulations General Air Permit. See Section 3.2 for air emission information. The overall impacts caused by commuting construction workers and building activities would be temporary (TerraPower 2024-TN10896).

3.10.3 Environmental Impacts of Operation

A summary of potential nonradiological waste impacts from operation is provided to ensure that a complete environmental review of the Kemmerer Unit 1 life cycle is assessed. A detailed analysis of the impacts of operation of Kemmerer Unit 1 would be provided during the environmental review of the application for an OL should USO submit one to the NRC. The analysis below provides a summary of potential impacts on the environment that could result from the generation, handling, and disposal of nonradioactive waste during operations at the Kemmerer Unit 1 site. Section 2.6 describes the nonradioactive waste streams that would be generated from the operations at the Kemmerer Unit 1 site. The Kemmerer Unit 1 site would follow all applicable Federal, State, and local requirements and standards for handling, transporting, and disposing of nonradioactive wastes (TerraPower 2024-TN10896).

Operational solid wastes include trash, sewage-treatment sludge, and industrial wastes. Universal waste such as scrap metal, lead acid batteries, and paper collected at the site will be recycled offsite at an approved recycling facility (TerraPower 2024-TN10896). The applicant estimates that based on a similar reactor size, the facility is expected to produce approximately 3,500 tons (3,175.1 MT) of nonradioactive, nonhazardous solid waste annually (TerraPower 2024-TN10896). Other solid wastes include water treatment resins and sanitary treatment residuals, which would be managed and disposed of offsite in compliance with applicable Federal, State, and local requirements and standards for handling, transporting, and disposing of solid waste. Waste sludge from oil water separator and extended aeration skid would be disposed of offsite to an approved disposal location.

Liquid waste includes NPDES-permitted discharges such as effluents containing chemicals or biocides, wastewater effluents, site stormwater runoff, and other liquid waste such as oils, paints, and solvents that require offsite disposal. The applicant would temporarily store the used oil and rags onsite before transporting them to an offsite permitted recycling or recovery facility or disposing at an offsite licensed commercial waste disposal facility (TerraPower 2024-TN10896).

Stormwater at the proposed Kemmerer Unit 1 site would be routed into the retention ponds with emergency spillways to prevent overflow. Section 3.4 discusses impacts on surface and groundwater quality from operations of Kemmerer Unit 1. As noted in Section 3.4, the Kemmerer Unit 1 facility's wastewater discharges would be managed in compliance with WYPDES permit requirements. Further considerations may be necessary during the NRC staff's environmental review of a future OL application should USO submit one to the NRC.

Small quantities of hazardous waste may be generated during plant operations, such as waste paints, laboratory packs, and solvents. The applicant indicates that Kemmerer Unit 1 would be a small quantity generator. The hazardous waste would be disposed of at licensed hazardous waste-management facilities (TerraPower 2024-TN10896).

The applicant explained in Section 5.10.3 of the ER (TerraPower 2024-TN10896) that operation of the site would result in small quantities of gaseous emissions from diesel generators. These emissions would occur mainly during startup, shutdown, and testing. Emissions projections for the standby diesel equipment are detailed in Table 3.4-3 of the ER. The site's air emissions would be regulated under a Wyoming Air Quality Standards and Regulations General Air Permit. Impacts on air quality are discussed in Section 3.2.

3.10.4 Environmental Impacts of Decommissioning

The review team expects decommissioning to generate nonradiological solid waste materials such as building rubble and debris, concrete and structural materials, wood, glass, metals, finished materials, and office equipment, materials, and supplies. The review team expects that the applicant would use BMPs to limit the amount of dust and other airborne particles. Liquid wastes from chemicals, solvents, and cleaning solutions would produce small amounts of volatilized chemicals, but BMPs would minimize their contribution to degradation of local air quality. The review team expects that the nonradiological waste impacts from decommissioning Kemmerer Unit 1 would be bounded by the analyses reported for nonradiological waste impacts in Section 4.3.10.4 of the decommissioning generic EIS (NRC 2002-TN7254), which concluded that these impacts would not be detectable.

3.10.5 Cumulative Impacts

Appendix E identifies past, present, and reasonably foreseeable future projects that could cumulatively contribute to the environmental impacts of the proposed action. Past, present, and foreseeable projects in the geographical area of interest could contribute to the cumulative impacts for nonradiological waste in a way similar to the construction activities at the Kemmerer Unit 1 site. Key past, present, and reasonably foreseeable actions that could affect nonradiological waste impacts from construction in the region would be other nonradiological waste from other construction projects in the area. However, there are at least three landfills within an 85 mi (136.8 km) radius of the site. Additionally, the applicant stated that there is adequate capacity at the Kemmerer landfill to support the project's anticipated nonhazardous solid waste related to construction, operation, and decommissioning (TerraPower 2024-TN11009).

3.10.6 Conclusions

The review team concludes that the potential direct, indirect, and cumulative nonradiological waste impacts of the proposed action would be SMALL. This conclusion is based upon the above analysis and is supported by site permits and BMPs for the construction of Kemmerer Unit 1.

3.11 Transportation of Radioactive Material

3.11.1 Affected Environment

This section addresses the radiological and nonradiological environmental impacts from normal operating (radiological) and accident conditions (radiological and nonradiological) resulting from the shipment of unirradiated fuel to the Kemmerer Unit 1 site, shipment of low-level radioactive waste (LLRW) and mixed waste to offsite disposal facilities during operations, and shipment of spent nuclear fuel to an interim storage facility or a permanent geologic repository during decommissioning. For the purposes of these analyses, the review team considered the proposed Yucca Mountain, Nevada, repository site as a surrogate destination for a monitored retrievable storage facility or permanent geologic repository.

3.11.2 Environmental Impacts of Construction

There are no environmental impacts related to the transportation of fuel and waste during construction because the fuel would not have yet been brought onsite and no radioactive waste would have been generated.

3.11.3 Environmental Impacts of Operation

The NRC performed a generic analysis of the environmental effects of the transportation of fuel and waste to and from LWRs in the "Environmental Survey of Transportation of Radioactive Materials to and from Nuclear Power Plants" (WASH-1238; AEC 1972-TN22) and in a supplement to WASH-1238 (NRC 1975-TN216), and found the impacts to be small. The results of WASH-1238 were codified into 10 CFR 51.52 Table S-4 (TN10253). These documents summarize the environmental impacts of transportation of fuel and waste to and from one LWR of 3,000 to 5,000 MWt (1,000 to 1,500 MWe). Impacts are provided for normal conditions of transport and accidents in transport for a reference 1,100 MWe LWR. Dose to transportation workers during normal transportation operations was estimated to result in a collective dose of

4 person-rem per reference reactor-year. The combined dose to the public along the route and the dose to onlookers were estimated to result in a collective dose of 3 person-rem per reference reactor-year.

In NUREG-0170, "Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes" (NRC 1977-TN417, NRC 1977-TN6497), the NRC evaluated the shipment of radioactive material, including shipments of unirradiated fuel, spent nuclear fuel, and radioactive waste to and from nuclear power plants. The NRC concluded in NUREG-0170 that the average radiation dose to the population at risk from normal transportation is a small fraction of the limits recommended for members of the general public from all sources of radiation other than natural and medical sources and is a small fraction of the natural background dose. In addition, the NRC determined that the radiological risk from accidents in transportation is small, amounting to about 0.5 percent of the normal transportation risk on an annual basis. The NRC also determined in NUREG-0170 that the environmental impacts of normal transportation of radioactive materials and the risks attendant to accidents involving radioactive material shipments are sufficiently small to allow continued shipments by all modes. The doses from radioactive waste accidents were negligible when compared to the doses from accidents involving spent nuclear fuel shipments. WASH-1238, NUREG-0170, and other LWR transportation assessments by the NRC form the assessment of the transportation of radioactive material to and from Kemmerer Unit 1.

Section 6.2 of the ER indicates that the Kemmerer Unit 1 reactor will not meet the conditions of 10 CFR 51.52(a) to directly apply Table S-4 (TN10253). USO provided a description and analysis of the environmental effects of transportation in accordance with 10 CFR 51.52(b) (TerraPower 2024-TN10896). The provided information has been considered as the basis for the review team's review. The information supplied by USO was compared to Table S-4 as part of the description provided under the requirements of 10 CFR 51.52(b).

3.11.3.1 Fresh High-Assay Low-Enriched Uranium Fuel Shipments

Over the life of the Kemmerer Unit 1 reactor, HALEU fuel, enriched between 5 weight percent (wt%) and 20 wt% uranium-235, would be used (DOE 2024-TN11670). Section 6.2 of the ER discusses the transportation of nuclear fuel to and from Kemmerer Unit 1 (TerraPower 2024-TN10896). Section 6.1 of the ER provides details about the uranium content of fresh HALEU fuel, the annual fuel requirements, and the expected number of annual shipments required to meet the needs of the Kemmerer Unit 1 reactor operating at standard operating levels. USO estimates that there would be two assemblies per package in ten packages per shipment. This would meet the estimated requirement of 27 assemblies per year in 2 shipments (average of 1.4 shipments) or less per year (TerraPower 2024-TN10896).

The source of the fresh fuel was not stated in the ER (TerraPower 2024-TN10896); however, the fuel production process was described in Section 6.1.1.2. USO has stated that Kemmerer Unit 1 would use a HALEU fuel type but has not publicly specified a maximum enrichment level. The NRC staff has performed a number of environmental evaluations of the shipment of fresh uranium fuel for LWRs operating at higher power levels for lower enrichment levels than the Natrium reactor. Incident free, or normal operation, transportation impact analysis assumed the transportation package meets the regulatory requirements of 10 CFR 71.47 (TN301), "External radiation standards for all packages." The accident analyses involving unirradiated fuel shipments accounted for radiological doses, along with nonradiological fatalities and injuries due to the physical impacts of an accident.

Normal conditions of transport, also called “incident-free shipping,” are transportation activities during which shipments reach their destination without releasing any radioactive material to the environment. Impacts from these shipments would be from low levels of radiation that penetrate the shielding provided by unirradiated fuel shipping containers. Very low radiation exposures at some level would occur to the following individuals: (1) persons residing along the transportation corridors between the fuel fabrication facility and the Kemmerer Unit 1 site or alternative sites; (2) persons in vehicles traveling on the same route as an unirradiated fuel shipment; (3) persons present at vehicular stops for refueling, rest, and vehicle inspections; and (4) transportation crew workers. Calculations to estimate these low levels are completed with very conservative assumptions, but the NRC staff identified some overly conservative data in the supplied analysis. The NRC staff considers the provided analysis to be conservative and to represent a bounding analysis of the impacts from the transportation of Natrium fuel and waste. USO has stated that it would provide an updated analysis at the OL stage. NUREG-2266 (NRC 2024-TN10333) completed an analysis of shipping unirradiated LWR fuel from Richland, Washington to Turkey Point, Florida. This is the longest distance for the transportation of fresh fuel within the U.S. That distance of approximately 3,187 mi (5,129 km) bounds the distance from GNF-A to Kemmerer Unit 1 of approximately 2,131 mi (3,430 km). In addition, the number of annual shipments analyzed in NUREG-2266 is 3 to 6 shipments per reactor-year (NRC 2024-TN10333). The number of shipments varies based on reactor design, with BWRs requiring enough fuel to reload half a core and PWRs requiring enough fuel to reload a third of a core. Therefore, these two factors, an increased distance and greater number of shipments, bound impacts considering the shipment characteristics for Kemmerer Unit 1. The radiological impacts for Kemmerer Unit 1 of transportation of fresh fuel should remain bounded by NUREG-2266 (NRC 2024-TN10333) determined impacts.

3.11.3.2 LLRW Shipments

Currently, four operating disposal facilities in the U.S. are licensed to accept LLRW from commercial facilities (NRC 2017-TN6518). They are located at Clive, Utah; Andrews County, Texas; near Barnwell, South Carolina; and near Richland, Washington. The Energy*Solutions* disposal facility at Clive, Utah, is licensed by the State of Utah to accept Class A LLRW from all regions of the U.S. The Waste Control Specialists site in Andrews County, Texas, is licensed to accept Class A, B, and C LLRW from the Texas Compact generators (Texas and Vermont) and from outside generators with permission from the Texas Compact. Energy*Solutions* Barnwell Operations located near Barnwell, South Carolina, accepts waste from the Atlantic Compact states (Connecticut, New Jersey, and South Carolina) and is licensed by the State of South Carolina to dispose of Class A, B, and C LLRW. U.S. Ecology, located near Richland, Washington, accepts LLRW from the Northwest and Rocky Mountain Compact States (Washington, Alaska, Hawaii, Idaho, Montana, Oregon, Utah, Wyoming, Colorado, Nevada, and New Mexico) and is licensed by the State of Washington to dispose of Class A, B, and C waste. The LLRW disposal sites that could accept LLRW shipments from Kemmerer Unit 1 are the Energy*Solutions* disposal facility at Clive, Utah, accepting Class A LLRW; U.S. Ecology, near Richland, Washington, accepting Class A, B, and C LLRW; and the Waste Control Specialists site in Andrews County, Texas for Class A, B, and C LLRW. In 2023, there was a total of approximately 3,290,069 ft^3 (93,164 m^3) of Class A LLRW, 6,292 ft^3 (178 m^3) of Class B LLRW, and 2,505 ft^3 (71 m^3) of Class C LLRW shipped to the disposal sites (DOE 2024-TN10120).

Section 6.2.2.3 of the ER (TerraPower 2024-TN10896) states that the average expected volume of LLRW is 2,070 ft^3 (58.6 m^3) per year. This estimate does not specify a receiving location; however, the total volume would be a small fraction of the annual amounts disposed of at LLRW disposal facilities.

The NRC has previously evaluated the environmental impact of the transportation of radioactive materials on public roads and by air. The NRC concluded in 1977 that when radioactive material transportation is performed in compliance with all Federal regulations, the impact of such transportation is small (NRC 1977-TN417). USO did not specify a maximum burnup level for the fuel at Kemmerer Unit 1. As a result, the environmental impacts from transportation would be reviewed during the OL stage of the licensing process should USO submit an OL application to the NRC.

The NRC has determined that the environmental impacts—radiological and nonradiological—of normal (i.e., incident free) transportation of radioactive materials and the risks and consequences of accidents involving radioactive material shipments in packages for which the NRC has issued design approvals meeting the performance standards of 10 CFR Part 71 were small (49 FR 9375-TN7951). Regulations, shipping practices, and package designs for transporting radioactive material have remained essentially unchanged since 1977. Transportation performed in conjunction with the operation of Kemmerer Unit 1 would be a small fraction of the annual volume of LLRW shipped to licensed disposal facilities and would be performed in compliance with U.S. Department of Transportation and NRC regulations. The NRC staff would review updated information if USO submits an OL application to determine the impacts from transportation of LLRW during Kemmerer Unit 1 operation.

3.11.3.3 Spent Nuclear Fuel Shipments

The NRC has extensively analyzed shipments of spent LWR fuel to a proposed geologic repository in a number of new reactor licensing reviews and as part of three away-from-reactor interim storage facility licensing reviews (i.e., Private Fuel Storage Facility, Holtec International Consolidated Interim Storage Facility, and the Interim Storage Partners Consolidated Interim Storage Facility). Prior NRC transportation analyses of spent LWR fuel environmental impacts in support of license renewal for burnup levels up to 62 GWd/metric tons of uranium (MTU) were found to still be bounded by Table S-4 of 10 CFR 51.52 (TN10253), as documented in NUREG1437, Revision 1 (2013 LR GEIS) and Revision 2 (NRC 2013-TN2654, NRC 2024-TN10161). The NRC also assessed LWR spent nuclear fuel shipments in NUREG-2125, which demonstrates that the NRC regulations continue to provide adequate protection of public health and safety during the transportation of spent nuclear fuel (NRC 2014-TN3231). The analysis of burnup level was further reviewed up to 80 GWd/MTU in NUREG-2266 (NRC 2024-TN10333). NUREG-2266 also assessed the impacts of transportation of fuel enriched up to 8 percent.

As noted in Section 6.2.2.2 of the ER (TerraPower 2024-TN10896), using the Regulatory Guide 4.2 limit of 0.5 MTU per shipment yields an estimated 4 shipments per year from Kemmerer Unit 1, with a potential increase to 12 shipments per year when the reactor reaches full power level (NRC 2018-TN6006). For comparison, the Clinch River Nuclear Site early site permit final EIS transportation analysis assessed 137 annual spent fuel shipments (NRC 2019-TN6136). Based on this comparison, spent fuel shipments associated with Kemmerer Unit 1 would be less than those for a traditional LWR.

Normal and accident analysis uses source terms for irradiated fuel stated in Table 6.2-5 of the ER. Source terms are compared to values used during the NRC's analysis of shipping accident tolerant fuels in NUREG-2266 (NRC 2024-TN10333) in Table 3-24. Most of the comparable values are lower than the values used in the NUREG-2266 calculations, which are expected to indicate minimal impact from the transportation of spent nuclear fuel (SNF) to a surrogate disposal location. Potential impacts from Natrium fuel activity/assembly from all values, including those that are higher than the NUREG-2266 bounding values, will be assessed in detail during the OL phase of the project. That distance of approximately 630 mi (1,013 km) is bounded by the distance analyzed in NUREG-2266 of approximately 2,975 mi (4,787 km).

Table 3-24 Comparison of Natrium Fuel Composition with NUREG-2266 Bounding Values

A2 + Radionuclides	NUREG-2266 Bounding 0.5 MTU Inventory (Curies)	Natrium Fuel Activity/Assembly (Curies)
Kr-85	8.04×10^3	2.89×10^2
Sr-90	8.07×10^4	1.27×10^4
Ru-106	1.76×10^4	5.29×10^{-8}
Cs-134	5.05×10^4	3.54×10^{-2}
Cs-137	1.10×10^5	1.88×10^4
Pu-238	7.98×10^3	8.79×10^2
Pu-239	2.61×10^2	3.89×10^2
Pu-240	3.99×10^2	1.54×10
Pu-241	1.03×10^5	5.76×10^2

Source: NRC 2024-TN10333, TerraPower 2024-TN10896

The impacts of normal transportation of fuel and waste are estimated in Tables 6.2-7 and 6.2-8 of the ER (TerraPower 2024-TN10896). These are reproduced in Table 3-25 and compared to the collective dose requirement stated in Table S-4 of 10 CFR 51.52 (TN10253). The collective dose to populations potentially affected by transportation related exposure from radiological materials is low when compared to Natrium fuel, but also when compared to the maximum and median impacts determined in NUREG-2266 (NRC 2024-TN10333).

Table 3-25 Population Impacts from Transportation of Radioactive Material

Transport Package	Public Onlookers	Residents Along Route
NUREG-2266 Irradiated Fuel Median Value (person-rem/Ref Reactor year)[(a)]	5.74	3.3×10^{-1}
NUREG-2266 Irradiated Fuel Maximum Value (person-rem/Ref Reactor year)[(a)]	7.61	4.49×10^{-1}
Unirradiated Natrium Fuel (person-rem/Ref Reactor year)	1.0×10^{-2}	1.1×10^{-2}
Irradiated Natrium Fuel (person-rem/Ref Reactor year)	3.5×10^{-1}	5.1×10^{-1}
LLRW (person-rem/Ref Reactor year)	7.7×10^{-1}	1.4×10^{-1}
Title 10 of the *Code of Federal Regulations* 51.52, Table S-4 (person-rem/Ref Reactor year)	3.0	3.0

LLRW = low-level radioactive waste.
(a) NUREG-2266 (NRC 2024-TN10333), Table E-2.

The values in Table 3-25 have been normalized to the average annual number of shipments. These values are for 4.1 shipments of unirradiated fuel, 12 shipments of irradiated fuel, and 75 shipments of radioactive waste.

As presented in ER Section 6.2 (TerraPower 2024-TN10896), the RADTRAN transportation risk code package was used to determine doses due to accidents involving shipments of irradiated fuel during transportation from the point of origin (Kemmerer Unit 1) to a proposed geologic repository used as a surrogate spent fuel disposal facility (i.e., the proposed Yucca Mountain geologic repository). The resulting calculated population dose risk is 5.6×10^{-6} person-rem per reference reactor year.

In addition to radiological accident impacts, non-radiological accident impacts due to transportation probabilities of occurrence of an accident, for physical injury, and fatalities are calculated based on the commercial event rates per unit distance and the round-trip distances for the transport of unirradiated fuel, irradiated fuel, and radioactive waste. Round-trip distances are used because a non-radiological event can occur even during the return trip despite no radioactive material being present. The estimated non-radiological impacts are presented in ER Table 6.2-9 and shown here in Table 3-26. These potential non-radiological accident impacts are very small and bounded by Table S-4.

Table 3-26 Non-Radiological Impacts of Transportation Accidents

Transport Package	Total Annual Distance (km)	Accident per RRY	Injury per RRY	Fatality per RRY
Unirradiated Fuel	2.78×10^4	1.0×10^{-2}	7.1×10^{-3}	3.4×10^{-4}
Irradiated Fuel	2.42×10^4	7.2×10^{-3}	5.4×10^{-3}	2.5×10^{-4}
Radioactive waste	1.75×10^5	5.7×10^{-2}	4.7×10^{-2}	1.3×10^{-3}

RRY = Reference Reactor year.
Source: (TerraPower 2024-TN10896)

3.11.4 Environmental Impacts of Decommissioning

Decommissioning activities would address the disposal of all remaining LLRW with shipments to licensed LLRW disposal facilities. Outside of contaminated systems, structures, and components, such as the reactor vessel and fuel handling equipment, the same LLRW generated during operations would be present at the time of cessation of operations and would be handled and shipped to LLRW disposal sites in the same manner as previously described (Section 3.11.3), such as the tritium capture materials and dry active wastes as Class A and B LLRW. The total amount of LLRW shipped to and from the site from all sources is estimated to be 2,070 ft^3 (58.6 m^3). Thus, as is noted for LLRW shipments during operations, this volume of material is a small fraction of the total annual volume of LLRW shipped to licensed disposal facilities and is performed in compliance with U.S. Department of Transportation and NRC regulations. If any SNF remains onsite and has not been transported to a storage or disposal facility, the remaining canistered SNF would be stored onsite at a licensed ISFSI.

The impacts associated with transporting equipment and materials (radiological and nonradiological) offsite during decommissioning of an LWR are analyzed in Section 4.3.17 of the decommissioning generic EIS and are found to be small (NRC 2002-TN665). As is the case for LWRs, the materials transported offsite would include all contaminated wastes generated onsite from the deconstruction of the Kemmerer Unit 1 facilities. Radiological impacts would include exposure of transportation workers and the general public along the transportation routes. Nonradiological impacts would include increased traffic volume, additional wear and tear on roadways, and potential traffic accidents. The Kemmerer Unit 1 facilities are smaller than the

LWR facilities evaluated in the decommissioning generic EIS and would have less contaminated material to be shipped to LLRW disposal sites. The nonradiological decommissioning transportation impacts would also be less than those presented in the decommissioning generic EIS due to the smaller size of the Kemmerer Unit 1 facilities. The NRC staff would review updated information in an OL application, should USO submit one, to determine transportation impacts during decommissioning.

3.11.5 Cumulative Impacts

In reviewing past, present, and reasonably foreseeable future projects in the region from Appendix E, no functioning or proposed nuclear facilities within the geographic area of interest for Kemmerer Unit 1 were noted.

3.11.6 Conclusions

The review team concludes that the potential direct, indirect, and cumulative impacts of the proposed action on the transportation of radioactive material would be SMALL. This conclusion is based upon the above analysis and is supported by the lack of transportation of nuclear fuel to the site during construction and the lack of nearby nuclear facilities in the geographic area of interest.

3.12 Uranium Fuel Cycle and Radiological Waste Management

3.12.1 Uranium Fuel Cycle

As presented in 10 CFR 51.51(a) (TN10253), a light-water-cooled nuclear power reactor can use Table S-3, “Table of Uranium Fuel Cycle Environmental Data,” as the basis for uranium fuel cycle environmental effects. While the Kemmerer Unit 1 Natrium reactor is not a light-water-cooled nuclear power reactor, USO would rely upon the same uranium fuel cycle addressed by Table S-3.

ER Section 6.1.2 states that the fuel-cycle-related environmental impacts estimated in WASH-1248, “Environmental Survey of the Uranium Fuel Cycle” (AEC 1974-TN23), codified in Table S-3 of 10 CFR 51.51, would bound the impacts of this proposed action as the same uranium fuel cycle will be relied upon for Kemmerer Unit 1. Table S-3 would bound the impacts of the Natrium reactor fuel, because of uranium fuel cycle changes since WASH-1248 (AEC 1974-TN23). These changes are due to:

- Increasing use of in situ leach uranium mining, which has lower environmental impacts than traditional mining and milling methods.
- Transitioning of U.S. uranium enrichment technology from gaseous diffusion to gas centrifugation, which requires less electrical usage per separative work unit.
- Current LWRs are using nuclear fuel more efficiently due to higher levels of fuel burnup, which results in less demand for mining and milling activities.
- Less reliance on coal-fired electrical generation plants, which results in less gaseous effluent releases from electrical generation sources supporting uranium fuel cycle activities.

Additionally, any fuel production facility must satisfy the regulatory requirements of 10 CFR Part 40 (TN4882), “Domestic Licensing of Source Material,” 10 CFR Part 70 (TN4883), “Domestic Licensing of Special Nuclear Material,” 10 CFR Part 71 (TN301), “Packaging and

Transportation of Radioactive Material," and 10 CFR Part 73 (TN423), "Physical Protection of Plants and Materials."

Two aspects of the front end of the uranium fuel cycle are different for the Kemmerer Unit 1 Natrium reactor. First, the Natrium reactor is designed to use a HALEU enrichment level fuel with up to 20 wt% uranium-235 (TerraPower 2024-TN10896). The applicant did not identify an expected annual amount of fresh fuel for the reactor, though it did state that the throughput for production of Natrium reactor fuel at GNF-A is expected to be approximately 18 MTU per year. This estimate is based on four 0.5 MTU shipments per year being needed over the 40-year licensed operating life (2 MTU/yr) compared to an average of 20 to 33 MTU/yr for current LWRs. Thus, due to the lower quantity of uranium needed, the impacts from uranium recovery and uranium conversion would be less than the impacts presented in WASH-1248 (AEC 1974-TN23) and, therefore, Table S-3 would be bounding.

Regarding the source of HALEU for the Kemmerer Unit 1 Natrium reactor, one potential source for the needed fuel would be DOE. DOE is supporting efforts regarding availability of HALEU for civilian domestic research, development, demonstration, and commercial use in the U.S. to prevent reliance on Russia or other foreign suppliers to fuel the next generation of nuclear power (86 FR 71055-TN7945). DOE has ongoing programs related to the HALEU supply chain. This includes the DOE HALEU Consortium, which was established by DOE to help secure a domestic supply of HALEU for commercial use. Members of the Consortium can request HALEU through the HALEU allocation process (DOE 2025-TN11671). DOE and its national laboratories are also in the process of recycling used nuclear fuel from government-owned research reactors to recover highly enriched uranium that can then be used to develop HALEU fuel (DOE 2024-TN11670).

The second aspect concerns the Natrium reactor fuel type, which is designed to use metallic fuel, a type of fuel that is not used in current LWRs. The source of fresh metallic fuel is expected to be GNF-A at a proposed Natrium Fuel Fabrication Facility. The manufacturing process for the Natrium reactor fuel is similar to the typical LWR fuel production process, but with one additional step of metallization (TerraPower 2024-TN10896). Metallization is not a typical step of the fuel production process. As stated in Section 6.1.1.4.5 of the ER (TerraPower 2024-TN10896), GNF-A expects that the fuel production process will be based on the sodium fast reactor metal fuel production methods developed by Idaho National Laboratory. The fabrication of Natrium reactor fuel would likely be bounded by these impacts due to the Kemmerer Unit 1 lower power level and annual fuel needs.

At this time, GNF-A does not have a license to manufacture Natrium reactor fuel. The environmental impacts of such fuel production would be assessed by the NRC during the license amendment request process to amend GNF-A's fuel fabrication license and would be addressed with regards to use at Kemmerer Unit 1 during the OL phase of the licensing process should USO submit an OL application to the NRC.

There are two types of Natrium reactor fuel—Type 1 and Type 1B. Type 1 fuel would be the initial operational fuel used in the reactor. At a later, yet to be determined, time, USO may switch to Type 1B fuel, but only after following the appropriate license amendment request process to amend the Kemmerer Unit 1 operating license. Use of Type 1B fuel would be contingent on prior NRC review, including environmental review, and approval.

USO has no plans for reprocessing spent Natrium reactor fuel (TerraPower 2024-TN10896) and would store the spent fuel onsite upon cessation of operation until final disposition. Kemmerer

Unit 1 would have enough spent fuel storage capacity within the Rx Building to support at least 10 years of licensed reactor operation. After 10 years of cooling, fuel would be transferred to dry storage and to an onsite ISFSI. The location of the ISFSI is yet to be determined, but it is expected to begin operation by 2040 (TerraPower 2024-TN10896).

3.12.2 Radiological Waste Management

Liquid and solid radioactive waste-management systems would be used for the collection, processing, packaging, and storage of the radioactive materials produced as byproducts during operation and decommissioning of Kemmerer Unit 1. Waste processing systems would be designed to meet the design objectives of 10 CFR Part 50 (TN249), “Domestic Licensing of Production and Utilization Facilities,” and 10 CFR Part 20 (TN283), “Standards for Protection Against Radiation.”

USO describes in ER Section 3.4.2 (TerraPower 2024-TN10896) the Kemmerer Unit 1 waste systems used to collect, process, store, monitor, and appropriately address the disposal of the radioactive waste. The human health impacts from potential emissions from the NI and the EI are discussed in Section 3.9.1.3.

3.12.2.1 Liquid Radiological Waste Management

USO describes the liquid radioactive waste processing system in ER Section 3.4.2.1 (TerraPower 2024-TN10896). The Kemmerer Unit 1 liquid waste management system (LWMS) is designed to collect, segregate, process, store, monitor, and sample liquid radioactive waste generated from normal operation. This includes any anticipated operational occurrences. The LWMS is designed for zero liquid release through the reuse or evaporation of processed liquid waste and this has no release points. The liquid radioactive waste-management system functions to control, collect, process, handle, store, and dispose of liquids containing radioactive material. This is managed using several process trains consisting of tanks, pumps, ion exchangers, and filters. The system is designed to handle both normal and anticipated operational occurrences. Normal operations include processing of the fuel handling building (FHB) sump, which collects from the following:

- spent fuel pool (SFP) cooling and purification leakage local sumps
- SFP liner leakage sump
- truck bay local sump
- solid radwaste processing system (RWS) dewatering leakage sump
- RAC towers rainwater collection sumps
- gaseous radwaste processing system (RWG) enclosure fire sprinkler sump
- various FHB floor drains
- sampling chemistry sink
- Fuel Auxiliary Building LWMS leakage sump
- Water Pool Fuel Handling System spent resins
- spent resins storage tank leakage sump
- resin dewatering from RWS

- NI heating ventilation and air conditioning system dehumidifier condensate
- process radiation monitor flush line drains
- personnel laundry decontamination
- decontamination hand washing and showers
- equipment decontamination

In addition, the radioactive waste-management system can handle effluent streams that typically do not contain radioactive material, but that may, on occasion, become radioactive (e.g., steam generator blowdown as a result of steam generator tube leakage).

No liquid radioactive waste is expected to be released from the LWMS. All liquid radioactive waste from the LWMS would be used as make up water for the SFP. Any excess clean water would be evaporated and released to the environment through the NI ventilation and air conditioning system. The exception to this is tritium, which could migrate into steam generator blowdown. As described in PSAR Table 9.1-6 (TerraPower 2024-TN10896), any amount released through this method would be indistinguishable from background.

3.12.2.2 Solid Waste Management and Onsite Fuel Storage

As described in ER Section 3.4.2.1 the RWS would manage typical nuclear facility operational wastes, originating as dry or wet wastes. Spent resins are considered to be wet wastes. The system is not intended to manage large waste materials such as core assemblies, spent nuclear fuel, and contaminated equipment. The dry waste stream would contain the following contaminated items:

- ventilation filters
- contaminated tools
- plastics
- miscellaneous dry materials (wood, cloth, paper)

Dry solid wastes would be collected, processed, and packaged as generated through normal plant operation, including anticipated operational occurrences. The RWS would be located in the FHB as described in PSAR Figure 9.3-1 (TerraPower 2024-TN10896) and would include a compaction skid, dewatering skid, and a storage area. The storage area would include enough space to store one fuel cycle’s worth of wastes. Estimates of expected volume or generation rates of radioactive waste are not provided in the ER, but shipment is described in Section 6.2 of the ER (TerraPower 2024-TN10896) and the impacts of transportation are discussed in Section 3.11 of this EIS. The majority of these isotopes are longer lived, so decay in storage would not provide significant reduction in total activity.

USO estimates that the SFP would accommodate 10 years of spent nuclear fuel and states that construction of an ISFSI is anticipated. Section 5.1.1 of the ER (TerraPower 2024-TN10896) estimates that an ISFSI may be needed as soon as 2040, which would require an ISFSI general license in accordance with 10 CFR 72.210 (TN4884) Subpart K.

A summary of solid waste management and onsite fuel storage is provided in ER Section 5.9.6, while offsite storage of spent fuel is discussed in ER Section 6.1.2.6.2 (TerraPower 2024-TN10896). USO notes in ER Section 6.1.2.6.2 that although advanced nuclear reactors were not directly included, the same assumptions in the Continued Storage generic EIS (NUREG-2157), such as the regulations in 10 CFR Part 71, Part 72, and Part 73 and assumptions for safe handling, storage, and management of spent fuel, are applicable to Kemmerer Unit 1 (TerraPower 2024-TN10896). As part of the solid waste management program and to maintain potential worker dose as low as is reasonably achievable, USO would implement practices to minimize to the greatest extent possible Class A, B, and C LLRW generation (TerraPower 2024-TN10896). More information regarding as low as is reasonably achievable and minimizing the production and processing of solid waste would be provided at the OL stage. USO has no other plans for temporary storage onsite at this time.

3.12.2.3 Gaseous Waste Management

The RWG functions to collect, process, and discharge radiation-bearing gaseous wastes. This is managed using a once-through, ambient-temperature, activated-carbon delay system. Radioactive isotopes of iodine and the noble gases xenon and krypton are created as fission products within the fuel rods during operation. The RWG provides holdup for decay of short-lived isotopes and additional holdup for longer-lived isotopes of noble gases, such as krypton and xenon. Holdup is provided through the use of carbon delay beds prior to release to the environment. Hold up times in the carbon delay beds can be found in PSAR Table 9.1-6. Additionally, the RWG filters particulates. The outflow from the RWG is transmitted to the heating ventilation and air conditioning system for release to the environment through the plant exhaust stack as a monitored release.

3.12.3 Cumulative Impacts

In reviewing past, present, and reasonably foreseeable future projects in the region (Appendix E), no functioning or proposed nuclear facilities within the geographic area of interest of Kemmerer Unit 1 were noted.

3.12.4 Conclusions

The review team concludes that the potential direct, indirect, and cumulative impacts of the proposed action on the uranium fuel cycle and radiological wastes would be SMALL. This conclusion is based upon the above analysis and is supported by there being no radioactive material present during construction.

3.13 Postulated Accidents

3.13.1 Design Basis Accidents and Severe Accidents

This section discusses the potential offsite radiological consequences of the Design Basis Accident (DBA) that could only occur during operations. The results of the analysis are compared to the reference values for stationary power reactor siting specified in 10 CFR Part 100 Subpart B, “Evaluation Factors for Stationary Power Reactor Site Applications on or After January 10, 1997” (10 CFR Part 100-TN282). The DBA is a conservative evaluation and represents the bounding impacts from the operation and decommissioning of Kemmerer Unit 1.

A DBA is an event that could result in radiological consequences exceeding those of any credible accident. It is a bounding calculation of the radiological consequences of postulated DBAs at the proposed Kemmerer Unit 1 site. The DBA is based on events unique to the design of Kemmerer Unit 1 that could hypothetically release radioactive materials into the environment.

The DBA is defined and analyzed in Chapter 3 of the PSAR (TerraPower 2024-TN10896). This definition is also stated in Table 5.11-2 of the ER. The offsite radiological consequences are stated in Table 5.11-19 of the ER. The highest estimated radiological consequences calculated at the EAB and low population zone meet the applicable dose criteria stated in 10 CFR 50.34, which specifies the following:

1. An individual located at any point on the boundary of the exclusion area for any 2-hour period following the onset of the postulated fission product release, would not receive a radiation dose in excess of 25 rem Total Effective Dose Equivalent.

2. An individual located at any point on the outer boundary of the low population zone, who is exposed to the radioactive cloud resulting from the postulated fission product release (during the entire period of its passage) would not receive a radiation dose in excess of 25 rem Total Effective Dose Equivalent.

A further analysis of severe accidents was performed by USO using initial probabilistic risk assessment and is described in Section 3 of the PSAR (TerraPower 2024-TN10896). USO identified two source terms that could result in an exceedance of the second criterion listed above. The probabilistic risk assessment process uses representative meteorological demographics, land use, and exposure pathway data to estimate a dose risk using the MELCOR Accident Consequence Code System (MACCS) computer code. These impacts are summarized from identified release categories and are summarized in Table 5.11-21 of the ER. The total impacts are summarized in Table 3-27.

Table 3-27 Summary of Severe Accident Impacts at Kemmerer Unit 1

Risk Factor	Total
Latent Cancer Fatality Risk ≤ EAB+10-mi (per reactor-yr)	5.06×10^{-12}
Air - Population Dose Risk (person-rem/reactor-yr)	9.21×10^{-5}
Water - Population Dose Risk (person-rem/reactor-yr)	3.23×10^{-6}
Food - Population Dose Risk (person-rem/reactor-yr)	5.82×10^{-5}
Total - Population Dose Risk (person-rem/reactor-yr)	1.53×10^{-4}
Economic Cost Risk ($/reactor-yr)	2.62×10^{-2}
Land Area Decontamination Risk (acre/reactor-yr)	1.86×10^{-8}

EAB = Equivalent Absorbed Activity.
Source: (TerraPower 2024-TN10896)

A summary of the postulated events and consequences is provided in ER Section 5.11 (TerraPower 2024-TN10896). The values provided in Table 5.11-22 quantify the risk from the severe accidents chosen to represent a bounding estimate of impacts. These values have been compared to the values provided in Appendix E of the NUREG-1437, Revision 2 (NRC 2024-TN10161) and other recently reviewed reactors and are shown in Table 3-28.

Table 3-28 Severe Accident Frequency and Dose Risk at Kemmerer Unit 1

Reactor	Core Damage Frequency (per Ryr)[a]	Dose Risk (person-rem per Ryr)[a]
Current Reactor Maximum[b]	2.4×10^{-4}	6.9×10
Current Reactor Mean[b]	3.1×10^{-5}	1.5×10
Current Reactor Median[b]	2.5×10^{-5}	1.3×10
Current Reactor Minimum[b]	1.9×10^{-6}	5.5×10^{-1}
AP1000[c] Reactor at the Turkey Point Site	2.4×10^{-7}	2.7×10^{-1}
ESBWR at the Fermi 3 Site[d]	1.7×10^{-8}	3.2×10^{-2}
U.S. APWR at the Comanche Peak Site[d]	1.2×10^{-6}	3.0×10^{-1}
U.S. EPR at the Calvert Cliffs 3 Site[d]	5.3×10^{-7}	3.5×10^{-1}
Natrium at the Kemmerer 1 Site[d]	1.4×10^{-8}	1.5×10^{-4}

AP1000 = Advanced Passive 1000; APWR = U.S. Advanced Pressurized Water Reactor; EPR = U.S. Evolutionary Power Reactor; ESBWR = Economic Simplified Boiling Water Reactor.
(a) To convert to person-Sv, divide by 100.
(b) Based on MACCS calculations for over 70 current plants at over 40 sites.
(c) The AP1000 is a pressurized-water reactor proposed for use at the Turkey Point site. Accident frequency and dose risk are calculated with MACCS code using Turkey Point site-specific input, Turkey Point Units 6 and 7 COL Application, Part 3 – Environmental Report (FPL 2014-TN4058).
(d) TerraPower 2024-TN10896.

Table 3-27 shows that the probability-weighted consequences of severe accidents for Kemmerer Unit 1 are small, even when compared to other advanced reactors. For perspective, Table 3-29 compares the health risks from severe accidents to larger reactors. The dose risks per reactor-year can be quantified to understand potential human health impacts, or latent cancer fatalities (LCF). The total severe accident risk of Kemmerer Unit 1 is equivalent to 5×10^{-12} LCF per year. This value is compared to other reactors in Table 3-29.

Table 3-29 Comparison of Average Latent Cancer Fatalities Risk Per Reactor-Year at Kemmerer Unit 1

Reactor Site	Average LCF Risk Per Reactor-Year[a]
Grand Gulf[b]	3×10^{-10}
Peach Bottom[b]	4×10^{-10}
Sequoyah[b]	1×10^{-8}
Surry[b]	2×10^{-9}
Zion[b]	1×10^{-8}
ESBWR at the Fermi 3 Site[c]	4×10^{-11}
U.S. APWR at the Comanche Peak Site[d]	3×10^{-10}
U.S. EPR at the Calvert Cliffs 3 Site[e]	2×10^{-10}
Kemmerer[f]	5×10^{-12}

APWR = U.S. Advanced Pressurized Water Reactor; EPR = U.S. Evolutionary Power Reactor; ESBWR = Economic Simplified Boiling Water Reactor; LCF = latent cancer fatalities.
(a) To convert person-rem to person-Sv, divide by 100.
(b) NUREG-1150 (NRC 1990-TN525).
(c) NUREG-2105, Vol. 1 (NRC 2013-TN6436).
(d) NUREG-1943, Vol. 1 (NRC 2011-TN6437).
(e) NUREG-1936, Vol. 1 (NRC 2011-TN1980).
(f) TerraPower 2024-TN10896.

3.13.2 Severe Accident Mitigation Analysis

As of the time of the submission of the Kemmerer Unit 1 CP application, USO has performed an initial severe accident mitigation alternative (SAMA) and severe accident mitigation design alternative (SAMDA) analysis. The SAMA/SAMDA cost-benefit analysis is a seven-step process based on the guidance in NUREG/BR-0184 (NRC 1997-TN676) and is also outlined in the SAMA license renewal guidance of NEI 05-01 (NEI 2005-TN1978). This process is usually intended for a 20-year license renewal period, but USO has applied the methodology to a 60-year (i.e., 40-year initial and 20-year renewal) reactor lifetime. USO has completed a couple of the steps, namely the determination of severe accident risk and the determination of costs associated with severe accident risks and the maximum benefit value from implementation of a mitigation.

USO applied NUREG-1530, Revision 1 to provide the dollar per person-rem to convert dose to a dollar value using a value of $8,200 per person-rem (NRC 2022-TN7859). This value was applied to exposure costs that are broken down into immediate and long-term doses to plant workers following an accident while onsite economic costs are those associated with cleanup, decontamination, and obtaining replacement power. The calculations used an evaluation period of 60 years, an electrical output of 500 MWe, a baseline discount rate of 7 percent, and a sensitivity discount rate of 3 percent. The maximum averted costs from ER Table 5.11-23 (TerraPower 2024-TN10896) are identified in Table 3-30.

Table 3-30 Severe Accident Mitigation Alternative Cost Risk Analysis at Kemmerer Unit 1

Cost Risk Discount	7 Percent	3 Percent
Offsite Total Exposure and Economic	$18.08	$35.74
Onsite Total Exposure and Economic	$411.91	$1,051.78
Maximum Averted Cost Risk	$430	$1,100

Source: (TerraPower 2024-TN10896)

The maximum averted costs indicate that the preliminary SAMA review has not identified a cost beneficial mitigation.

The NRC staff will conduct a thorough independent review of the Kemmerer Unit 1 safety-related structures, systems, and components, which it will document in its safety evaluation. The NRC staff will determine if the structures, systems, and components are designed, implemented, and maintained to ensure that they are available and reliable to perform their preventive or mitigative functions when needed so that the likelihood of serious consequences is small. If the NRC staff determines, as documented in its safety evaluation, that USO has met all of the relevant NRC regulatory requirements and, therefore, has demonstrated that Kemmerer Unit 1 would meet the regulatory standard of adequate protection of public health and safety, then the likelihood of accidents would be reliably controlled. The Kemmerer Unit 1 Natrium reactor is a first-of-a-kind reactor and the design would not be finalized until construction is nearly complete.

USO has stated that a full SAMA analysis would be performed at the OL stage of the licensing process. At that time, the NRC staff would perform a review of new and significant information, if an OL application is received. This would include a review of the complete SAMA/SAMDA analysis.

3.13.3 Environmental Impacts of Decommissioning

The review team assessed the impact of postulated accidents during operations in Section 3.13.1. During decommissioning, SNF and LLRW may be present onsite; however, the impacts of the maximum credible accident during operations should bound the impacts of accidents that remain applicable during decommissioning. The review team concludes that the potential direct, indirect, and cumulative radiological human health impacts of the proposed action during the period of operation and during decommissioning, along with cumulative impacts, would be minor and not noticeable (Section 3.9.1.6). This conclusion is based primarily on the fact that the Kemmerer Unit 1 Natrium reactor is estimated to have radiological effluent releases well below the NRC requirements for potential doses to members of the public (e.g., the nearest resident) with appropriate radiological environmental monitoring and because occupational doses would be less than annual dose limits under 10 CFR Part 20 (TN283) regulations. The NRC considered in Section 4.3.9 of the decommissioning generic EIS the potential impacts of radiological accidents, including spent-fuel-related accidents, resulting from decommissioning (NRC 2002-TN7254). The review team determined that the conclusions in the decommissioning generic EIS apply to the Kemmerer Unit 1 Natrium reactor and concludes that the impacts are minor and not noticeable. The review team also concludes that additional mitigation measures are not likely to be sufficiently beneficial to be warranted.

3.13.4 Cumulative Impacts

In reviewing past, present, and reasonably foreseeable future projects in the region from Appendix E, no functioning or proposed nuclear facilities within the geographic area of interest of Kemmerer Unit 1 were noted.

3.13.5 Conclusions

The review team concludes that the potential direct, indirect, and cumulative impacts of the proposed action on postulated accidents would be SMALL. This conclusion is based upon the above analysis and is supported by the fact that there is no radiological material present during construction and that the potential for radiological exposure would be less than the annual dose limits.

4 ALTERNATIVES

This section describes alternatives to granting a CP for Kemmerer Unit 1 and the environmental impacts of those alternatives. The need to compare the proposed action with alternatives arises from the requirement in Section 102(2)(C)(iii) of NEPA (TN661), which states that an EIS shall include alternatives to the proposed action, including the no-action alternative, that that are technically and economically feasible, and meet the purpose and need of the proposal. The NRC implements this requirement through regulations in 10 CFR Part 51 (TN10253) and in the Interim Staff Guidance to NUREG-1537 (NRC 2012-TN5527, NRC 2012-TN5528), which state that the EIS will include an analysis that considers and weighs the environmental effects of the proposed action, the environmental impacts of alternatives to the proposed action, and alternatives available for reducing or avoiding adverse environmental effects.

For the licensing of nuclear power reactors, the NRC staff considers a no-action alternative and a range of reasonable alternatives that may include alternative sites, alternative layouts of proposed facilities within a site, modification of existing facilities instead of building new facilities, alternative technologies, and alternative transportation methods (NRC 2012-TN5527, NRC 2012-TN5528). The applicant followed a systematic process for identifying a range of reasonable alternative sites for the proposed Kemmerer Unit 1 project, as outlined in Section 9.3 of the ER (TerraPower 2024-TN10896). The process involved systematic consideration of possible sites, leading to the identification of three reasonable sites: the proposed Kemmerer Unit 1 site; the Naughton 12 site south of and adjacent to the Naughton Power Plant in Lincoln County, Wyoming; and the Jim Bridger 22 site located in Sweetwater County, Wyoming. The applicant did not consider alternative layouts of the proposed facilities on these sites. There are many possible layouts for the proposed facilities within the sites, but none would substantially differ with respect to environmental impacts. Because none of the three sites presently contain existing facilities, the applicant did not consider opportunities to repurpose existing facilities in lieu of building new facilities.

Because the purpose and need for the proposed Federal action is to demonstrate and test new technologies, specifically the Natrium reactor, the applicant did not consider alternative technologies for Kemmerer Unit 1 (TerraPower 2024-TN10896).

The NRC staff evaluated the applicant's process for identifying reasonable alternatives to the proposed action and finds, as described below, the applicant's process to be reasonable. Specifically, the NRC staff finds that the applicant's process is analytical, logical, appropriate to the purpose and need identified in Chapter 1, and in keeping with the spirit and intent for identifying a range of reasonable alternatives for analysis in an EIS. Below, Section 4.1 addresses the environmental impacts from the no-action alternative and Section 4.2 addresses the potential alternative sites for the project, including potential environmental impacts from the alternative sites.

4.1 No-Action Alternative

Under the no-action alternative, the NRC would not issue a CP to USO for Kemmerer Unit 1. Therefore, the applicant would not be able to build a Natrium reactor to demonstrate its design features and safety functions. As such, the purpose and need for the proposed action would not be met. While not building Kemmerer Unit 1 might not necessarily preclude the future development of reactors using Natrium technologies, it could slow or impede the safe and efficient development of the technology. In the short term, at the Kemmerer Unit 1 site, none of the environmental effects associated with the NRC's authorization of construction of Kemmerer Unit 1 as described in Chapter 3 would occur under the no-action alternative. However, preconstruction impacts evaluated by DOE in the 2024 TFF and the 2025 Preconstruction EAs could occur. Additionally, under the no-action alternative, the proposed site would remain available for other government or private industrial development projects, and many of the environmental impacts resulting from land disturbance and building new industrial facilities on the site might still occur at some time in the future.

The need-for-power analysis in Chapter 5 discusses PacifiCorp's Integrated Resource Plan, which concludes that there is a need for power, particularly advanced nuclear energy, associated with the planned retirement of existing coal-fired facilities in the service area. If the no-action alternative were selected and Kemmerer Unit 1 was not constructed, this need for power would likely need to be met either through the extended operation of the Naughton Power Plant or the development of new generating capacity. The environmental impacts associated with the extended operation of existing assets or new generating assets could be substantial and greater than those associated with the proposed action.

4.2 Site Alternatives

4.2.1 Process for Identifying Reasonable Alternative Sites

The applicant followed the process described in Section 9.3 of the ER (TerraPower 2024-TN10896) to evaluate potential sites for the proposed facilities. The process followed applicable NRC guidance including Regulatory Guide 4.2, Revision 3, "Preparation of Environmental Reports for Nuclear Power Stations"; Regulatory Guide 4.7, Revision 3, "General Site Suitability Criteria for Nuclear Power Stations"; and NUREG-1555. The process also followed industry best practices, such as the Electric Power Research Institute "Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Energy Generation Facilities" (EPRI 2015-TN5285). This process involved defining business objectives and an ROI, screening the ROI to identify candidate areas, identifying potential sites within the candidate areas, identifying candidate sites through the application of suitability criteria, and finally selecting a proposed site and alternative sites.

The results of the applicant's siting process are summarized in Section 9.3.1 of the ER (TerraPower 2024-TN10896). Business objectives used to define the ROI included:

- ability to meet ARDP schedule
- ability to replace high carbon energy in a high carbon region or service area with carbon-free energy
- ability to provide energy storage in a region with a high penetration of renewable energy.

As a result, the applicant's ROI was defined as the PacifiCorp service territory, based upon proposed coal plant retirements and applicable renewable portfolio standards and because PacifiCorp is one of TerraPower's partners in the project.

To identify candidate areas, various health and safety and environmental criteria were applied, and areas inconsistent with the purpose and need or that could increase the risk to obtaining a license were screened out. This resulted in the identification of 12 candidate areas. These 12 candidate areas were then screened to identify optimum areas for siting the Natrium reactor. Areas at or near four identified coal sites (Jim Bridger, Naughton, Dave Johnston, and Wyodak

Power Plants) were carried forward as potential sites. The Wyodak power plant was subsequently eliminated because a parcel of suitable size to site the Natrium reactor was not identified there. This resulted in the identification of four potential sites—two at or near the Naughton Power Plant and one each at or near the Jim Bridger and Dave Johnston Power Plants. Suitability characteristics were applied to each of the four potential sites and the Dave Johnston site was eliminated based upon a lower ability to meet the project objectives and transmission grid congestion. As a result, the following three sites moved forward for detailed analysis in this EIS: the Naughton 19/20 site (Kemmerer Unit 1), the Naughton 12 site, and the Jim Bridger 22 site.

4.2.2 Affected Environment and Environmental Impacts for the Naughton 12 Site Alternative

4.2.2.1 Affected Environment

The Naughton 12 site is an undeveloped site located south of and adjacent to the Naughton Power Plant in Lincoln County, Wyoming, approximately 2.7 mi (4.3 km) northwest of the Kemmerer Unit 1 site. Similar to the proposed action, the Natrium reactor at Naughton 12 would consist of a closed-loop cooling system with an MDCT with makeup water coming from a 1.8 mi (4.3 km) pipeline from the Naughton Power Plant Raw Water Settling Basin, and with two 1.6 mi (2.6 km) transmission lines to connect the facility to the Naughton Power Plant switchyard. The Naughton 12 site is located on privately owned land that is zoned by Lincoln County for industrial use.

The facility footprint would require approximately 58 ac (23.5 ha), with additional acreage for site access, the makeup water pipeline, transmission corridors, and construction activities. The total amount of acreage assumed would be approximately 197 ac (79.7 ha) (TerraPower 2024-TN10896).

4.2.2.2 Environmental Impacts of Construction

Building the Natrium reactor at the Naughton 12 site would involve the conversion of approximately 197 ac (79.7 ha) of a combination of undeveloped and industrial land near an existing industrial site (TerraPower 2024-TN10896). This site's zoning allows for the development of a power plant, and the surrounding area has existing industrial development. Any visual impact is expected to be similar to that for the Kemmerer Unit 1 site.

Water resources available for use at the Naughton 12 site are from the same Green River Basin as for the Kemmerer Unit 1 site. The site would discharge wastewater to an unnamed tributary to the NFLMC near the Naughton Power Plant and would require the issuance of an NPDES permit for operation (TerraPower 2024-TN10896). Construction of the Natrium reactor at the Naughton 12 site would result in unavoidable impacts to water resources including streams (specifically, an unnamed tributary to the NFLMC), wetlands, and 100-year floodplains. To maintain the drainage associated with the stream during and after building activities, the stream would need to be permanently rerouted to a different location. Building activities would need to minimize and avoid surface water impacts to the greatest extent possible to protect water quality, maintain existing hydrologic functions, and protect aquatic communities on the site. Nine federally listed species have the potential to occur in the vicinity of the Naughton 12 site (FWS 2025-TN11656)—yellow-billed cuckoo, North American wolverine, Ute ladies'-tresses, monarch butterfly, Suckley's cuckoo bumblebee, bonytail, Colorado pikeminnow, humpback chub, and razorback sucker. However, no species that are federally listed, proposed for listing, or candidates for listing have been observed by biologists during recent reconnaissance surveys of wildlife, wetland surveys, or aquatic surveys (TerraPower 2024-TN10896). The site lies within WGFD-designated land within the crucial winter, yearlong pronghorn range (WGFD 2015-TN11611). The site is outside sage-grouse core habitat area (ESRI 2025-TN11657). Construction activities at the Naughton 12 site would physically disturb stream channels, wetlands, and floodplains, thereby potentially affecting aquatic ecological communities. Some of these impacts would be temporary and limited to the duration of construction, while other impacts would continue during operations.

Anticipated socioeconomic impacts are expected to be the same as those for the Kemmerer Unit 1 site. Workforce sizes, types, and settlement patterns would be the same. Because of the proximity of the Naughton 12 site and the Kemmerer Unit 1 site, both would be drawing workforce from the same communities, and the increased demands on housing and community services would be the same (TerraPower 2024-TN10896).

There are several known archaeological sites located on or near the Naughton 12 site (TerraPower 2024-TN10896). Because no systematic field inventory of the area has been completed, there may be additional unidentified sites. However, based on the NRC staff's preliminary review and available data, similar to the Kemmerer Unit 1 site, it is anticipated that construction at the Naughton 12 site has the potential to impact historic and cultural resources given the known presence of archaeological sites in this portion of southwest Wyoming and the documented ethnographic use of this landscape by Indian Tribes (see TerraPower 2024-TN10896).

For most of the other resources, the impacts of constructing at the Naughton 12 site would be similar to those for the Kemmerer Unit 1 site, as presented in Chapter 3. Air quality, public and occupational health, and nonradiological waste management would have similar construction impacts regardless of location. Since no radiological material would be present onsite during construction, no related impacts would be expected at the Kemmerer Unit 1 site or any of the alternative sites.

4.2.3 Affected Environment and Environmental Impacts for the Jim Bridger 22 Site Alternative

4.2.3.1 Affected Environment

The Jim Bridger 22 site is an approximately 442 ac (178.9 ha) site located in Sweetwater County, Wyoming, approximately 23.5 mi (37.8 km) east of Rock Springs and 7 mi (km) north of Point of Rocks. Similar to the proposed action, the Natrium reactor at Jim Bridger 22 would consist of a closed-loop cooling system with an MDCT. Makeup water would come from a 3.9 mi (6.3 km) pipeline from the Jim Bridger Reservoir and two 3.7 mi (6.0 km) transmission lines would connect the site to the Jim Bridger coal plant switchyard. The Jim Bridger 22 site is located on privately owned land that is zoned for mineral development; power plants on such lands are conditional use subject to approval by the Sweetwater County Planning and Zoning Commission. The water pipeline and transmission corridors would cross Bureau of Land Management-administered lands and would therefore be subject to Bureau of Land Management ROW grants.

The facility footprint would require approximately 63 ac (25.5 ha), with additional acreage for site access, the makeup water pipeline, transmission corridors, and construction activities. The total amount of acreage assumed would be approximately 278 ac (112.5 ha) (TerraPower 2024-TN10896).

4.2.3.2 Environmental Impacts of Construction

Building the Natrium reactor at the Jim Bridger 22 site would involve the conversion of approximately 278 ac (112.5 ha) of previously undeveloped land to industrial use (TerraPower 2024-TN10896). This site's zoning allows for the development of a power plant, and the surrounding area has existing industrial development. Any visual impact is expected to be similar to that for the Kemmerer Unit 1 site.

Water resources available for use at the Jim Bridger 22 site are from the same Green River Basin as for the Kemmerer Unit 1 site. The site would use evaporation ponds due to a lack of discharge point to a nearby waterway; therefore, this site would not require an NPDES permit for operation (TerraPower 2024-TN10896). The site would require significant earthwork based on the general topography of the site, thereby disturbing larger areas of undisturbed landscape as compared to the proposed action; however, any proposed hydrological alteration to the site would be minimal assuming mitigation for hydrologic impacts meets Federal, State, and local requirements.

Construction of the Natrium reactor at the Jim Bridger 22 site would involve the permanent loss of some sagebrush shrub-scrub habitat and the displacement of common sagebrush-associated wildlife species. Eight federally listed species have the potential to occur in the vicinity of the Jim Bridger 22 site (FWS 2025-TN11658)—yellow-billed cuckoo, Ute ladies'-tresses, monarch butterfly, Suckley's cuckoo bumblebee, bonytail, Colorado pikeminnow, humpback chub, and razorback sucker. The site is within WGFD-designated lands within the crucial winter, yearlong pronghorn range and is outside sage-grouse core habitat areas as described for the preferred site (Section 3.6.1.2).

Most land-disturbing activities would be confined to upland areas, and with the implementation of approved BMPs, it is not expected that construction activities at the Jim Bridger 22 site would affect aquatic ecological communities.

Anticipated socioeconomic impacts are expected to be similar to the proposed action (TerraPower 2024-TN10896). However, it would be expected that the regional population would continue to be considered a low population area with a population increase of 1.9 percent. With the increase in both direct and indirect jobs, local unemployment is expected to decrease. It is expected that an increase of tax revenues would occur during the construction period. An increase in traffic may occur during peak commuting hours but would be mitigated by staggering arrival and departure times. An increased demand for permanent housing may occur, causing existing housing prices to increase and the construction of more housing units within the area; however, based on the current inventory of the region, sufficient housing for the incoming workforce is available. It is not expected that public services would be materially impacted by the construction of the Natrium reactor at the Jim Bridger 22 site.

There are several known archaeological sites located on or near the Jim Bridger 22 site (TerraPower 2024-TN10896), including historic properties within the direct APE. Because no systematic field inventory of the area has been completed, there may be additional unidentified sites. Based on the review team's preliminary review and available data, it is anticipated that the

Jim Bridger 22 site has the potential to affect historic and cultural resources, including archaeological properties. The development of the Jim Bridger 22 site may require a Programmatic Agreement or MOA with the Wyoming SHPO (among other consulting parties) to address potential impacts to cultural resources that are eligible for listing in the NRHP within the project APE.

For most of the other resources, the impacts of construction at the Jim Bridger 22 site, as well as the cumulative impacts for all resources, would be similar to those for the Kemmerer Unit 1 site, as presented in Chapter 3. Air quality, public and occupational health, and nonradiological waste management would have similar construction impacts regardless of location. Since no radiological material would be present onsite during construction, no related impacts would be expected at the Kemmerer Unit 1 site or any of the alternative sites.

4.3 Cost–Benefit Analysis of the Alternatives

A principal objective of NEPA is for each Federal agency to consider in its decision-making process the environmental impacts of the proposed agency action and a reasonable range of alternatives. Specifically, Section 102(B) of NEPA (TN661) requires all Federal agencies, to the fullest extent possible, to:

> identify and develop methods and procedures…, which will ensure that presently unquantified environmental amenities and values may be given appropriate consideration in decisionmaking along with economic and technical considerations (TN661).

The purpose of this section is to identify potential societal benefits and costs of the proposed agency action and a reasonable range of alternatives. This section focuses on benefits and costs of importance to inform the decision-making process. This section compares the impact conclusions reached in this EIS.

4.3.1 Benefits

Benefits of the project include:

- addressing need for power
- reducing emissions compared to similarly sized fossil-fuel powered units
- demonstrating the Natrium reactor technology
- providing flexible and reliable power generation to meet demand
- increasing tax payments and revenue to the local economy

4.3.2 Costs

Costs of the project include:

- economic costs (capital costs for engineering, procurement, and construction, and annual operating expenses); and
- impacts to land use resources, water resources, ecological resources, socioeconomics (in-migrating workers and families – increased demand for housing, municipal water, and other

public services), historic and cultural resources, air quality, and nonradiological and radiological health and waste management, as discussed in Chapter 3.

4.3.3 Summary of Benefits and Costs

On the basis of the environmental impact assessments summarized in this EIS, the review team concludes that constructing, operating, and decommissioning Kemmerer Unit 1 would have accrued benefits that would outweigh the economic, environmental, and social costs. This conclusion applies regardless of whether the project is sited at the Kemmerer Unit 1 site or at one of the two alternative sites.

4.4 Comparison of the Potential Environmental Impacts

Table 4-1 below tabulates the review team’s conclusions regarding the significance of potential environmental impacts for each environmental resource area affected by each alternative evaluated in detail in this EIS. Each conclusion presented in the table is inclusive of direct, indirect, and cumulative impacts of the construction of the Natrium reactor. Potential environmental impacts from the preferred alternative (Kemmerer Unit 1) would be SMALL for most environmental resource areas but would be greater than SMALL for historic and cultural resources, socioeconomics, and terrestrial ecological resources. These conclusions reflect that building the Natrium reactor at the Kemmerer Unit 1 site may require the disturbance of surface and subsurface archaeological resources, may impact housing and traffic, and may contribute to loss of terrestrial habitat. Additionally, construction-related activities, purchases, and workforce expenditures would generate several types of taxes including an estimated increase in Lincoln County’s collected property tax, which is anticipated to be a significant beneficial impact, thereby benefiting the socioeconomic profile of the area.

Table 4-1 Comparison of Environmental Impacts of Alternatives for Kemmerer Unit 1 Evaluated in Detail

Resource Area	No-Action	Kemmerer Unit 1 (Naughton 19/20)	Naughton 12	Jim Bridger 22
Land Use and Visual Resources	SMALL to LARGE	SMALL	SMALL	SMALL
Air Quality	SMALL to MODERATE	SMALL	SMALL	SMALL
Hydrology and Water Resources	SMALL to MODERATE	SMALL	MODERATE	SMALL
Aquatic Ecological Resources	SMALL to LARGE	SMALL	MODERATE to LARGE	SMALL
Terrestrial Ecological Resources	SMALL to LARGE	MODERATE	MODERATE	MODERATE
Historic and Cultural Resources	MODERATE to LARGE	MODERATE to LARGE	MODERATE to LARGE	MODERATE to LARGE
Socioeconomics	MODERATE to LARGE	MODERATE to LARGE	MODERATE to LARGE	MODERATE to LARGE
Public and Occupational Health	SMALL	SMALL	SMALL	SMALL

Table 4-1 Comparison of Environmental Impacts of Alternatives for Kemmerer Unit 1 Evaluated in Detail (Continued)

Resource Area	No-Action	Kemmerer Unit 1 (Naughton 19/20)	Naughton 12	Jim Bridger 22
Nonradiological Waste Management	SMALL	SMALL	SMALL	SMALL
Uranium Fuel Cycle and Radiological Waste Management	SMALL	SMALL	SMALL	SMALL
Transportation of Radioactive Material	SMALL	SMALL	SMALL	SMALL
Postulated Accidents	SMALL	SMALL	SMALL	SMALL

For many resource areas, the Naughton 12 and the Jim Bridger 22 sites would have impacts similar to those of the proposed action. Specifically, both the Naughton 12 and the Jim Bridger 22 sites would require the disturbance of soils containing surface and subsurface archaeological resources and would generate several types of taxes benefiting the socioeconomic profile of the area and thus have a MODERATE to LARGE impact to those resources. The Naughton 12 site would require filling a wetland and relocating an intermittent stream near the Naughton Power Plan, thereby potentially affecting water and aquatic resources and causing a MODERATE to LARGE impact to those resources.

Based on the analysis presented above and the significance conclusions presented in Table 4-1, the review team concludes that there are no environmentally preferrable alternatives to the proposed action that meet the purpose and need for the proposed action. Although the no-action alternative might avoid some of the impacts described for the proposed action in the analysis presented in Chapter 3, the no-action alternative would not meet the purpose and need for the proposed action. Because the review team did not identify any environmentally preferrable alternatives that meet the purpose and need for the proposed action, the review team concludes that there is no obviously superior alternative to the proposed action from an environmental perspective.

5 NEED FOR POWER

The purpose and need for the proposed action is to demonstrate the Natrium reactor while ultimately replacing electricity generation capacity in the PacifiCorp service area following planned retirement of existing coal-fired facilities and providing operational flexibility through energy storage to complement a region with a high penetration of renewables. The PacifiCorp 2023 Integrated Resource Plan (IRP) provides an analysis on which the NRC staff relied to reach its conclusion that there is a need for power from Kemmerer Unit 1 (PacifiCorp 2023-TN11034). The IRP analysis shows a need for advanced nuclear energy as part of its least-cost, least-risk preferred portfolio that will reduce coal-fueled generation capacity by over 2,999 MW by 2032 (PacifiCorp 2023-TN11034). The following sections discuss the need for power in the context of PacifiCorp's and TerraPower's determination (PacifiCorp 2023-TN11034; TerraPower 2024-TN10896).

Chapter 8 of NUREG-1555 provides guidance for the review and analysis of the need for power for a proposed nuclear power plant (NRC 2007-TN614). The guidance states that: "Affected States or regions continue to prepare need-for-power evaluations for proposed energy facilities. The NRC will review the evaluation for the proposed facility and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the State's or region's need-for-power evaluation is found acceptable, no additional independent review by NRC is needed, and the State's analysis can be the basis for ESRPs [Environmental Standard Review Plans] 8.2 through 8.4" (NRC 2007-TN614).

With regard to a need-for-power review, the NRC staff determines whether an independently derived needs determination meets the four acceptability criteria and, if it does, reports the conclusions of that independently derived determination. No independent assessment of the relevant service area's need for power is necessary for the NRC staff to meet its responsibility under NEPA (TN661).

5.1 <u>Description of the Power System</u>

This section characterizes the institutional and physical characteristics of the PacifiCorp system. Section 5.1.1 describes the current power system, including geographic considerations, and regional characteristics. Section 5.1.2 provides an assessment of the PacifiCorp analytical process in the context of the NRC's four acceptability criteria.

5.1.1 Description of the PacifiCorp System

PacifiCorp, a wholly owned subsidiary of Berkshire Hathaway Energy, owns approximately 12,000 MW of generation capacity from a diverse mix of hydroelectric, wind, natural gas, coal, solar, and geothermal resources. PacifiCorp, through subsidiaries Pacific Power and Rocky Mountain Power, serves approximately 2.1 million customers in six States—Utah, Oregon, Washington, Wyoming, Idaho, and California—and within these States serves customers in a total of 90 counties (Figure 5-1) (PacifiCorp 2023-TN11034, PacifiCorp 2023-TN11036).

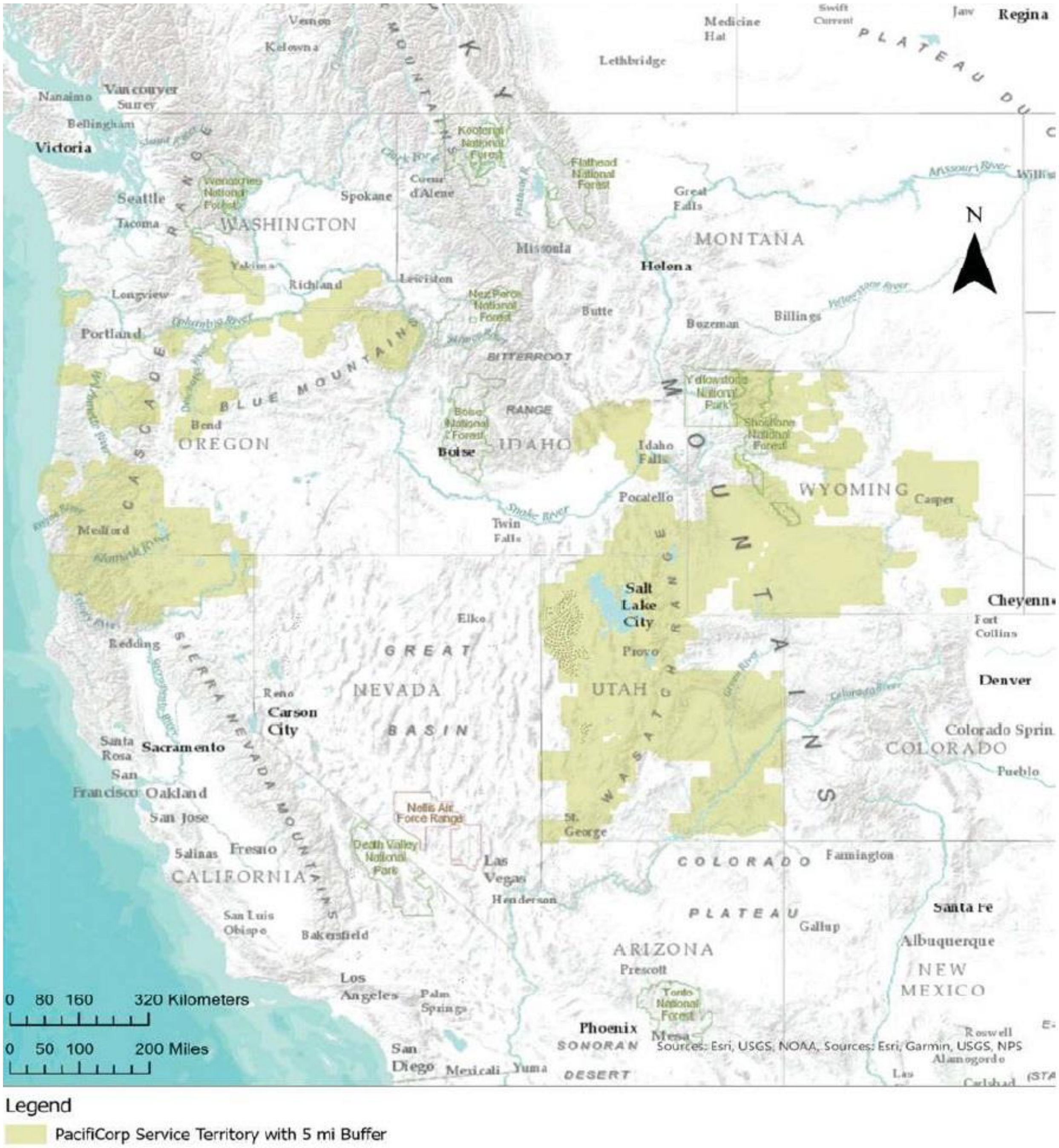

Figure 5-1 PacifiCorp Service Area. Source: TerraPower 2024-TN10896.

PacifiCorp's power system operates in a multifaceted market. Operations and costs are tied to a larger electric system known as the Western Interconnection, which functions, on a day-to-day basis, as a geographically dispersed marketplace. The Western Electricity Coordinating Council (WECC) is the regional entity responsible for the Western Interconnection and includes Wyoming. The WECC is regulated by the North American Electric Reliability Corporation (NERC) with oversight from the Federal Energy Regulatory Commission. The WECC is required by NERC to monitor and enforce reliability standards by users, owners, and operators of the bulk power system.

PacifiCorp balances its short-term resource supply and retail demand by transacting with neighboring balancing authority areas and other counterparts. Balancing authorities ensure, in real time, that power systems' demand and supply are balanced and are responsible for maintaining operating conditions under mandatory reliability standards issued by NERC. The PacifiCorp transmission network includes 17,100 liner mi (27,519.9 km) across 10 States and is highly integrated with other transmission systems across the western U.S. (PacifiCorp 2023-TN11034). During 2022, PacifiCorp had total summer capacity resources of approximately 11,029 MW, consisting of installed capacity of 9,445 MW including residential, commercial, and industrial customers (TerraPower 2024-TN10896).

5.1.2 Evaluation of the PacifiCorp Evaluation Process

The NRC staff determined whether the analytical process and need-for-power evaluation performed by PacifiCorp meets the four NRC criteria for being (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty (see NUREG-1555; NRC 2013-TN3547). The following describes how the PacifiCorp IRP need-for-power analysis addresses the four NRC criteria.

5.1.2.1 Systematic

The NRC staff determined that PacifiCorp used a systematic process for determining the need for the proposed Kemmerer Unit 1. PacifiCorp files an IRP on a biennial basis with State utility commissions of Utah, Oregon, Washington, Wyoming, Idaho, and California (PacifiCorp 2023-TN11034; TerraPower 2024-TN10896). The primary objective of the IRP is to identify the best mix of resources to serve customers in the future. The best combination of resources is determined through analysis that measures cost and risk. The least-cost, least-risk resource portfolio, defined as the preferred portfolio, is the portfolio that can be delivered through specific action items at a reasonable cost and with manageable risks while considering customer demand for clean energy and ensuring compliance with State and Federal regulatory obligations. The 2023 IRP is developed using State-specific standards and guidelines and provides the basis for need-for-power evaluation (PacifiCorp 2023-TN11036).

The 2023 IRP provides an up-to-date forecast and expected resource portfolio, respective of all known current conditions. PacifiCorp accomplishes this through an assessment of the planning environment, resulting in a determination of the load and energy positions for the front 10 years of the 20-year planning horizon. Load forecasts used in the modeling and analysis of the IRP employ econometric models using historical data and inputs such as economic growth, weather, seasonality, and other customer usage and behavior changes (PacifiCorp 2023-TN11036).

5.1.2.2 Comprehensive

The NRC staff determined that the analysis of issues affecting the need for power in the PacifiCorp service area is comprehensive. This conclusion is based on the fact that the factors analyzed by PacifiCorp in the 2023 IRP include electric system reliability, resource adequacy, the basis for forecasts and cost assumptions, evaluations of alternatives, cost-effectiveness, and implemented load-reduction programs such as new energy efficiency and demand-side management programs (PacifiCorp 2023-TN11036). The load forecast is developed by forecasting the monthly sales by customer class for each jurisdiction. Customer forecasts are based on a combination of regression analysis and exponential smoothing techniques using historical data. PacifiCorp identified all existing energy generators by technology, newly proposed resource additions, new construction, and potential closures over the time period. All analyses are performed with forecasting and statistical modeling and methodological approaches appropriate for the power industry.

5.1.2.3 Subject to Confirmation

The NRC staff determined that the processes, models, and estimates presented in the 2023 IRP were subject to a confirmation process supported by comprehensive data analysis and an extensive public-input process. The IRP was developed through an open and extensive public review process, with input from a diverse group of stakeholders including customer advocacy groups, community members, regulatory staff, and other interested parties, allowing for both confirmation and feedback regarding analyses. The 2023 IRP includes input from stakeholders and presented findings from a broad range of studies and technical analyses (PacifiCorp 2023-TN11034).

5.1.2.4 Responsive to Forecasting Uncertainty

The resource portfolios for the 2023 IRP include forecasting uncertainties such as the effects from current Federal emissions regulations and pending Federal regulations on new source review and GHG emissions. A planning resource margin of 13 percent was also applied (TerraPower 2024-TN10896). The planning resource margin represents an incremental capacity requirement, applied as an increase to the obligation to ensure that there will be sufficient capacity available on the system to manage uncertain events, such as weather and outages, and known requirements, such as operating reserves (PacifiCorp 2023-TN11036). PacifiCorp developed resource portfolios that quantify the long-term cost trends and uncertainties under varying potential sensitivities while understanding the fundamental strengths and weaknesses of various energy resources. Therefore, the NRC staff determined that the factors and planning resource margin relied upon in the 2023 IRP are responsive to forecasting uncertainty.

5.2 Determination of Demand

The current and forecasted baseload and peak power demand, along with how the capacity and energy of Kemmerer Unit 1 would be used, is discussed in this section. PacifiCorp's assessment of its load and resource balance, including long-term forecasts for both energy and coincident peak load, are integral inputs to its IRP analysis.

Capacity balances are an input to the IRP analysis. The balances comprise a year-by-year comparison of projected loads against the existing resource base, with and without available market purchases, assumed coal unit retirements, and incremental new energy efficiency savings from the preferred portfolio before adding new generating resources (PacifiCorp 2023-TN11034).

The capacity balance is developed by first determining the system coincident peak load for each of the first 10 years of the planning horizon. Then, the annual firm capacity availability of the existing resource is determined for each of these annual system summer and winter peak periods, as applicable, and summed as follows:

Existing Resources = Thermal + Hydro + Renewable + Storage + Firm Purchases + Qualifying Facilities − Firm Sales

The peak load, private generation, demand response, existing energy efficiency, and new energy efficiency (from the preferred portfolio) are netted together for each of the annual system summer and winter peaks, as applicable, to compute the annual peak obligation:

Obligation = Load − Private Generation − Demand Response − New and Existing Energy Efficiency

The level of reserves to be added to the obligation is then calculated. This is accomplished by taking the net system obligation as calculated above multiplied by the 13 percent planning reserve margin adopted for the 2023 IRP. The formula for this calculation is as follows:

Planning Reserves = Obligation × Planning Reserve Margin

Finally, the annual capacity position is derived by adding the computed reserves to the obligation and then subtracting that amount from existing resources, including available market purchases, as shown in the following formula:

Capacity Position = (Existing Resources + Available Market purchases) − (Obligation + Planning Reserves) (PacifiCorp 2023-TN11034)

Table 8.2-4 through Table 8.2-7 of the ER show the annual capacity balances and component line items for the summer peak and winter peak (TerraPower 2024-TN10896).

5.2.1 Factors Influencing Forecast Demand

This section discusses key factors affecting the future demand for electricity that PacifiCorp considered in the 2023 IRP.

5.2.1.1 Projected Growth

The principal factors affecting the change in electricity demand over time are changes in the number and type of customers needing power. Electrical demand and energy usage in the PacifiCorp service area are compared to regional population growth. On average, non-California Independent Service Organization WECC regional demand grew 1.1 percent in 2022 to 469,000 MWh, and demand is expected to continue growing to approximately 474,000 MWh in 2023 (PacifiCorp 2023-TN11034). Generally, non-California Independent Service Organization WECC utilities have adjusted their 5-year load expectation up for 2 reasons. The first reason is the broad sector emissions reductions targets, which are electrifying residential, transportation, and industrial processes. The second reason is population growth in the Pacific Northwest and Arizona as a result of people moving for job opportunities and lower costs of living. Interconnection-wide peak-hour demand occurs in the summer. Based on data submitted by balancing authorities, the peak demand for the Western Interconnection is expected to grow from 175 gigawatts in 2023 to 194 gigawatts in 2032, an increase of almost 11 percent (PacifiCorp 2023-TN11034).

5.2.1.2 Demand-Side Management

Demand-side management refers to energy conservation and efficiency programs that do not require new generating capacity. Demand-side management programs include reducing energy demand through consumer behavioral changes or through altering the characteristics of the electrical load. These programs can be initiated by a utility, transmission operators, the State, or other load-serving entities. In general, residential electricity consumers have been responsible for the majority of peak load reductions, and participation in most demand-side management programs is voluntary.

For planning purposes, PacifiCorp classifies demand-side management resources into four categories—changing energy use during peak periods (demand response), intensity (energy efficiency), timing (price response and load shifting), and behaviors (education and information). These resources are captured through programmatic efforts that promote efficient electricity use through various intervention strategies and programs. These programs would reduce the need to buy reserve power on the market and create greater customer benefits. Ongoing conservation and cost-effective, demand-response initiatives would seek to deliver 799 MW of energy efficiency between 2023 and 2026 and 372 MW of demand response between 2023 and 2026 (PacifiCorp 2023-TN11034). A summary of demand-side management resources are provided in Table 8.3-8 of the ER (TerraPower 2024-TN10896). Specific details for each category are described below:

- Demand Response—Resources from fully dispatchable or scheduled firm capacity produce offerings and programs: Program examples include residential and small commercial central air conditioner load control programs that are dispatchable and irrigation load management and interruptible or curtailment programs (which may be dispatchable or scheduled firm, depending on the particular program design or event noticing requirements).
- Energy Efficiency—Resources from non-dispatchable, firm energy, and capacity product offering and programs: Energy efficiency programs are energy and related capacity savings, which are achieved through facilitation of technological advancements in equipment, appliances, and structures or repeatable and predictable voluntary actions on a customer's part to manage the energy use at their business or home. These programs generally provide financial incentives or services to customers to improve the efficiency of existing or new residential or commercial buildings.
- Price Response and Load Shifting—Resources from price-responsive energy and capacity product offerings and programs: Price response and load-shifting programs seek to achieve short duration (hour by hour) energy and capacity savings from actions taken by customers voluntarily, based on a financial incentive or signal.
- Education and Information—Non-incentivized behavioral-based savings achieved through broad-based energy education and communication efforts. The program objectives are to help customers better understand how to manage their energy usage through no-cost actions such as conservative thermostat settings and turning off appliance, equipment, and lights when not in use (PacifiCorp 2023-TN11034).

5.2.1.3 Climate Change

PacifiCorp's load forecast is based on historical weather, adjusted for expectations and impacts from climate change. The historical weather is defined by the 20-year period of 2002 through 2021. The analysis uses the data from the historical period and adjusts the percentile of the data to achieve the expected target average annual temperature and calculate the heating degree data, the cooling degree day impacts, and peak producing weather impacts within the energy forecast and peak forecast (PacifiCorp 2023-TN11034).

5.2.1.4 Electrification Adjustment

The load forecast used for the 2023 IRP portfolio development includes PacifiCorp's expectations for transportation electrification based on current and expected electric vehicle adoption trends (PacifiCorp 2023-TN11034).

5.2.1.5 Regulatory Planning Environment

In 2015, the EPA revised the ozone NAAQS and States were required to submit revised State Implementation Plans by 2018 to comply with new, more stringent standards. EPA took two actions in 2023 to address the States' downwind impact obligations under the 2015 NAAQS. First, in February 2023, EPA disapproved 21 States' submissions. Each of those States proposed to take no action to revise their State Implementation Plans, having concluded that existing controls were adequate or that they did not contribute significantly to nonattainment or interfere with maintenance of Federal ozone standards in other States. Second, on March 15, 2023, EPA issued a Federal Implementation Plan, the Good Neighbor Plan, covering those 21 States, as well as two additional States that had not submitted any revisions to their plans. Various States, including Utah, and private parties, including PacifiCorp, have filed lawsuits challenging EPA's disapproval of States' plans as well as the Good Neighbor Plan. In February 2024, the U.S. Supreme Court heard oral arguments on a consolidated action of a number of applications to postpone implementation of the EPA's Good Neighbor Plan (CRS 2024-TN11037). In June 2024, the U.S. Supreme Court granted State and industry applicants' request to stay EPA's Good Neighbor Plan while the case proceeds in the D.C. Circuit Court.

In 2019, the Washington Legislature approved the Clean Energy Transformation Act, which requires that 100 percent of electricity sales in Washington be 100 percent renewable and non-emitting by 2045. PacifiCorp filed its first Clean Energy Action Plan for the Clean Energy Transformation Act in its 2021 IRP and laid the groundwork for compliance with the Clean Energy Transformation Act in an analysis based on the preferred portfolio. PacifiCorp filed its first Clean Energy Implementation Plan on December 30, 2021, and has refiled this document responsive to Washington staff and stakeholder feedback in March 2023.

In 2021, Oregon passed House Bill 2021, which directs utilities to reduce emissions levels below 2010–2012 baseline levels by 80 percent by 2030, 90 percent by 2035, and 100 percent by 2040. Utilities will also convene a Community Benefits and Impacts Advisory Group. The 2023 IRP includes modeling to support House Bill 2021, which is expanded upon in PacifiCorp's first Oregon Clean Energy Plan submission and filed concurrently with the IRP.

5.2.2 PacifiCorp Demand for Electricity

The analysis for demand of electricity shows that after incorporating future energy efficiency savings from the preferred portfolio in the 2023 IRP, PacifiCorp's system capacity is sufficient once proxy resources (i.e., a power-purchase agreement from another energy producer) are added beginning in 2026 as described in Table 8.2-8 in the ER (TerraPower 2024-TN10896).

5.3 <u>Determination of Supply</u>

The existing generating capacity in the PacifiCorp planning area is a key input to PacifiCorp's modeling efforts. The existing supply of generating capacity presented in the following sections for the PacifiCorp power market is disaggregated by fuel type.

5.3.1 Thermal Plants

A listing of PacifiCorp's existing coal- and natural gas-fueled thermal plants is provided in ER Table 8.3-1 and Table 8.3-2, respectively (TerraPower 2024-TN10896).

5.3.2 Renewable Resources

PacifiCorp's renewable energy portfolio includes wind, solar, and geothermal resources, biomass and biogas, and hydroelectric generation. PacifiCorp either owns or purchases renewable resources under contract. A description of each PacifiCorp renewable resource is provided in the ER and is summarized in Table 5-1.

Table 5-1 Summary of PacifiCorp Renewable Resources

Resource Type	Ownership Type	Capacity (MW)
Wind	Owned	2,935
Wind	Non-owned	2,535
Solar	Power-purchase agreement	3,278
Geothermal	Owned	34
Geothermal	Power-purchase agreement	20
Biomass and Biogas	Power-purchase agreement	80
Hydroelectric Generation	Owned	968
Hydroelectric Generation	Purchased	463
Private Generation	Solar	772
Private Generation	Wind	0.8
Private Generation	Hydro	0.8
Private Generation	Gas[a]	1
Private Generation	Mixed[b]	1.2
Generation Total Capacity	**-**	**11,090**
Storage Capacity[c]	Existing	350
Storage Capacity[c]	New Projects	3
Total Capacity	**-**	**11,443**

(a) Gas includes biofuel waste gas and fuel cells.
(b) Mixed includes projects with multiple technologies—solar/biogas and solar/wind.
(c) Storage capacity associated with existing or new solar facilities.
"-" denotes no data in table cell.
Source: TerraPower 2024-TN10896

5.3.3 Existing Demand-Side Management Resource Summary

PacifiCorp's existing demand-side management programs, their assumed impact, and how the programs are treated for purposes of incremental resource planning are summarized in Table 8.3-8 of the ER (TerraPower 2024-TN10896). Since incremental energy efficiency is determined as an outcome of the resource modeling and is characterized as a new resource under this assessment, existing energy efficiency appears as having zero megawatts. Similarly, demand response resources available to the preferred portfolio are characterized as incremental (TerraPower 2024-TN10896).

5.3.4 Known or Anticipated Power Purchases or Sales

PacifiCorp obtains the remainder of its capacity and energy requirements through long-term firm contracts, short-term firm contracts, and spot market purchases. Figure 5-2 below describes the contract capacity in place for 2023 through 2042 (PacifiCorp 2023-TN11034). Major capacity reductions in solar purchases, wind purchases, and qualifying facilities contracts would occur. For planning purposes, PacifiCorp assumes interruptible load contracts and demand responses are extended through the end of the planning period. All contracts are shown at their peak capacity contribution levels.

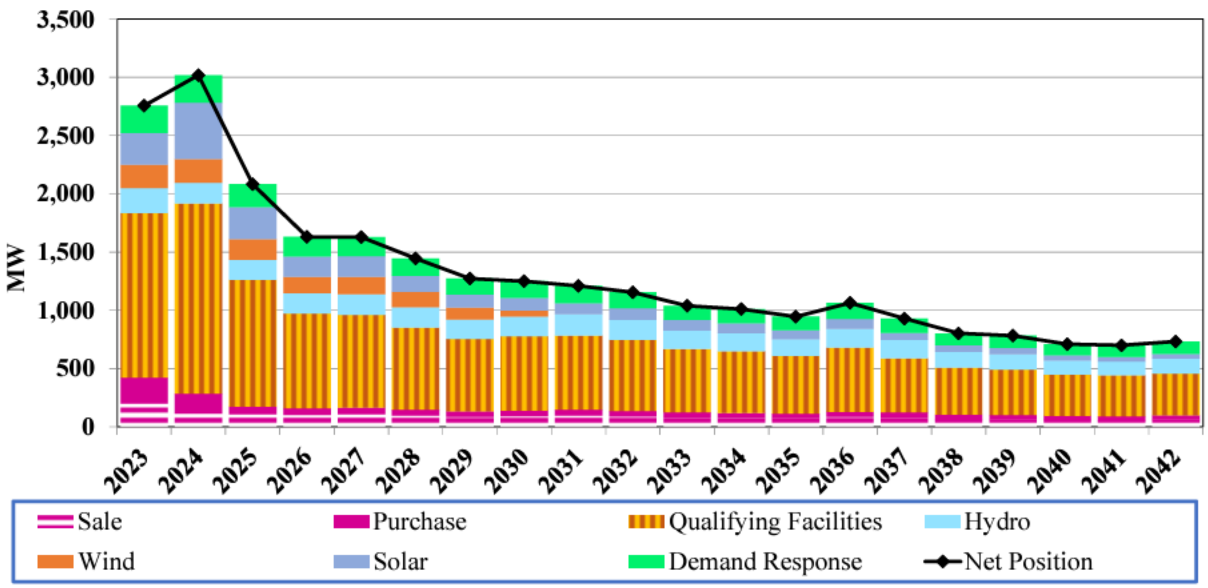

Figure 5-2 Contract Capacity in the 2021 Integrated Resource Plan Summer Load and Resource Balance. Source: PacifiCorp 2023-TN11034.

5.3.5 Potential Capacity Additions, Retirements, Uprates, and Fuel Switches

The purpose of the load and resource balance is to compare annual obligations (demand) to the annual capability of PacifiCorp's existing resources after retirements and future energy efficiency savings from the 2023 IRP preferred portfolio without adding new generating resources (TerraPower 2024-TN10896).

The resource portfolios produced for the 2023 IRP considered a wide range of potential coal and natural gas retirement dates, options to convert to gas or to retrofit for carbon capture utilization and sequestration for certain coal units, options to install selective catalytic reduction or selective non-catalytic reduction technologies, and other planning uncertainties (TerraPower 2024-TN10896).

PacifiCorp developed variants of the top-performing resource portfolio to further analyze impacts of specific resource actions within the top-performing portfolio. In the resource portfolio analysis step, PacifiCorp conducted targeted reliability analysis to ensure portfolios had sufficient flexible capacity resources to meet reliability requirements; PacifiCorp then analyzed these different resource portfolios to measure the comparative cost, risk, reliability, and emission levels. This resource portfolio analysis ultimately informed selection of the least-cost and least-risk portfolio, the 2023 IRP preferred portfolio, and the portfolio that can be delivered through specific action items at a reasonable cost and with manageable risks while considering customer demand for clean energy and ensuring compliance with Federal and State regulatory obligations (TerraPower 2024-TN10896).

5.4 Conclusions

PacifiCorp's IRP analysis shows that after incorporating future energy efficiency savings from the preferred portfolio, PacifiCorp's system capacity is sufficient once proxy resources are added, in the summer starting in 2026, and in the winter peaks throughout the 20-year planning period (PacifiCorp 2023-TN11034). The 2023 IRP preferred portfolio includes Kemmerer Unit 1 and anticipates operation by summer 2030. By the end of 2032, the preferred portfolio includes 1,000 MW of additional advanced nuclear resources, and through 2037, the preferred portfolio includes 1,240 MW of non-emitting peaking resources. Advancement of these two technologies will be critical to the planned transition from coal in a way that will minimize impacts to employees and communities. Over the 20-year planning horizon, the 2023 IRP preferred portfolio includes 9,114 MW of new wind and 7,855 MW of new solar (TerraPower 2024-TN10896).

6 CONCLUSIONS AND RECOMMENDATIONS

This EIS describes the environmental review in response to an application submitted by TerraPower on behalf of USO, a wholly owned subsidiary of TerraPower, for a CP under 10 CFR Part 50 (TN249) that would allow the construction of a Natrium reactor on a 290 ac (117.4 ha) site in Lincoln County, Wyoming, approximately 3 mi (4.8 km) south of the City of Kemmerer, Wyoming. This EIS follows the requirements in 10 CFR Part 51 (TN10253), which are the NRC's regulations that implement NEPA (TN661). This section presents conclusions and recommendations based on the environmental review of the CP application. Section 6.1 of this EIS summarizes the environmental impacts of the proposed action. Section 6.2 compares the environmental impacts of the proposed action to the no-action alternative and to a range of reasonable alternatives that are technically and economically feasible and meet the purpose and need of the proposal. Section 6.3 discusses the unavoidable impacts of the proposed action and identifies resource commitments.

6.1 Environmental Impacts of the Proposed Action

As indicated in Section 1.1, the proposed action is for the NRC to decide whether to issue a CP to USO that would allow the construction of Kemmerer Unit 1. Section 1.2 presents the purpose and need for the proposed action, which is to allow USO to demonstrate the Natrium reactor while ultimately replacing electricity generation capacity in the PacifiCorp service area. Chapter 3 summarizes the potential direct, indirect, and cumulative environmental impacts of the proposed action and provides an impact level of SMALL, MODERATE, or LARGE for each potentially affected environmental resource area. These conclusions are based on the review team's independent environmental review, USO's ER, the review team's consideration of public comments received during the scoping process, and the review team's consultation with Federal, State, Tribal, and local agencies. Table 6-1 summarizes the environmental impact and provides the conclusion for each resource area considered.

Table 6-1 Summary of Environmental Impacts of the Proposed Project at the Kemmerer Unit 1 Site

Resource Area	EIS Section	Summary of Impact	Impact Level
Land use and visual resources	3.1	Approximately 218 ac onsite would be disturbed by preconstruction and construction activities. The construction of a transmission corridor and water supply pipeline from the Naughton Power Plant to the proposed facility is anticipated to temporarily disturb approximately 216 ac. New facilities such as the reactor building, steam generator, turbine buildings, meteorological tower, and concrete batch plant would be among the tallest structures and most visible features in the area when completed. The proposed construction impacts are consistent with the site's industrial zoning designation and with the land use goals of Lincoln County.	SMALL

Table 6-1 Summary of Environmental Impacts of the Proposed Project at the Kemmerer Unit 1 Site (Continued)

Resource Area	EIS Section	Summary of Impact	Impact Level
Air quality	3.2	Potential impacts to air quality are anticipated to be localized in and around the facility during construction activities. Any potential impact is expected to be temporary and to be minimized by compliance with Federal, State, and local regulations that govern construction activities and emissions. Additionally, any air quality impacts would be mitigated by fugitive dust, sediment, and erosion controls as well as phasing construction to minimize daily emissions. Air emission-producing equipment would be permitted under the WYDEQ.	SMALL
Hydrology and water resources	3.4	Land surface modifications during preconstruction and construction activities could affect the local distribution of infiltration, recharge, and surface water runoff on the proposed site. Increased infiltration would occur downgradient of the proposed outfall. Any changes in recharge would be localized to the site and would affect only the shallow groundwater on the site property. Surface water runoff would be controlled using BMPs to minimize hydrologic alterations and surface water quality degradation. Dewatering would temporarily lower shallow groundwater levels around excavations. Groundwater extracted for dewatering would be routed to a stormwater detention pond for eventual discharge or would be used on the site for dust control or compaction. Use for dust control would require an appropriate permit from the WYDEQ. Surface water use during construction activities would be a small fraction of excess capacity of the water supplier.	SMALL
Aquatic ecological resources	3.5	Potential impacts on the aquatic ecosystem from construction activities would mainly be associated with impacts to the North Fork Little Muddy Creek and the Muddy Creek basin from the construction of a new raw water line, a new water discharge line, and the stormwater management system. Streams onsite or in the transmission line corridor could be impacted by soil-disturbing activities that lead to soil erosion during site preparation and construction. Potential impacts would be temporary and minimized using BMPs.	SMALL

Table 6-1 Summary of Environmental Impacts of the Proposed Project at the Kemmerer Unit 1 Site (Continued)

Resource Area	EIS Section	Summary of Impact	Impact Level
Terrestrial ecological resources	3.6	Permanent loss of a cumulative 218 ac of intermountain basin big sagebrush scrubland and greasewood flat on the site. Temporary disturbance of 216 ac of various natural terrestrial habitats in the macro-corridors, of which approximately 118 ac would be permanently disturbed. Introduction of noise and vehicular activity into previously natural terrestrial setting. However, all affected habitats are common in the surrounding landscape and the proposed action is not likely to adversely affect resources protected under the Endangered Species Act. MODERATE impacts primarily reflect the introduction of a sizable complex of industrial features into a little-disturbed wild setting, including transmission towers and conductors capable of injuring birds and other wildlife.	MODERATE
Historic and cultural resources	3.7	There are known historic and cultural resources within the direct and indirect area of potential effects. Construction activities may result in an adverse effect to two historic properties, including one site at the Kemmerer Unit 1 location and one site within the macro-corridors. This impact determination may change to MODERATE if USO is able to avoid adverse effects to the two historic properties, or if the adverse effects are resolved through the execution of a memorandum of agreement. Consultation regarding the proposed action under NHPA Section 106 is ongoing.	MODERATE to LARGE
Socioeconomics	3.8	Given the relatively small number of construction workers in the region, low unemployment, and specialized skill and crafts workers needed to construct the nuclear facility, the majority of construction workers would likely migrate temporarily into the region as each skill and craft is needed. The in-migration of skilled construction workers would increase the demand for temporary housing and traffic volumes on local roads during shift changes. Additional construction jobs would include increased tax revenue, traffic volumes on local roads, and demand for housing and public services. Most of the socioeconomic impacts would occur during peak construction (18–24 months) when the influx of workers to the ROI would lead to a noticeable population increase in the relatively small, sparsely populated ROI.	MODERATE to LARGE

Table 6-1 Summary of Environmental Impacts of the Proposed Project at the Kemmerer Unit 1 Site (Continued)

Resource Area	EIS Section	Summary of Impact	Impact Level
		Beneficial impacts of new tax revenue would occur after the peak construction period and would not be available as potential mitigation for adverse impacts during that period.	
Public and occupational health	3.9	Occupational hazards would be managed through compliance with Occupational Safety and Health Administration regulations in 29 CFR Part 1910 (TN654). Emissions would comply with the Clean Air Act (TN1141). The implementation of a Spill Prevention, Control, and Countermeasures Plan, BMPs, and site permits would limit adverse offsite effects during construction. Noise to members of the public would decrease with distance and is expected to be significantly less than safe noise levels to the nearest residence. Other than radioactive material being brought onsite, such as for compaction testing and radiography, there would be no other sources for direct occupational exposure or exposure to the public during construction.	SMALL
Nonradiological waste management	3.10	Construction debris created by excavation and land clearing would be either recycled or disposed offsite to a licensed facility. Liquid waste produced during construction would be stored and disposed according to regulations. Construction and commissioning water would be reused when possible. During construction, the applicant would follow all applicable BMPs and Federal, State, and local requirements and standards for handling, transporting, and disposing of nonradiological wastes.	SMALL
Transportation of radioactive material	3.11	No radioactive material would be transported during construction, and no radiological impacts are anticipated.	SMALL
Uranium fuel cycle and radiological waste management	3.12	No nuclear fuel would be present and no radiological waste would be generated during construction.	SMALL
Postulated accidents	3.13	No nuclear fuel would be present during construction, and no radiological impacts are anticipated.	SMALL

ac = acre(s); BMP = best management practice; CFR = *Code of Federal Regulations*; EIS = environmental impact statement; WYDEQ = Wyoming Department of Environmental Quality.

6.2 Comparison of Alternatives

In Chapter 4 of this EIS, three alternatives to the proposed action of the construction of a Natrium reactor at the Kemmerer Unit 1 site outside of Kemmerer, Wyoming, are considered:

- the no-action alternative;
- the construction of a Natrium reactor at the Naughton 12 site (an undeveloped site located south of and adjacent to the Naughton Power Plant in Lincoln County, Wyoming); and
- the construction of a Natrium reactor at the Jim Bridger 22 site (an undeveloped site located near the Jim Bridger Power Plant in Sweetwater County, Wyoming).

Table 4-1 of this EIS compares the environmental impacts for each potentially affected environmental resource area for the proposed action to the environmental impacts for those resource areas for the no-action alternative, the Naughton 12 site alternative, and the Jim Bridger 22 site alternative. The no-action alternative would not meet the purpose and need for the proposed action. Additionally, under the no-action alternative, the benefits (demonstrating the Natrium reactor’s technologies, design features, and safety functions, and electricity generation) associated with the proposed action would not occur, and the need for power would not be met.

6.3 Resource Commitments

The following sections address issues related to resource commitments contributing to the cost-benefit analysis presented in Section 4.3.

6.3.1 Unavoidable Adverse Environmental Impacts

NEPA Section 102(2)(C)(ii) (TN661) requires that an EIS include information on any reasonably foreseeable adverse environmental effects that cannot be avoided if the proposal is implemented. For the purpose of this EIS, unavoidable adverse environmental impacts are defined as adverse environmental impacts that cannot be avoided even with the implementation of mitigation measures. The applicant addresses unavoidable adverse environmental impacts in Section 10.2 of the ER (TerraPower 2024-TN10896) and summarizes the unavoidable adverse environmental impacts and proposed mitigations in Table 10.2-1 of the ER (TerraPower 2024-TN10896).

As noted in Chapter 3, the review team concluded that the impacts on the evaluated resource areas from the construction of a Natrium reactor at the Kemmerer Unit 1 site would be SMALL, with the exception of the historic and cultural resources, terrestrial ecological resources, and socioeconomic areas, which would be larger than SMALL. A SMALL determination means that the environmental effects would not be detectable or would be so minor that they would neither destabilize nor noticeably alter any important attribute of the resource. However, a SMALL determination does not necessarily indicate that there would not be any adverse environmental effects that could be offset or minimized through mitigation. For those resource areas determined to have impacts from construction of greater than SMALL, there are opportunities to minimize and mitigate the adverse environmental effects. Therefore, Table 6-2 presents the unavoidable adverse environmental impacts from the construction of Kemmerer Unit 1, including mitigation and control measures intended to lessen adverse environmental effects. Unless noted otherwise, the mitigation measures presented in Table 6-2 are taken from Section 10.2 and Table 10.2-1 of the ER (TerraPower 2024-TN10896).

1 **Table 6-2 Unavoidable Adverse Environmental Impacts for the Proposed Action**

Resource Area	Unavoidable Adverse Impact	Mitigation Measures
Land Use and Visual Resources	Approximately 218 ac of undeveloped land on the Kemmerer Unit 1 site would be converted to industrial use. Additional offsite areas (a total of approximately 118 ac) would be permanently occupied by the transmission and water pipeline corridors. Land uses in these corridors would be limited during construction to compatible uses such as grazing and hunting.	Restricting heavy equipment and stockpiles to designated areas, revegetating and stabilizing temporarily disturbed land upon completion of construction activities in accordance with Wyoming Pollutant Discharge Elimination System requirements, minimizing impacts to wetlands and streams through avoidance and established BMPs to control erosion and runoff, the development and implementation of an SWPPP to minimize erosion and protect downgradient wetlands and surface waters, retention and protection of topsoil from excavation and trenches to be placed over subsoil when excavation or trenches are refiled, and monitoring revegetated areas to ensure that planting of native species are successful and that invasive species do not become established (TerraPower 2024-TN10896).
Air Quality	Air pollutant emissions from traffic, construction equipment, and fugitive dust would be possible during site preparation.	Dust suppression techniques would be used and equipment maintenance employed to reduce airborne emissions from construction activities (TerraPower 2024-TN10896). Construction activities would be phased to the extent practical to minimize peak emissions.
Hydrology and Water Resources	Local and temporary increase in sediments in water from increased erosion and pollutants from spills in construction stormwater runoff and discharges from dewatering of excavation. Minimal increase in the flood level upstream of the stream crossing. Local and temporary decrease in shallow groundwater levels during construction dewatering.	Minimize impacts to wetlands and streams through avoidance and established BMPs to control erosion and runoff, the development and implementation of an SWPPP to minimize erosion and protect downgradient wetlands and surface waters, the development and implementation of a SPCC Plan to respond to spills (TerraPower 2024-TN10896).

Table 6-2 Unavoidable Adverse Environmental Impacts for the Proposed Action (Continued)

Resource Area	Unavoidable Adverse Impact	Mitigation Measures
Aquatic Ecological Resources	Potential indirect impacts to wetland and waterways from runoff and sedimentation. Exposed soils create the potential for sedimentation of aquatic habitat.	Revegetating and stabilizing temporarily disturbed land upon completion of construction activities in accordance with Wyoming Pollutant Discharge Elimination System requirements. Minimize impacts to streams through avoidance and established BMPs to control erosion and runoff. The development and implementation of a SWPPP to minimize erosion and protect downgradient surface waters. Fueling and equipment maintenance would be restricted to designated areas away from wetlands and waterbodies. Use of horizontal directional drilling to reduce impact to waterbodies and transmission lines would be sited to span waterways. Construction in right-of-way would be performed when ground is dry and during the winter months. Detention ponds would be used to reduce turbidity of stormwater runoff. Natural drainage patterns would be maintained. When possible, streamside construction would be conducted during dry periods. Culverts would be installed at stream crossings to maintain natural water flow (TerraPower 2024-TN10896).
Terrestrial Ecological Resources	Clearing of 218 ac of sagebrush shrubland and greasewood habitat. Temporary disturbance of 216 ac of offsite habitat within pipeline and transmission corridors with approximately 118 ac of permanent disturbance. Some disturbance of wetlands for road construction and in transmission corridor. Potential indirect impacts to wetlands from runoff and sedimentation. Temporary displacement of wildlife from habitat loss and construction noise. Minor losses of birds due to collisions with structures and equipment. Direction and intensity of lighting during facility construction altering behavior of birds and mammals.	Terrestrial mitigation measures include all of the measures described above in Land Use, Air Quality, Hydrology and Water Resources, and Aquatic Resources and also include eight additional mitigation measures (TerraPower 2024-TN10896): (1) selecting the location and design of facility fences in consultation with WYDOT and WGFD to reduce impacts on livestock and wildlife; (2) using noise dampeners or mufflers to reduce engine noise and staggering ground-impacting activities to reduce vibrations, (3) cleaning vehicles and construction equipment before moving to a new location to minimize the transport of invasive plants, (4) scheduling construction activities

Table 6-2 Unavoidable Adverse Environmental Impacts for the Proposed Action (Continued)

Resource Area	Unavoidable Adverse Impact	Mitigation Measures
		in right-of-way when ground is dry and during the winter months, (5) scheduling construction activities outside avian nesting season if possible; (6) conducting nest clearing surveys for migratory birds 72 hours before any ground disturbance during the nesting season; (7) using industry standards and BMPs to reduce avian collisions, and (8) reducing light effects on wildlife by turning lights off at night and shielding lights when possible.
Historic and Cultural Resources	Potential to cause an adverse effect to National Register of Historic Places-eligible historic properties in the direct area of potential effects, and result in impacts to known historic and cultural resources throughout the indirect and direct area of potential effects.	NRC Section 106 consultation is ongoing. If adverse effects are unavoidable, a Memorandum of Agreement would be executed to resolve adverse effects between the SHPO, NRC and other parties. USO has developed procedures to avoid archaeological sites, and processes to follow when encountering inadvertent discoveries, throughout the Kemmerer Unit 1 site (e.g., see TerraPower 2024-TN10896).
Socioeconomics	Increased demand for housing, public infrastructure and services, and education resources on a short-term basis from the influx of construction workers, family members, workers filling indirect jobs; loss of temporary jobs once construction is completed; loss of local and State sales and use of tax revenues once construction is completed; decline in residential property tax; increase use of recreational areas from in-migrating workers and family members; an increase in rental rates for housing units of all types, new and existing, housing prices, an increase in short-term and long-term hotel and motel leasing rates.	Communication with local government, planning officials, and media would be maintained so that adequate time is given to plan for significant workforce changes; use of impact assistance payments (TerraPower 2024-TN10896).
Public and Occupational Health	Potential exists for physical and chemical hazards typical of any industrial facility including exposure to fugitive dust or emissions, noise, or typical construction hazards. For the purpose of the CP, members of the public and workers would not be exposed to radiation from operations	Noise dampeners or mufflers would be used to reduce engine noise, and ground-impacting activities would be staggered to reduce vibrations; implementation of differing dust suppression techniques to reduce airborne emissions; workers would have adequate training and personal

Table 6-2 Unavoidable Adverse Environmental Impacts for the Proposed Action (Continued)

Resource Area	Unavoidable Adverse Impact	Mitigation Measures
	as no radiological material used for operations would be onsite during construction.	protective equipment to minimize the risk of potentially harmful noise exposures; first-aid capabilities would be provided at the construction site; construction contractors would be required to comply with safety regulations; a worker health and safety monitoring program would be implemented at the construction site; construction worker arrival and departure times would be staggered to minimize congestion and impediments to smooth traffic flow.
Nonradiological Waste Management	Quantities of wastes would be minimized to the extent practical and disposed of in accordance with applicable Federal, State, and local regulations.	Dumpsters for general trash and for wood and paper recycling would be exchanged, on average, weekly for the duration of project, coordinate with suppliers to maximize material per container, equipment waste would be maintained at an onsite mechanic shop, drip pans and other containment systems would be used to contain any spillage, waste generated from portable toilets would be discharged through an approved and licensed subcontractor, wastewater generated from construction and commission testing would be used to support hydrostatic and other flushing requirements to the maximum extent possible, BMPs, SWPPP, and other requirements from the LCGP would be followed.

BMP = best management practice; CP = construction permit; ER = environmental report; LCGP = Large Construction General Permit; NRC = U.S. Nuclear Regulatory Commission; SHPO = State Historic Preservation Officer; SWPPP = stormwater pollution prevention plan; USO = US SFR Owner, LLC; WYDOT = Wyoming Department of Transportation; WGFD = Wyoming Game and Fish Department.

6.3.2 Relationship Between Local Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity

The construction of the facilities under the proposed action would result in short-term uses of environmental resources. “Short-term” is the period of time during which construction, operation, and decommissioning activities would take place. While the applicant indicates that decommissioning would commence once the facilities reach the end of their licensed life, the applicant does not indicate how long decommissioning would take. Applicants for the licensing of new reactors typically do not develop a plan for decommissioning when applying for CPs and/or OLs and no such plan is required at that time.

As indicated in Section 3.1, the construction of Kemmerer Unit 1 would require the short-term use of approximately 218 ac (88.2 ha) on a site of 290 ac (117.4 ha) of undeveloped land intended for industrial use over the life of the project. This land would not be available for other uses during that time but could be available for other uses after decommissioning. During construction, approximately 216 ac (87.4 ha) of undeveloped land in a 511 ac (206.8 ha) macro-corridor between the proposed site and the Naughton Power Plant would be temporarily disturbed. Following construction, the permanent conversion of approximately 118 ac (47.8 ha) would occur in the macro-corridor. This additional land may be available for other uses after construction, expect for the approximately 118 ac (47.8 ha) of permanently disturbed areas. As indicated in Section 3.1 of this EIS, the new facilities might be distantly visible over the life of Kemmerer Unit 1 from the surrounding areas.

As indicated in Section 3.2, air emissions from the construction of Kemmerer Unit 1 would introduce small amounts of criteria pollutants and GHG emissions at the facility site. However, such emissions are not expected to affect air quality to the extent that they would impair public health and the long-term productivity of the environment.

As indicated in Section 3.4, the construction of Kemmerer Unit 1 would require the use of only a small fraction of the local available water production capacity, supplied by municipal or commercial sources, which would not place short-term substantial demands on surface water or groundwater resources.

As explained in Section 3.6, the construction of Kemmerer Unit 1 would require the conversion of natural habitat to industrial land uses, thereby potentially displacing wildlife and reducing the availability of wildlife habitat over the life of the project. Any short-term ecological effects are anticipated to be minor and cease prior to the completion of decommissioning.

Increased employment, expenditures, and tax revenues generated during construction, operation, and decommissioning activities directly benefit local, regional, and State economies over the short term. As noted in Section 3.11, worker vehicles and the delivery and shipment of materials would increase the volume of traffic on local roads. There is an anticipated increase in demand for housing and services in Kemmerer and the surrounding areas. But these demands and traffic increases would be short term and expected during peak construction and decommissioning activities and during work shifts. Therefore, these demands and traffic increases would not affect long-term productivity.

As indicated in Section 3.10, management and disposal of nonhazardous waste would require a small increase in space at disposal facilities. Regardless of the location of those facilities, the use of land to meet waste disposal needs would reduce the long-term productivity of the land. The contribution of Kemmerer Unit 1 to these reductions would be minimal.

While the uses of, and impacts on, environmental resources would primarily be minimal over the short-term, the long-term benefits from the construction of Kemmerer Unit 1 could be substantial. Kemmerer Unit 1 could help demonstrate the commercial viability of the Natrium reactor while ultimately replacing electricity generation capacity in the PacifiCorp service area following the planned retirement of existing coal-fired facilities.

6.3.3 Irreversible and Irretrievable Commitment of Resources

This section describes the irreversible and irretrievable commitment of resources that have been noted in this EIS. For the purpose of this assessment, an irreversible commitment of resources occurs when potential impacts have the possibility to limit future options for a resource. An irretrievable commitment of resources is defined as the lost production or use of a resource that would cause the resource to be unavailable for use by future generations. Irreversible and irretrievable commitments of resources for construction of a nuclear power facility such as Kemmerer Unit 1 include the commitment of water, energy, raw materials, and other natural and human-made resources. In general, the commitments of capital and labor for a project such as Kemmerer Unit 1 are also irreversible.

Building, operating, and decommissioning Kemmerer Unit 1 at the proposed site near Kemmerer, Wyoming (proposed action), or at the alternative sites, would entail the irreversible and irretrievable commitment of energy, water, chemicals, fossil fuels, and other natural and human-made resources. Building Kemmerer Unit 1 at any site would consume concrete, structural steel, steel sheet pilings, precast piles, precast panels, asphalt, stone, roofing/siding, and temporary structures. These materials would be irretrievable unless USO recycles them during decommissioning (e.g., finds another facility to use such materials).

As described in Chapter 3, the water demands during the construction of Kemmerer Unit 1 would be minimal and readily met by municipal and commercial sources. These water resources are readily available, and the amounts required are not expected to deplete available supplies or exceed available system capacities. As described in Section 3.6, a small number of birds and other wildlife may be killed or injured by collision with Kemmerer Unit 1 structures or collision with vehicles used onsite or by workers traveling to the site. These losses of wildlife would be minor in terms of irreversibly affecting wildlife populations in the surrounding area, and any affected populations can be expected to subsequently recover and adapt to use adjacent and unaffected habitat. Irreversible losses of natural habitat or grazing land would occur at the proposed site because, as described in Section 3.1 and Section 3.6, the area was undeveloped and primarily used for livestock. Any disturbances to subsurface cultural resources at the proposed site could be irreversible.

As noted in Section 3.9, nonradiological irreversible commitments to occupational human health resources may occur. Such impacts would be similar to potential hazards that occur at any industrial construction site. Energy expended would be in the form of fuel for equipment, vehicles, and facility operation and electricity for equipment and facility operation. Electricity and fuel would be acquired from offsite commercial sources.

6.3.4 Unresolved Conflicts

NEPA requires that the review team study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources. In reviewing the potential impacts associated with the proposed action, the review team did not identify any unresolved conflicts concerning alternative uses of available resources.

6.4 Recommendation

After weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering reasonable alternatives, the review team recommends, unless safety issues mandate otherwise, that the NRC issue the requested CP to USO. This recommendation is based on:

- USO's ER, information gathered during the environmental audit, and responses to requests for clarifying information;
- the review team's consideration of public comments received during the scoping process;
- the review team's consultation with Federal, State, Tribal, and local agencies; and
- the review team's independent environmental review and assessment summarized in this EIS.

7 REFERENCES[1]

10 CFR Part 20. *Code of Federal Regulations*, Title 10, *Energy*, Part 20, "Standards for Protection Against Radiation." TN283.

10 CFR Part 40. *Code of Federal Regulations*, Title 10, *Energy*, Part 40, "Domestic Licensing of Source Material." TN4882.

10 CFR Part 50. *Code of Federal Regulations*, Title 10, *Energy*, Part 50, "Domestic Licensing of Production and Utilization Facilities." TN249.

10 CFR Part 51. *Code of Federal Regulations*, Title 10, *Energy*, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." TN10253.

10 CFR Part 70. *Code of Federal Regulations*, Title 10, *Energy*, Part 70, "Domestic Licensing of Special Nuclear Material." TN4883.

10 CFR Part 71. *Code of Federal Regulations*, Title 10, *Energy*, Part 71, "Packaging and Transportation of Radioactive Material." TN301.

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APPENDIX A

CONTRIBUTORS TO THE ENVIRONMENTAL IMPACT STATEMENT

Members of the U.S. Nuclear Regulatory Commission (NRC or Commission) Office of Nuclear Material Safety and Safeguards; Division of Rulemaking, Environmental, and Financial Support; and Environmental New Reactor Branch prepared this environmental impact statement. Staff from other NRC branches and from Pacific Northwest National Laboratory provided supplemental technical support and technical editing. Table A-1 below identifies each contributor's name and affiliation, summary of education and experience, and indication of function or expertise contributed to the document.

Table A-1 List of Preparers

Name and Affiliation	Education/Experience
Peyton Doub, NRC	MS Plant Physiology (Botany) BS Plant Sciences (Botany) Duke NEPA Certificate; Professional Wetland Scientist; Certified Environmental Professional; 38 years of experience in terrestrial and wetland ecology and NEPA
Brian Glowacki, NRC	BS Environmental Engineering 2 years of relevant experience
Robert Hoffman, NRC	BS Environmental Resource Management 35 years of experience in NEPA compliance, environmental impact assessment, alternatives identification and development, and energy facility siting
Sarah Lopas, NRC	MPA Environmental Policy BA Molecular Biology and Environmental Science; 23 years of combined industry and government experience in environmental reviews, and NRC project management for licensing and rulemaking
William Burris, NRC	MS Environmental Management BA Geology 33 of environmental management, compliance, remediation, regulation, and planning experience
Donald Palmrose, NRC	PhD Nuclear Engineering MS Nuclear Engineering BS Nuclear Engineering 39 years of experience including operations on U.S. Navy nuclear powered surface ships, technical and NEPA analyses, nuclear authorization basis support for DOE, and NRC project management
Jeffrey Rikhoff, NRC	MRP Regional Environmental Planning MS Development Economics BA English 44 years of combined industry and government experience in NEPA compliance for DOE Defense Programs/NNSA and Nuclear Energy, DoD, and DOI; project management; socioeconomic impact analysis, historic and cultural resource impact assessments, consultation with American Indian Tribes, and comprehensive land use and development planning studies

Table A-1 List of Preparers (Continued)

Name and Affiliation	Education/Experience
Gerry Stirewalt, NRC	PhD Structural Geology with two post-doctoral appointments BA Geology/Mathematics Registered PG and CEG Over 50 years of relevant experience in environmental and engineering geology, including 3-D geospatial modeling of subsurface stratigraphy, tectonic faults, and groundwater contaminant plumes
Rao Tammara, NRC	MS Environmental/Nuclear Engineering MS Chemical Engineering BS Chemical Engineering 50 years of engineering/consulting experience
Patricia Vokoun, NRC	BS Civil Engineering Over 25 years of combined industry and government experience in environmental planning and NRC project management
Gretchen Applegate, DOE	BS. Environmental Science Over 15 years of experience in NEPA
Amy Shanahan, DOE	MA Heritage Management Over 8 years of experience in NHPA
David Anderson, PNNL	MS Forest Economics BS Forest Resources 33 years of experience in NEPA planning, national and regional economic impact modeling, and socioeconomic impact analysis
Sophie Baur, PNNL	BS Biological Data Sciences 5 years of experience in natural resource management and environmental data analyses
Cyler Conrad, PNNL	PhD in Anthropology (Archaeology) MA in Anthropology (Archaeology) BA Anthropology 13 years of relevant experience Over 10 years of experience in archaeology, cultural resource management, National Historic Preservation Act Section 106, NEPA, and project management
Bradley Fritz, PNNL	MS Environmental Engineering BS Physics; Over 15 years of relevant experience in atmospheric measurements and regulatory compliance
Tracy Fuentes, PNNL	PhD Urban Design and Planning MS Plant Biology BS Botany Over 15 years of experience, including NEPA planning; environmental impact analysis, environmental resource monitoring, data analysis, and research
Dave Goodman, PNNL	JD Law BS Economics Over 15 years of experience including NEPA environmental impact assessments, ecological restoration, Endangered Species Act, land use and visual resources, and environmental law and policy
Tristan Hay, PNNL	PhD Radiation Health Physics MS Radiation Health Physics BS Physics BS Math

Table A-1 List of Preparers (Continued)

Name and Affiliation	Education/Experience
	13 years of experience in health physics, medical health physics, environmental impact analyses, radiological emergency preparedness, nuclear materials inspections and licensing, and radiation safety
James Jackson, PNNL	MS Environmental and Resource Management BS Ecology and Evolutionary Biology 18 years of experience including environmental impact analysis, construction management, site characterization and remediation, and waste management
Kimberly Leigh, PNNL	BS Environmental Science 25 years of experience in NEPA compliance and project management
Hayley McClendon, PNNL	BS Environmental Science 8 years of experience in environmental compliance and technical document preparation and review
Philip Meyer, PNNL	PhD Civil Engineering MS Civil Engineering BA Physics 30 years of relevant experience in subsurface hydrology and contaminant transport, including 15 years of experience in groundwater resource assessment and environmental impacts analysis
Ann Miracle, PNNL	PhD Molecular Immunology MS Molecular Genetics BA Biology; 18 years of experience in NEPA document preparation, ecological impact analysis, Endangered Species Act Section 7 consultations, and Essential Fish Habitat consultations
Jonathan Napier, PNNL	PhD Radiation Health Physics MS Health Physics BS Environmental Science Certified health physicist with 9 years of experience in health physics, nuclear materials inspections and licensing, and radiation safety
Michelle Niemeyer, PNNL	MS Agricultural Economics BS Agricultural Economics 15+ years of experience including NEPA environmental impact assessments, project management, economics, and stakeholder engagement
Tara O'Neil, PNNL	MBA BA Anthropology emphasis on archaeology Over 30 years of experience in NEPA, NHPA Section 106, Tribal engagement
Kendall Parker, PNNL	PhD Mechanical Engineering MS Mechanical Engineering BS Mechanical Engineering 3 years in human impact analysis of energy, electricity, and the environment
Mike Parker, PNNL	BA English Literature 25 years of experience copyediting, document design, and formatting and 20 years of experience in technical editing
Rajiv Prasad, PNNL	PhD Civil and Environmental Engineering MTech Civil Engineering BE Civil Engineering 25 years of experience in applying hydrologic principles to water resources engineering, hydrologic design, flooding assessments, environmental engineering, and impact assessment, including 15 years of experience in NEPA environmental assessments of surface water resources

Table A-1 List of Preparers (Continued)

Name and Affiliation	Education/Experience
Lauren Rodman, PNNL	MA Resource Management BA Environmental Studies Over 10 years of experience in Tribal engagement and stakeholder engagement, and 4 years of experience in NEPA environmental impact assessments
Kacoli Sen, PNNL	PhD Cancer Biology MS Zoology (specialization in ecology) BS Zoology Diploma in Environmental Law Over 6 years of document editing and production experience
Kazi Tamaddun, PNNL	PhD Civil and Environmental Engineering MS Civil Engineering 8 years of experience in hydrologic, hydraulic, ecosystem, and water systems modeling; hydro-climatology; and climate change modeling and analysis
Seema Verma, PNNL	PhD Biological Sciences MS Biosciences BS Zoology Graduate certificate in regulatory sciences; 3 years of experience in navigating Federal agency regulations (including Title 10 *Code of Federal Regulations)* and NEPA environmental impact assessments of nonradiological human health, noise, and nonradological waste
Caitlin Wessel, PNNL	PhD Marine Science MS Coastal, Marine, and Wetland Science BS Biology BS Math 11 years of relevant experience in environmental impact assessment and aquatic ecology
Lin Zeng, PNNL	PhD Environmental Science and Engineering BE Civil Engineering 10 years of experience on socioeconomic analysis and environmental impact assessment

AM or MA = Master of Arts; BA = Bachelor of Arts; BS = Bachelor of Science; DoD = U.S. Department of Defense; DOE = U.S. Department of Energy; DOI = U.S. Department of Interior; CEG = Certified Engineering Geologist; EA = environmental assessment; GIS = geographic information system; MBA = Master of Business Administration; MRP = Master of Regional Planning; MS = Master of Science; NEPA = National Environmental Policy Act of 1969; NNSA = National Nuclear Security Administration; NRC = U.S. Nuclear Regulatory Commission; PG = Professional Geologist; PhD = Doctor of Philosophy; PNNL = Pacific Northwest National Laboratory.

APPENDIX B

AGENCIES, ORGANIZATIONS, TRIBES, AND INDIVIDUALS CONTACTED

The U.S. Nuclear Regulatory Commission (NRC or Commission) is providing electronic copies of the Kemmerer Unit 1 Construction Permit Environmental Impact Statement to the agencies, organizations, Tribes, and individuals listed in Table B-1. The NRC will also send copies to citizens that provided comments and contact information during the scoping period. The NRC will provide copies to other interested organizations and individuals upon request.

Table B-1 List of Agencies, Organizations, Tribes, and Persons to Whom Copies of this Environmental Impact Statement Are Sent

Name	Affiliation	Contact Information
Melissa McCoy	U.S. Environmental Protection Agency, Region 8	NEPA Program U.S. EPA Region 8 1595 Wynkoop Street Denver, CO 80202
Alison Gordon	U.S. Geological Survey	3450 Princeton Pike Lawrenceville, NJ 08648
Will Schultz	Wyoming Game and Fish Department	5400 Bishop Blvd Cheyenne, WY 82006
Brian Beadles	Wyoming State Historic Preservation Office	2301 Central Avenue Barret Building, Third Floor Cheyenne, WY 82002
Todd Parfit, Director	Wyoming Department of Environmental Quality	200 West 17th St. Cheyenne, WY 82002
Bill Marzella	Advisory Council on Historic Preservation	401 F Street NW, Suite 308 Washington DC 20001-2637
Kristin Kerwin, Director Environment, Health, Safety and Security	U.S. Department of Energy, Office of Clean Energy Demonstrations	kristin.kerwin@hq.doe.gov
Gretchen Applegate, Compliance Specialist	U.S. Department of Energy, Office of Clean Energy Demonstrations	gretchen.applegate@hq.doe.gov
Amy Shanahan, Cultural Resource Specialist	U.S. Department of Energy, Office of Clean Energy Demonstrations	amy.shanahan@hq.doe.gov
Dennis Alex, Chairman	Northwestern Band of the Shoshone Nation	2575 Commerce Way Ogden, UT 84401
Janet Alkire, Chairwomen	Standing Rock Sioux Tribe	1 Standing Rock Avenue Fort Yates, ND 58538
Harlan Baker, Chairman	Chippewa Cree Tribe	96 Clinic Road Box Elder, MT 59521
Durell Cooper, Chairman	Apache Tribe of Oklahoma	P.O. Box 1330 Anadarko, OK 73005
Boyd I. Gourneau, Chairman	Lower Brule Sioux Tribe	187 Oyate Circle Lower Brule, SD 57548
Robert Flying Hawk, Chairman	Yankton Sioux Tribe	P.O. Box 1153 Wagner, SD 57380

Table B-1 List of Agencies, Organizations, Tribes, and Persons to Whom Copies of this Environmental Impact Statement Are Sent (Continued)

Name	Affiliation	Contact Information
Mark Fox, Chairman	Three Affiliated Tribes of the Fort Berthold Reservation	404 Frontage Road New Town, ND 58763
Lloyd Goggles, Chairman	Northern Arapaho Tribe	P.O. Box 396 Ethete, WY 82520
Justin Gray Hawk, Sr., Chairman	Fort Peck Assiniboine and Sioux Tribes	P.O. Box 1027 Poplar, MT 59255
Kathleen Wooden Knife, President	Rosebud Sioux Tribe	P.O. Box 430 Rosebud, SD 57570
Lonna Jackson-Street, Chairperson	Spirit Lake Tribe	P.O. Box 359 Fort Totten, ND 58335
Rodney Gervais Jr., Chairman	Blackfeet Nation	P.O. Box 850 Browning, MT 59417
Victoria Kitcheyan, Chairwoman	Winnebago Tribe of Nebraska	P.O. Box 687 Winnebago, NE 68071
Ryman LeBeau, Chairman	Cheyenne River Sioux Tribe	P.O. Box 590 Eagle Butte, SD 57625
Peter Lengkeek, Chairman	Crow Creek Sioux Tribe	P.O. Box 50 Fort Thompson, SD 57339
Daniel Moon, Chairman	Skull Valley Band of Goshute Indians	1198 N. Main St. Tooele, UT 84074
Amos Murphy, Chairman	Confederated Tribes of the Goshute Reservation	HC61 Box 6104 Ibapah, UT 84034
Julius Murray, Chairman	Ute Indian Tribe	P.O. Box 190 Fort Duchesne, UT 84026
J. Garret Renville, Chairman	Sisseton Wahpeton Oyate	P.O. Box 509 Agency Village, SD 57262
Candace Schmidt, Chairwoman	Ponca Tribe of Nebraska	P.O. Box 288 Niobrara, NE 68760
Jason Sheridan, Chairman	Omaha Tribe of Nebraska	P.O. Box 368 Macy, NE 68039
Wayland Large, Chairman	Eastern Shoshone Tribe of the Wind River Reservation	P.O. Box 538 Fort Washakie, WY 82514
Frank Star Come Out, President	Oglala Sioux Tribe	P.O. Box 2070 Pine Ridge, SD 57770
Jeffrey Stiffarm, President	Fort Belknap Indian Community	RR1, Box 66 Harlem, MT 59526
Lee Juan Tyler, Chairman	Shoshone-Bannock Tribes	P.O. Box 306 Fort Hall, ID 83203
Reggie Wassana, Governor	Cheyenne and Arapaho Tribes	P.O. Box 38 Concho, OK 73022
Gene Small, President	Northern Cheyenne Tribe	P.O. Box 128 Lame Deer, MT 59043
Shannon F. Wheeler, Chairman	Nez Percé Tribe	P.O. Box 305 Lapwai, ID 83540
Frank White Clay, Chairman	Crow Tribe	P.O. Box 159 Crow Agency, MT 59022

Table B-1 List of Agencies, Organizations, Tribes, and Persons to Whom Copies of this Environmental Impact Statement Are Sent (Continued)

Name	Affiliation	Contact Information
Forrest Tahdooahnippah, Chairman	Comanche Nation	P.O. Box 908 Lawton, OK 73502
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Jaime Egolf	-	jamieegolf@qwestoffice.net

"-" denotes no data in table cell.

APPENDIX C

CHRONOLOGY OF ENVIRONMENTAL REVIEW CORRESPONDENCE

This appendix contains a chronological listing of correspondence between the U.S. Nuclear Regulatory Commission (NRC or Commission), US SFR Owner, LLC (USO), and external parties as part of its environmental review for the Kemmerer Unit 1 reactor construction permit. All documents, with the exception of those containing proprietary information, have been placed in the NRC's Public Document Reading Room at One White Flint North, 11555 Rockville Pike (First Floor), Rockville, Maryland, and are available electronically from the NRC's Agencywide Document Access and Management Systems (ADAMS). ADAMS accession numbers for each document are included below. Some of the ADAMS accession numbers below lead to a folder containing several documents. If you need assistance in accessing or searching in ADAMS, contact the Public Document Room staff at 1-(800)-397-4209. Table C-1 lists the environmental review correspondence by date.

Table C-1 List of Correspondence Between the U.S. Nuclear Regulatory Commission and External Parties Concerning Kemmerer Unit 1

Date	Correspondence Description	ADAMS Accession No. or *Federal Register* Citing
06/08/2021	Letter to NRC from Ryan Sprengel, TerraPower, LLC, submitting the Regulatory Engagement Plan for the Natrium Reactor	ML21159A221
06/02/2023	Letter to NRC from Ryan Sprengel, TerraPower, LLC, submitting the Kemmerer Power Station Unit Construction Permit Application Submittal Timeline	ML23153A132
03/19/2024	Letter from NRC to George Wilson, TerraPower, LLC, submitting the preapplication readiness assessment report for Kemmerer Power Station Unit 1	ML24060A227
03/28/2024	Letter to NRC from George Wilson, TerraPower, LLC, submitting a Construction Permit Application for Kemmerer Power Station Unit 1	ML24088A059
05/14/2024	*Federal Register Notice* – Construction Permit Application; Notice of receipt and availability of the Kemmerer Station Unit 1 reactor (89 FR 42004)	*89 FR 42004*
05/14/2024	Letter from NRC to George Wilson, TerraPower LLC, acknowledging receipt of the application	ML24127A183
05/21/2024	Letter from NRC to George Wilson, TerraPower, LLC, acceptance for docketing of Kemmerer Power Station Unit 1 Permit Application by USO	ML24135A109
06/04/2024	*Federal Register Notice* – Notice for the acceptance for docketing, opportunity to request a hearing and petition for leave to intervene; order imposing procedures	89 FR 47997
06/12/2024	Letter from NRC to George Wilson, TerraPower, LLC, providing a summary of the schedule and resource estimates for the detailed review of the Kemmerer Unit 1 construction permit	ML24162A063
06/12/2024	Letter from NRC to Reid Nelson, Executive Director of the Advisory Council on Historic Preservation requesting to initiate Section 106 consultation and scoping process for Kemmerer Station Unit 1	ML24114A089

Table C-1 List of Correspondence Between the U.S. Nuclear Regulatory Commission and External Parties Concerning Kemmerer Unit 1 (Continued)

Date	Correspondence Description	ADAMS Accession No. or *Federal Register* Citing
06/12/2024	Letter from NRC to Sara Sheen, State Historic Preservation Officer, Wyoming State Historic Preservation Officer, Wyoming State Historic Preservation Office inviting to submit comments or concerns on the scope of the environmental review	ML24114A090
06/12/2024	Letter from NRC to George Wilson, TerraPower, LLC, Notice of Intent to prepare an Environmental Impact Statement and conducting scoping related to the construction permit	ML24109A275
06/13/2024	Memorandum of Understanding between the U.S. Department of Energy and NRC for coordination among parties for responsibilities under the National Environmental Policy Act of 1969, as amended	ML24172A001
06/14/2024	*Federal Register Notice* – Notice of Intent to Conduct Scoping Process and Prepare an Environmental Impact Statement (89 FR 49917)	89 FR 49917
06/14/2024	Letter from NRC to Dennis Alex, Chairman, Northwestern Band of the Shoshone Nation, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A160
06/14/2024	Letter from NRC to Clyde J.R. Estes, Chairman, Lower Brule Sioux Tribe, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A164
06/14/2024	Letter from NRC to Harlan Baker, Chairman, Chippewa Cree Tribe Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A162
06/14/2024	Letter from NRC to Durell Cooper, Chairman, Apache Tribe of Oklahoma, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A163
06/14/2024	Letter from NRC to Janet Alkire, Chairwoman, Standing Rock Sioux Tribe, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A161
06/14/2024	Letter from NRC to Lloyd Goggles, Chairman, Northern Arapaho Tribe, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A167
06/14/2024	Letter from NRC to Robert Flying Hawk, Chairman, Yankton Sioux Tribe, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A165
06/14/2024	Letter from NRC to Justin Gray Hawk, Sr. Chairman, Fort Peck Assiniboine and Sioux Tribes, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A168

Table C-1 List of Correspondence Between the U.S. Nuclear Regulatory Commission and External Parties Concerning Kemmerer Unit 1 (Continued)

Date	Correspondence Description	ADAMS Accession No. or *Federal Register* Citing
06/14/2024	Letter from NRC to Scott Kipp, Chairman, Blackfeet Nation, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A171
06/14/2024	Letter from NRC to Lonna Jackson-Street, Chairperson, Spirit Lake Tribe, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A170
06/14/2024	Letter from NRC to Mark Fox, Chairman, Three Affiliated Tribes, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A166
06/14/2024	Letter from NRC to Victoria Kitcheyan, Chairwoman, Winnebago Tribe of Nebraska, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A172
06/14/2024	Letter from NRC to Scott O. Herman, President, Rosebud Sioux Tribe, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A169
06/14/2024	Letter from NRC to Candace Schmidt, Chairwomen, Ponca Tribe of Nebraska, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A179
06/14/2024	Letter from NRC to Amos Murphy, Chairman, Confederated Tribes of the Goshute Reservation, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A176
06/14/2024	Letter from NRC to Julius Murray, Chairman, Ute Indian Tribe, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A177
06/14/2024	Letter from NRC to Jason Sheridan, Chairman, Omaha Tribe of Nebraska, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A180
06/14/2024	Letter from NRC to J. Garret Renville, Chairman, Sisseton Wahpeton Oyate, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A178
06/14/2024	Letter from NRC to Daniel Moon, Chairman, Skull Valley Band of Goshute Indians, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A175

Table C-1 List of Correspondence Between the U.S. Nuclear Regulatory Commission and External Parties Concerning Kemmerer Unit 1 (Continued)

Date	Correspondence Description	ADAMS Accession No. or *Federal Register* Citing
06/14/2024	Letter from NRC to Peter Lengkeek, Chairman, Crow Creek Sioux Tribe, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A174
06/14/2024	Letter from NRC to Ryman LeBeau, Chairman, Cheyenne River Sioux Tribe, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A173
06/14/2024	Letter from NRC to Lee Juan Tyler, Chairman, Shoshone-Bannock Tribes, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A184
06/14/2024	Letter from NRC to Reggie Wassana, Governor, Cheyenne and Arapaho Tribes, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A185
06/14/2024	Letter from NRC to Mark Woommavovah, Chairman, Comanche Nation, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A189
06/14/2024	Letter from NRC to Shannon F. Wheeler, Chairman, Nez Percé Tribe, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A187
06/14/2024	Letter from NRC to Serena Wetherelt, President, Northern Cheyenne Tribe, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A186
06/14/2024	Letter from NRC to Frank White Clay, Chairman, Crow Tribe, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A188
06/14/2024	Letter from NRC to Frank Star Comes Out, President, Oglala Sioux Tribe, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A182
06/14/2024	Letter from NRC to Jeffrey Stiffarm, President, Fort Belknap Indian Community, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A183
06/14/2024	Letter from NRC to John St. Clair, Chairman, Eastern Shoshone Tribe, Request to Initiate Section 106 Construction and Scoping Process for Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24165A181

Table C-1 List of Correspondence Between the U.S. Nuclear Regulatory Commission and External Parties Concerning Kemmerer Unit 1 (Continued)

Date	Correspondence Description	ADAMS Accession No. or *Federal Register* Citing
07/15/2024	Plan for a General Audit of the Kemmerer Unit 1 Construction Permit Application	ML24187A117
07/19/2024	Letter to the NRC from the Northern Arapaho Tribe Regarding Response to Section 106 Initiation and Scoping	ML24283A170
07/31/2024	USO – Kemmerer Unit 1 Environmental Report Audit Plan	ML24213A268
08/13/2024	NRC Memorandum: Summary of Public Scoping Meeting Related to the Environmental Scoping Process of the USO Construction Permit for Kemmerer Unit 1	ML24222A597
09/04/2024	Letter from NRC to Amy Shanahan, U.S. Department of Energy Office of Clean Energy Demonstrations Regarding a Supplemental Review of a Permanent Electrical Distribution Line at the TerraPower Natrium Reactor Project pursuant to the National Historic Preservation Act	ML24233A057
10/08/2024	Letter from NRC to Amy Shanahan, U.S. Department of Energy Office of Clean Energy Demonstrations Regarding a review of a cultural resource testing plan and research design for road investigations at the TerraPower Natrium Reactor Project site	ML24281A046
10/08/2024	Letter from NRC to Amy Shanahan, U.S. Department of Energy Office of Clean Energy Demonstrations Regarding a Review of Preconstruction Activities at the TerraPower Natrium Reactor Project for Kemmerer Unit 1	ML24275A072
10/23/2024	Email from NRC to TerraPower, LLC, Request for Confirmation of Information for Kemmerer Unit 1 Environmental Report Batch #1 Information Needs	ML24298A114
10/29/2024	Letter to NRC from George Wilson, TerraPower, LLC, on the Submittal of Approved TerraPower, LLC Topical Report, “An Analysis of Potential Volcanic Hazards at the Proposed Natrium Site near Kemmerer, Wyoming”	ML24303A409
11/06/2024	Email from NRC to TerraPower, LLC, Request for Supplemental Information for Kemmerer Unit 1 Environmental Report Batch #1, Batch #2, and Batch #3 Information Needs and Requests for Additional Information	ML24311A168
11/22/2024	Memorandum from NRC concerning the Issuance of Environmental Scoping Summary Report with the NRC Staff’s Review of the USO Construction Permit Application for Kemmerer Unit 1	ML24271A031
11/22/2024	Environmental Impact State Scoping Process Summary Report Kemmerer Power Station Unit 1 Construction Permit Kemmerer, Wyoming, November 2024	ML24274A253
11/25/2024	Environmental Impact Statement Scoping Process Summary Report: Kemmerer Power Station Unit 1 Construction Permit	ML24274A253
11/25/2024	Letter from NRC to George Wilson, TerraPower, LLC, Revised Resource Estimate related to Section 106 process of the National Historic Preservation Act	ML24304A977
12/06/2024	Letter to NRC from George Wilson, TerraPower, LLC, the Transmittal of Responses to NRC’s Request for Supplemental	ML24344A002

Table C-1 List of Correspondence Between the U.S. Nuclear Regulatory Commission and External Parties Concerning Kemmerer Unit 1 (Continued)

Date	Correspondence Description	ADAMS Accession No. or *Federal Register* Citing
	Information for Kemmerer Unit 1 Environmental Report Batch#1, Batch #2, and Batch #3 Information Needs and Requests for Additional Information	
12/17/2024	Letter to NRC from George Wilson, TerraPower, LLC, the Transmittal of Response RAI-1 and Class III Cultural Resource Inventory Report (Non-public)	ML24352A354 (non-public)
02/04/2025	Letter from NRC to Sara Sheen, Wyoming State Historic Preservation Officer, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25034A123
02/04/2025	Letter from NRC to Jaime Loichinger, Advisory Council on Historic Preservation, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25034A121
02/04/2025	Letter from NRC to Dennis Alex, Chairman, Northwestern Band of the Shoshone Nation, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25034A151
02/04/2025	Letter from NRC to Boyd I. Gourneau, Chairman, Lower Brule Sioux Tribe, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25034A144
02/04/2025	Letter from NRC to Harlan Baker, Chairman, Chippewa Cree Tribe, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25029A048
02/04/2025	Letter from NRC to Durell Cooper, Chairman, Apache Tribe of Oklahoma, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML24358A181
02/04/2025	Letter from NRC to Janet Alkire, Chairwoman, Standing Rock Sioux Tribe, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25035A210
02/04/2025	Letter from NRC to Lloyd Goggles, Chairman, Northern Arapaho Tribe, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25034A176
02/04/2025	Letter from NRC to Robert Flying Hawk, Chairman, Yankton Sioux Tribe, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25035A214

Table C-1 List of Correspondence Between the U.S. Nuclear Regulatory Commission and External Parties Concerning Kemmerer Unit 1 (Continued)

Date	Correspondence Description	ADAMS Accession No. or *Federal Register* Citing
02/04/2025	Letter from NRC to Justin Gray Hawk, Sr. Chairman, Fort Peck Assiniboine and Sioux Tribes, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25034A169
02/04/2025	Letter from NRC to Rodney Gervais Jr., Chairman, Blackfeet Nation, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25029A027
02/04/2025	Letter from NRC to Lonna Jackson-Street, Chairperson, Spirit Lake Tribe, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25035A212
02/04/2025	Letter from NRC to Mark Fox, Chairman, Three Affiliated Tribes, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25035A213
02/04/2025	Letter from NRC to Victoria Kitcheyan, Chairwoman, Winnebago Tribe of Nebraska, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25035A215
02/04/2025	Letter from NRC to Kathleen Wooden Knife, President, Rosebud Sioux Tribe, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25034A170
02/04/2025	Letter from NRC to Amos Murphy, Chairman, Confederated Tribes of the Goshute Reservation, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25029A041
02/04/2025	Letter from NRC to Julius Murray, Chairman, Ute Indian Tribe, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25035A211
02/04/2025	Letter from NRC to Jason Sheridan, Chairman, Omaha Tribe of Nebraska, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25034A165
02/04/2025	Letter from NRC to J. Garrett Renville, Chairman, Sisseton Wahpeton Oyate, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25035A209
02/04/2025	Letter from NRC to Daniel Moon, Chairman, Skull Valley Band of Goshute Indians, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25035A208

Table C-1 List of Correspondence Between the U.S. Nuclear Regulatory Commission and External Parties Concerning Kemmerer Unit 1 (Continued)

Date	Correspondence Description	ADAMS Accession No. or *Federal Register* Citing
02/04/2025	Letter from NRC to Peter Lengkeek, Chairman, Crow Creek Sioux Tribe, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25029A050
02/04/2025	Letter from NRC to Ryman LeBeau, Chairman, Cheyenne River Sioux Tribe, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25029A028
02/04/2025	Letter from NRC to Lee Juan Tyler, Chairman, Shoshone-Bannock Tribes, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25034A171
02/04/2025	Letter from NRC to Reggie Wassana, Governor, Cheyenne and Arapaho Tribes, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25029A026
02/04/2025	Letter from NRC to Forrest Tahdooahnippah, Chairman, Comanche Nation, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25029A042
02/04/2025	Letter from NRC to Shannon F. Wheeler, Chairman, Nez Percé Tribe, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25034A180
02/04/2025	Letter from NRC to Gene Small, President, Northern Cheyenne Tribe, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25034A163
02/04/2025	Letter from NRC to Frank White Clay, Chairman, Crow Tribe, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25034A154
02/04/2025	Letter from NRC to Frank Star Comes Out, President, Oglala Sioux Tribe, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25034A159
02/04/2025	Letter from NRC to Jeffrey Stiffarm, President, Fort Belknap Indian Community, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25034A166
02/04/2025	Letter from NRC to Wayland Large, Chairman, Eastern Shoshone Tribe, Notification of Adverse Effect for TerraPower Kemmerer Power Station Unit 1 Construction Permit Review in Lincoln County, Wyoming	ML25034A181

Table C-1 List of Correspondence Between the U.S. Nuclear Regulatory Commission and External Parties Concerning Kemmerer Unit 1 (Continued)

Date	Correspondence Description	ADAMS Accession No. or *Federal Register* Citing
02/11/2025	Transmittal of Kemmerer Unit 1 Class III Cultural Resource Inventory Report (Public)	ML25049A292
02/12/2025	Transmittal to NRC from WY SHPO – Concurrence with Class III Survey and Adverse Effects	ML25044A095
02/18/2025	Transmittal to NRC from ACHP – Acknowledging Adverse Effects	ML25049A244
02/26/2025	Letter to the NRC from the Northern Arapaho Tribe Regarding Response to Adverse Effect Notification	ML25057A496
02/27/2025	Transmittal to NRC from George Wilson, TerraPower, LLC, the TerraPower Tribal Information Workshop Presentation	ML25058A245
02/27/2025	Transmittal to NRC from George Wilson, TerraPower, LLC, the Transmittal of Responses to NRC's request for Supplemental Information AECO-2 and STO-2	ML25058A220
03/04/2025	Transmittal to NRC from George Willson, TerraPower, LLC, the Cultural resource site avoidance and request for approval to conduct testing in accordance with Historic Properties Treatment Plan	ML25064A005
03/12/2025	Letter to the NRC from the Comanche Nation Regarding Response to Adverse Effect Notification	ML25072A054
03/14/2025	Letter from U.S. Department of Energy Office of Clean Energy Demonstrations to the NRC Regarding the Sodium Test and Fill Facility – Supplemental Review of the Permanent Electrical Distribution Line	ML25073A264
03/16/2025	Transmittal to NRC from George Wilson, TerraPower, LLC, the Transmittal of Responses to NRC's Request for Supplemental Information HYD-10, HYD-13, and HYD-14	ML25076A001
03/21/2025	Transmittal to NRC from George Wilson, TerraPower, LCC, Testing Plan for Cultural Resource Sites 48LN740 and 48LN8940	ML25083A002
03/24/2025	Letter from NRC to Sara Sheen, Wyoming State Historic Preservation Officer, Request for Concurrence on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25073A136
03/24/2025	Letter from NRC to Dennis Alex, Chairman, Northwestern Band of the Shoshone Nation, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25073A120
03/24/2025	Letter from NRC to Boyd Gourneau, Chairman, Lower Brule Sioux Tribe, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A167
03/24/2025	Letter from NRC to Harlan Baker, Chairman, Chippewa Cree Tribe, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A181

Table C-1 List of Correspondence Between the U.S. Nuclear Regulatory Commission and External Parties Concerning Kemmerer Unit 1 (Continued)

Date	Correspondence Description	ADAMS Accession No. or *Federal Register* Citing
03/24/2025	Letter from NRC to Durell Cooper, Chairman, Apache Tribe of Oklahoma, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25073A120
03/24/2025	Letter from NRC to Janet Alkire, Chairwoman, Standing Rock Sioux Tribe, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A183
03/24/2025	Letter from NRC to Lloyd Goggles, Chairman, Northern Arapaho Tribe, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A191
03/24/2025	Letter from NRC to Robert Flying Hawk, Chairman, Yankton Sioux Tribe, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A200
03/24/2025	Letter from NRC to Justin Gray Hawk, Sr. Chairman, Fort Peck Assiniboine and Sioux Tribes, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A188
03/24/2025	Letter from NRC to Rodney Gervais Jr., Chairman, Blackfeet Nation, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A202
03/24/2025	Letter from NRC to Lonna Jackson-Street, Chairperson, Spirit Lake Tribe, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A192
03/24/2025	Letter from NRC to Mark Fox, Chairman, Three Affiliated Tribes, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A197
03/24/2025	Letter from NRC to Victoria Kitcheyan, Chairwoman, Winnebago Tribe of Nebraska, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A207
03/24/2025	Letter from NRC to Kathleen Wooden Knife, President, Rosebud Sioux Tribe, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A189
03/24/2025	Letter from NRC to Amos Murphy, Chairman, Confederated Tribes of the Goshute Reservation, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the	ML25083A166

Table C-1 List of Correspondence Between the U.S. Nuclear Regulatory Commission and External Parties Concerning Kemmerer Unit 1 (Continued)

Date	Correspondence Description	ADAMS Accession No. or *Federal Register* Citing
	Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	
03/24/2025	Letter from NRC to Julius Murray, Chairman, Ute Indian Tribe, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A187
03/24/2025	Letter from NRC to Jason Sheridan, Chairman, Omaha Tribe of Nebraska, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A184
03/24/2025	Letter from NRC to J. Garrett Renville, Chairman, Sisseton Wahpeton Oyate, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A182
03/24/2025	Letter from NRC to Daniel Moon, Chairman, Skull Valley Band of Goshute Indians, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A173
03/24/2025	Letter from NRC to Peter Lengkeek, Chairman, Crow Creek Sioux Tribe, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A182
03/24/2025	Letter from NRC to Ryman LeBeau, Chairman, Cheyenne River Sioux Tribe, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A203
03/24/2025	Letter from NRC to Lee Juan Tyler, Chairman, Shoshone-Bannock Tribes, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A190
03/24/2025	Letter from NRC to Reggie Wassana, Governor, Cheyenne and Arapaho Tribes, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A199
03/24/2025	Letter from NRC to Forrest Tahdooahnippah, Chairman, Comanche Nation, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A176
03/24/2025	Letter from NRC to Shannon F. Wheeler, Chairman, Nez Percé Tribe, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A204

Table C-1 List of Correspondence Between the U.S. Nuclear Regulatory Commission and External Parties Concerning Kemmerer Unit 1 (Continued)

Date	Correspondence Description	ADAMS Accession No. or *Federal Register* Citing
03/24/2025	Letter from NRC to Gene Small, President, Northern Cheyenne Tribe, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A180
03/24/2025	Letter from NRC to Frank White Clay, Chairman, Crow Tribe, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A177
03/24/2025	Letter from NRC to Frank Star Comes Out, President, Oglala Sioux Tribe, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A175
03/24/2025	Letter from NRC to Jeffrey Stiffarm, President, Fort Belknap Indian Community, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A185
03/24/2025	Letter from NRC to Wayland Large, Chairman, Eastern Shoshone Tribe, Request for Consultation on Archaeological Testing Plan for Sites 48LN740 and 48LN8940 at the Proposed TerraPower Kemmerer Power Station Unit 1 Site in Lincoln County, Wyoming	ML25083A208

ACHP = Advisory Council on Historic Preservation; ADAMS = Agencywide Document Access and Management Systems; FR = *Federal Register*; Kemmerer Unit 1 = Kemmerer Power Station Unit 1; NRC = U.S. Nuclear Regulatory Commission; TerraPower = TerraPower, LLC; USO = US SFR Owner.

APPENDIX D

REGULATORY COMPLIANCE AND LIST OF FEDERAL, STATE, AND LOCAL PERMITS AND APPROVALS

Table D-1 contains a list of the environmental-related authorizations, permits, and certifications potentially required by Federal, State, regional, local, and affected Native American Tribal agencies related to site preparation and construction of the Kemmerer Unit 1 reactor.

Table D-1 was adapted from Table 1.4-1 of the environmental report submitted to the U.S. Nuclear Regulatory Commission by the applicant (TerraPower 2024-TN10896).

Table D-1 Authorizations Required for Preconstruction, Construction, and Operation Activities at Kemmerer Unit 1

Agency	Authority	Requirement	Activity Covered
NRC	Atomic Energy Act 10 CFR 50.50	Construction Permit	Construction of the facilities
NRC	10 CFR 50.57	Operating License	Operation of the facilities
NRC	10 CFR Part 40	Source Material License	Possession, use, and transfer of special nuclear material
NRC	10 CFR Part 30	Byproduct Material License	Production, possession, and transfer of radioactive byproduct material
NRC	NEPA, 10 CFR Part 51	NRC Issuance of Environmental Impact Statement(s)	Evaluation of environmental impacts from construction and operation
U.S. Department of Energy	NEPA, 10 CFR Part 1021	U.S. Department of Energy completes NEPA of 1969 review for building activities that occur prior to issuance of NRC Environmental Impact Statement(s)	Evaluation of building activities that occur prior to issuance of NRC Environmental Impact Statement(s)
U.S. Department of Energy	Nuclear Waste Policy Act (42 U.S.C. 10101 et seq.), 10 CFR Part 961	Spent Fuel	Contract for disposal of spent nuclear fuel entered or under negotiation in accordance with 42 U.S.C. 10222(b)(1)
U.S. Army Corps of Engineers	Clean Water Act of 1976 (33 U.S.C. 1251, et seq.)	Section 404 Permit; Nationwide Permit	Approval for activities required for crossings of waters of the U.S. from construction of linear projects
U.S. Fish and Wildlife Service	Endangered Species Act	Section 7 Consultation	Protection of endangered and threatened species and critical habitats designated under the Federal Endangered Species Act
Federal Aviation Administration	Federal Aviation Act 14 CFR 77	Construction Notice	Construction of structures that potentially may impact air navigation. Construction or building activities greater than 200 feet (60.96 meters)
Wyoming Department of Environmental Quality	Wyoming Industrial Development Information and Siting Act Wyoming Statute Title 35, Chapter 12	Industrial Siting Permit	Facilities with an estimated construction cost above the annually adjusted construction cost indicated in Title 35, Chapter 12. Cannot commence construction without permit

Table D-1 Authorizations Required for Preconstruction, Construction, and Operation Activities at Kemmerer Unit 1 (Continued)

Agency	Authority	Requirement	Activity Covered
Wyoming Department of Environmental Quality	Clean Water Act of 1976 (Wyoming has delegation authority), Wyoming Environmental Quality Act of 1973, Wyoming Statute Title 35, Chapter 11	National Pollutant Discharge Elimination System/Wyoming Pollutant Discharge Elimination System Large Construction General Permit	Large construction general permit covers stormwater discharges from construction activities that disturb 5 or more acres A Stormwater Pollution Prevention Plan along with a notice of intent to Wyoming Department of Environmental Quality within 30 days prior to start of construction
Wyoming Department of Environmental Quality	-	National Pollutant Discharge Elimination System/Wyoming Pollutant Discharge Elimination System Individual Industrial Discharge Permit	Coverage includes industrial wastewater discharge activities (operation) and stormwater discharges from industrial activities
Wyoming Department of Environmental Quality	-	Temporary Construction Dewatering Permit	Construction dewatering activities less than 12 months
Wyoming Department of Environmental Quality	Clean Air Act Amendments of 1990, (Wyoming has delegation authority), Wyoming Environmental Quality Act of 1973, Wyoming Statute Title 35, Chapter 11	New Source Review, Title V Operations Permit Construction Notice	Operation that generates air emissions
Wyoming Department of Environmental Quality	SDWA and Wyoming Water Quality Rules and Regulations, Chapters 3, 5, 11, and 12; The Wyoming Environmental Quality Act, W.S. 35-11-101 and Article 3, W.S. 35-11-103, and 301	WYDEQ Water Quality Division Water and Wastewater Permit to Construct	Construction of, “a system for the provision to the public of water for human consumption through pipes or constructed conveyances, if such system has at least fifteen (15) service connections or regularly serves at least twenty-five (25) individuals”
Wyoming Department of Environmental Quality	-	Certificate of Completion	Submit a certificate of completion form after construction of water distribution and wastewater facilities is complete

Table D-1 Authorizations Required for Preconstruction, Construction, and Operation Activities at Kemmerer Unit 1 (Continued)

Agency	Authority	Requirement	Activity Covered
Wyoming Department of Environmental Quality	-	Operator Certificate	Operation of a public water supply EPA Operator Certificate Program Management, administered under the Wyoming Operator Certification Program in coordination with the EPA Region 8 coordinator
Wyoming State Historic Preservation Office	National Historic Preservation Act of 1966, Wyoming Antiquities Act of 1935	National Historic Preservation Act Section 106 Consultation for Historic and Cultural Resources	Consultation, cultural resource inventory, and project review in compliance with Section 106 of the National Historic Preservation Act and Wyoming Antiquities Act of 1935
Wyoming Department of Transportation	Wyoming Department of Transportation Rules and Regulations, General Section, Chapter 13, Access Facilities, W.S. 24-2-105 and W.S. 24-6-101 through W.S. 24-6-111	Wyoming Department of Transportation Access Permit	An access permit is required for any widening or building of an approach from land joined to a State highway right-of-way Requires applicants to be responsible for construction, maintenance, and removal (if necessary) of the approach
Wyoming State Engineer's Office	Wyoming Industrial Development Information and Siting Act, Wyoming Statute Title 35, Chapter 12	SEO issuance of preliminary and final opinion that there is a sufficient quantity of water available for operation of the proposed facility – Part of ISP	The Wyoming State Engineer's Office is charged with the regulation and administration of the water resources in Wyoming
Wyoming Department of Transportation	Wyoming Statute Title 41, Chapter 3, Section 41-3-930	Permit to Appropriate Groundwater	Beneficial use of groundwater during construction
Wyoming State Engineer's Office	Land Use Regulations, Lincoln County, Wyoming, Chapter 2, page 9	Land Use Permit and Driveway Access Permit	Issuance of Land Use Permit - No premises shall be used, or building, or structure constructed within any zoning district, as a conditional use until the owner has obtained a conditional use permit from the Board of County Commissioners
Wyoming State Engineer's Office	Land Use Regulations, Lincoln County, Wyoming, Appendix C, pages 1 - 19	Floodplain Permit	Issuance of Floodplain Permit: All impacts of activities proposed within regulated floodplains must be evaluated in compliance with the Lincoln

Table D-1 Authorizations Required for Preconstruction, Construction, and Operation Activities at Kemmerer Unit 1 (Continued)

Agency	Authority	Requirement	Activity Covered
			County Land Use Regulations, Appendix C, “Flood Overlay Provisions”
Wyoming State Engineer’s Office	Land Use Regulations, Lincoln County, Wyoming, Chapter 2, page 10	Small Wastewater Permit	The installation of a small wastewater system requires a permit to construct in compliance with Lincoln County Land Use Regulations, Appendix E, “Small Wastewater Design Standards”

CFR = *Code of Federal Regulations;* EPA = U.S. Environmental Protection Agency; ISP = Industrial Siting Permit; NEPA = National Environmental Policy Act; NRC = U.S. Nuclear Regulatory Commission; SDWA = Safe Drinking Water Act; SEO = State Engineer’s Office; U.S.C. = *United States Code*; WYDEQ = Wyoming Department of Environmental Quality.
“-” denotes no data in table cell.

D.1 Reference

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APPENDIX E

SUMMARY OF CUMULATIVE EFFECTS AND CLIMATE CHANGE

Cumulative effects are defined as those that may result from the incremental effects of an action when added to the effects of other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time. Cumulative effects can also result from environmental disruptions that occur concurrently or near each other if there is insufficient time between disruptive events for the environment to recover (EPA 2022-TN11242). This appendix summarizes potential projects that could contribute to cumulative effects and incremental effects attributable to the construction of the proposed Kemmerer Unit 1.

E.1 Regional Cumulative Effects

Cumulative effects are typically evaluated by combining the effects of a proposed action with the effects of other past, present, and reasonably foreseeable future actions in the region of interest (ROI).[1] These other actions include onsite and offsite projects conducted by Federal, State, and local governments; the private sector; or individuals that are within the ROIs of the proposed action. Activities described in this appendix are likely to be geographically separated and have different ROIs. Therefore, the effects at one location would not generally be cumulative with effects at another location.

The effects of the building activities and operation of Kemmerer Unit 1, as described in this document, are combined with other past, present, and reasonably foreseeable future actions in the region that could affect the same resources, regardless of agency, private industry, or individuals within the ROI. The actions within the ROI discussed in this appendix are those expected to overlap with the effects of the proposed construction of Kemmerer Unit 1 due to timing and geographic area. Not all the effects of the construction of Kemmerer Unit 1 will be cumulative with other past, present, and reasonably foreseeable future actions. In addition, the effects of construction activities are based on existing environmental conditions, so the impact analysis has already accounted for past and present actions.

To identify potential projects that could contribute to cumulative effects, a search was conducted for projects sponsored by Federal, State, and local governments; the private sector; or individuals within the ROI of Kemmerer Unit 1 that had applied for an Industrial Siting Permit with the Wyoming Department of Environmental Quality or had completed an environmental assessment (EA) or environmental impact statement (EIS). This was accomplished by searching Federal (e.g., Bureau of Land Management National Environmental Policy Act register), State (e.g., Wyoming Department of Environmental Quality Industrial Siting Division and Wyoming Department of Transportation), and local websites. Projects that are within the ROI and would occur within the time frame of construction of Kemmerer Unit 1 are identified in Table 7.1-1 of the environmental report and summarized below (TerraPower 2024-TN10896).

[1] The ROI is the geographic area over which past, present, and reasonably foreseeable future actions could contribute to cumulative impacts and is dependent on the type of resource analyzed.

Kemmerer Unit 1 Preconstruction

The U.S. Department of Energy's Office of Clean Energy Demonstrations issued a final EA and related Finding of No Significant Impact on February 18, 2025, that evaluated the potential impacts from providing funding to TerraPower, LLC (TerraPower) for preconstruction activities for Kemmerer Unit 1. Preconstruction activities were assessed, such as site preparation; the laying of foundations and construction of buildings; the installation of underground services and stormwater management ponds; nonstructural backfill; and the establishment of temporary trailers, portable bathroom facilities, power, and parking areas (DOE 2025-TN11602). The preconstruction activities described in the EA will alter the affected environment prior to the U.S. Nuclear Regulatory Commission (NRC or Commission)-authorized construction activities described in this EIS. Preconstruction activities are expected to commence in May 2025 and continue for 18 months.

TerraPower Test and Fill Facility

The U.S. Department of Energy's Office of Clean Energy Demonstrations issued a final EA and related Finding of No Significant Impact in May 2024 that evaluated the potential impacts of the design and construction of the TerraPower Test and Fill Facility (TFF) (DOE 2024-TN11200). The TFF is related to but has independent utility from the Kemmerer Unit 1 project. As described in the TFF EA, the intent of the TFF is "(1) to support prototype-scale sodium testing/qualification for the Natrium Demonstration Plant (Kemmerer Unit 1); (2) to advance technologies for future Natrium style reactors; and (3) to provide the initial sodium fill for Kemmerer Unit 1." The TFF would be located on approximately 17.5 ac (7.2 ha) to the north of the Kemmerer Unit 1 project and would involve an additional 14.5 ac (5.7 ha) of temporary disturbance, including portions (e.g., site access) through the Kemmerer Unit 1 site. Construction on the TFF was initiated in 2024.

Naughton Power Plant

PacifiCorp has proposed to convert Units 1 and 2 of the Naughton Power Plant from coal to natural gas. Unit 3 of the Naughton Power Plant was already converted to natural gas in 2019. This conversion is expected to be completed by 2026, and the converted units are planned to operate through 2036. Electric distribution and water supply systems would service both the Naughton Power Plant and Kemmerer Unit 1 during this overlapping operational time frame.

Other Projects

- Kanata Kemmerer Decarbonization Work—The Kemmerer Decarbonization Work would be located at the Kemmerer Mine site and would repurpose feedstock of the existing Naughton generating station. Kemmerer Decarbonization Work plans to supply net-zero ammonia to serve agriculture and energy needs (Cowboy State Daily 2024-TN11219).
- The TriSight facility would involve the use of coal to produce fertilizer and beauty products.
- Lincoln Solar 1 and Lincoln Solar 2—Currently being developed by Greenbacker Renewable Energy Company, LLC, the Lincoln Solar projects are a proposed photovoltaic solar facility to be located in Lincoln and Sweetwater Counties.
- Uinta Wind—Developed by Florida Power & Light Company for a proposed 80 turbine, 161 MW wind energy project in northeast Uinta County, on approximately 24,000 ac (9,712.5 ha) of private and State lands that are currently used for livestock grazing and oil and gas production (BLM 2024-TN11235).

- Subsegment D3, Gateway West Transmission project—a proposed new 200 mi (321.9 km) long, 500 kV transmission line running from the Anticline substation near the Jim Bridger Power Plant in central Wyoming to the Populus substation in southeastern Idaho. A portion of the right-of-way is proposed to traverse Lincoln County north of the City of Kemmerer. The line is scheduled to be in service by 2028 at the earliest (PacifiCorp 2025-TN11238).
- ExxonMobil LaBarge Carbon Capture Project—ExxonMobil is proposing an expansion at its LaBarge, Wyoming carbon capture and sequestration project at Shute Creek Facility. The expansion would capture up to 1.2 million metric tons (MT) of carbon dioxide (CO_2) in addition to the 6–7 MT of CO_2 that is currently captured at the facility annually (ExxonMobil 2022-TN11239).
- Ciner Soda Ash Facility—proposed construction of a new soda ash refinery unit and associated facilities in Sweetwater County.
- Dry Creek Trona Mine Project—The Pacific Soda, LLC proposed operations would mine approximately 23.5 million MT of ore from trona beds located on private and public land near City of Green River, Wyoming. It is estimated that Pacific Soda, LLC would refine approximately 6.0 million MT of marketable soda ash per year at this location (BLM 2024-TN11240).
- Wyoming Department of Transportation Wildlife Crossing Along U.S. Route 189 (U.S. 189)—Wyoming Department of Transportation submitted a grant package on July 31, 2023, to the U.S. Department of Transportation Federal Highway Administration for the U.S. 189 Habitat Connectivity Corridor Expansion project, which would consist of several underpasses, high barrier wildlife fencing, and an overpass across U.S. 189. These would be spread over a 30 mi (48.3 km) stretch from the U.S. 189/30 junction north on U.S. 189 to around mile marker 34. The project is expected to begin construction in 2025 with a completion date of 2028 (WGFD 2024-TN11199).

E.2 Global Cumulative Effects – Climate Change and Greenhouse Gases

Climate change is the decades or longer change in climate measurements (e.g., temperature and precipitation) that has been observed on a global, national, and regional level (IPCC 2023-TN8557; USGCRP 2023-TN9762; EPA 2024-TN10205). Climate change is, in and of itself, a potential cumulative impact of multiple human activities and interactions with environmental changes. Prediction of the local magnitude, style, and timing of climate changes requires an understanding of how influences on climate interact with the proposed project. The following is a description of the local influences of climate change and an assessment of environmental resources (e.g., air quality, water resources, and socioeconomics) influenced by Kemmerer Unit 1.

Climate change research indicates that the cause of the Earth's warming over the last 50 to 100 years is due to the buildup of greenhouse gases (GHGs) in the atmosphere resulting from human activities (IPCC 2023-TN8557; USGCRP 2023-TN9762; EPA 2024-TN10205). Global surface temperature has increased faster since 1970 than in any other 50-year period over at least the last 2,000 years (IPCC 2023-TN8557). On a global level, from 1901 to 2016, the average temperature has increased by 1.8°F (1.0°C) (USGCRP 2018-TN5847; EPA 2024-TN10205). In July 2024, the global surface temperature was 2.2°F (1.2°C) above the 20th-century average of 60.4°F (15.8°C) (NCEI 2024-TN10602). Since 1901, precipitation has increased at an average rate of 0.03 in. (0.08 cm) per decade on a global level (EPA 2024-TN10205). The observed global change in average surface temperature and precipitation has been accompanied by an increase in sea surface temperatures, a decrease in global glacier ice, an increase in sea level, and changes in extreme weather events (IPCC 2023-TN8557; USGCRP 2023-TN9762; EPA 2024-TN10205). Such extreme events include an increase in the frequency of heat waves, very heavy precipitation (defined as the heaviest 1 percent of all daily events), and recorded maximum daily high temperatures (IPCC 2023-TN8557; USGCRP 2023-TN9762).

In the performance of this assessment, the NRC staff considered regional projected climate change effects from numerous climate assessment reports, including those from the U.S. Global Change Research Program (USGCRP), the Intergovernmental Panel on Climate Change (IPCC), the U.S. Environmental Protection Agency, and NOAA (IPCC 2023-TN8557; USGCRP 2023-TN9762; EPA 2024-TN10205; NCEI 2024-TN10602).

The IPCC sixth assessment synthesis report concluded that "[i]t is unequivocal that human influence has warmed the atmosphere, ocean and land" (IPCC 2023-TN8557). Furthermore, the IPCC, from their climate change scenario projections, concludes with a high confidence that adverse impacts from climate change will continue to intensify (IPCC 2023-TN8557). The Fifth National Climate Assessment published by the USGCRP uses shared socioeconomic pathway (SSP) and representative concentration pathway (RCP) emission scenarios when presenting projected climate change. The four RCP scenarios are numbered in accordance with the change in radiative forcing measured in watts per square meter (i.e., +2.6 [very low], +4.5 [lower], +6.0 [mid-high], and +8.5 [higher]) (USGCRP 2018-TN5847). For example, RCP 2.6 is representative of a mitigation scenario aimed at increasing renewable energy (USGCRP 2023-TN9762). RCP 8.5 reflects a scenario where total annual global CO_2 emissions in the year 2100 are quadruple emissions in 2000 (USGCRP 2023-TN9762). The five SSPs (SSP1-1.9, SSP1-2.6, SSP2-4.5, SSP3-7.0, and SSP5-8.5) cover a range of GHG pathways and climate change mitigation strategies.

Climate change and its impacts can vary regionally, spatially, and seasonally, depending on local, regional, and global factors. Observed climate changes and impacts have not been uniform across the United States. For example, annual precipitation has increased across most of the central and eastern States and decreased across the southern and western States (USGCRP 2023-TN9762). The Fifth National Climate Assessment is used to project possible climate changes within the region of the proposed Kemmerer Unit 1 facility. The region described in the Fifth National Climate Assessment, the Northern Great Plains region, includes Montana, Nebraska, North Dakota, South Dakota, and Wyoming. This region is known for its climate extremes and variability with strong east–west precipitation and north–south temperature gradients, as exemplified in Wyoming (USGCRP 2023-TN9762).

Temperature trends within the region are similar to other areas of the Nation. A trend analysis shows that, since 1895, the average annual temperature in Wyoming has increased at a rate of 0.2°F (0.1 °C) per decade (NCEI 2024-TN10602). Since 1900, there have been fewer very cold days (maximum temperature of 0°F (-17.7°C) or lower) than the long-term average for several decades (USGCRP 2023-TN9762). Increases of approximately 2.5°F (1.39°C) are projected for the period of 2021–2050 relative to 1976–2005 in all future GHG emission scenarios (also known as RCPs), and larger rises are projected by late century (2071–2100): 2.8°F (1.56°C) to 7.3°F (4.1°C) in a lower scenario (RCP4.5) and 5.8°F (3.2°C) to 11.9°F (6.6°C) in the higher scenario (RCP8.5) (USGCRP 2018-TN5847). Overall increased temperatures and thus aridity is projected to continue within the region.

Precipitation in the region has been relatively stable, with all States recording their wettest five-year period between 1995 and 2019 (USGCRP 2023-TN9762). A trend analysis shows that, since 1895, the average precipitation in Wyoming has decreased at a rate of 0.02 in. (0.05 cm) per decade (NCEI 2024-TN10602). However, shifts in the form and timing of precipitation have been observed. More intense precipitation and variable precipitation events are projected to occur in all seasons, especially in spring (Frankson et al. 2022-TN10898; USGCRP 2023-TN9762). It is anticipated that more precipitation will fall as rain instead of snow, reducing water storage in the snowpack, particularly at lower elevations that are currently on the margins of reliable snowpack accumulations (BLM 2023-TN11672). Temporal and spatial variability continue to be dominant factors with precipitation and temperature (USGCRP 2023-TN9762).

Higher temperatures have been attributed to decreasing snowpacks and altered surface water resources and increased pressure on groundwater resources (USGCRP 2023-TN9762). Drought, already a staple of the region, is expected to increase, with localized droughts increasing by 2040 and more widespread regional droughts by 2070, under intermediate (RCP4.5), high, (RCP6.0), and very high (RCP8.5) scenarios across wet or dry global climate models (USGCRP 2023-TN9762). Under these projections, it is expected that summer drought will be more probable than spring drought. Projected warming is expected to increase evapotranspiration—the moisture transfer from Earth's surface and plants to the atmosphere, which may lead to drier soils later in the growing season (USGCRP 2023-TN9762). Western Wyoming and western Montana are projected to experience the highest changes in evapotranspiration within the region.

With increasing temperatures and decreasing relative humidity, fire potential is projected to increase in the future, with fire seasons becoming longer. Increased evapotranspiration and drought risk raise the probability of large fire occurrence (USGCRP 2023-TN9762). The number of wildfires and fire-season length increased from the 1970s to the 2000s by 889 percent and 85 days, respectively, in western Montana and Wyoming forests, with most ignited by lightning strikes rather than by humans (USGCRP 2023-TN9762). Under most scenarios, the number of wildfires and fire-season length are expected to increase until midcentury when fuel availability is expected to become more limited (USGCRP 2023-TN9762).

Climate Change Impacts on Environmental Resources

Climate change impacts can occur across all resource areas that could be affected by the proposed action, including the effects of constructing the Kemmerer Unit 1 facility. In order for there to be a climate change impact on an environmental resource, the proposed action must have an incremental new, additive, or increased physical effect or impact on the resource or environmental condition beyond what is already occurring. Below, the NRC considers the effects of climate change on environmental resource areas that may also be directly affected by the construction of the Kemmerer Unit 1 facility.

Site-specific environmental conditions are considered when siting nuclear power plants. This includes the consideration of meteorological and hydraulic siting criteria as set forth in 10 *Code of Federal Regulations* (CFR) Part 100, "Reactor Site Criteria" (10 CFR Part 100-TN282). NRC regulations require that a facility's safety-related structures, systems, and components be designed and constructed to withstand the effects of natural phenomena, such as flooding, without loss of capability to perform safety functions.

Air Quality: Climate change can impact air quality as a result of changes in meteorological conditions. Air pollution concentrations are sensitive to winds, temperature, humidity, and precipitation. Climate change is expected to worsen harmful ground-level ozone. Ozone, a criteria pollutant, is formed by the chemical reaction of NO_x and VOC in the presence of heat and sunlight. The emission of ozone precursors also depends on temperature, wind, and solar radiation (IPCC 2007-TN7421). Warmer temperatures, droughts, and wildfires are favorable conditions for higher levels of ozone and $PM_{2.5}$ (USGCRP 2023-TN9762). Recent studies indicate that thunderstorms, pollutants from urban corridors, and drought in the summer influences surface ozone in the Intermountain West, which includes Wyoming (Zhang et al. 2014-TN11674; Reddy and Pfister 2016-TN11673). As discussed in Section 3.2 of this EIS, the portion of Lincoln County where Kemmerer Unit 1 is located has concentrations of National Ambient Air Quality Standards pollutants that are lower than regulatory thresholds, and thus is considered to be in attainment. USGCRP reports that there is medium confidence that climate change is projected to worsen air quality in many U.S. regions (USGCRP 2023-TN9762). This is due to the uncertainty in how meteorology will respond to climate change and how these meteorological conditions will in turn change air pollutant concentrations. By midcentury, under a moderate emission scenario (RCP 4.5), average 1-year ozone concentrations increase by 2 parts per billion across most of the U.S., and the frequency of ozone levels of 70 parts per billion or higher for 8 hours or longer days is expected to increase (East et al. 2024-TN10550). Based on modeling results, an increased frequency of high ozone concentrations can increase the risk of not meeting the National Ambient Air Quality Standards by midcentury in areas currently attaining them (East et al. 2024-TN10550). However, as discussed in Section 3.2 of this EIS, air emissions from Kemmerer Unit 1 construction are minor and are expected to be below the 100-tons per year U.S. Environmental Protection Agency requirement for major Title V sources for all criteria pollutants.

Surface Water Resources: Observation data and climate model projections both indicate changes in precipitation, runoff, and air temperature in Wyoming and the Intermountain West region that could influence surface water availability and water quality (Frankson et al. 2022-TN10898). Observations of precipitation and air temperature in Wyoming over the last two decades (2002–2021) show an increase in average annual temperature of 0.4°F (0.22°C) and changes in annual average precipitation up to 0.07 in. (0.18 cm) greater than the historical baseline average of 1901-1960 (USGCRP 2023-TN9762; NCEI 2024-TN10602). Projected rising temperatures will increase the average lowest elevation at which snow falls. Continuing recent trends, this will increase the likelihood that precipitation will fall as rain instead of snow, reducing water storage in the snowpack, particularly at lower elevations that are currently on the margins of reliable snowpack accumulation (BLM 2023-TN11672). Another relevant trend is that Northern Great Plains has experienced a 24 percent increase in extreme precipitation events, and the frequency and severity of extreme precipitation events are projected to continue to increase across the region (Frankson et al. 2022-TN10898; USGCRP 2023-TN9762). Increases in annual precipitation and heavy precipitation can increase runoff and increase the potential for flooding. Increased runoff and high-flow events can result in the transport of a higher sediment load and other contaminants to surface waters with potential degradation of ambient water quality. Considering that Wyoming is a major source of water for other States, any change in precipitation can have broad impacts beyond its boundaries (Frankson et al. 2022-TN10898).

The seasonal balance of surface water supply and demand may be affected by the amount and timing of precipitation and seasonal evapotranspiration (USGCRP 2023-TN9762). Precipitation projections for midcentury (2036–2065) under the intermediate emissions scenarios (RCP 4.5) on average show a 0.5 in. (1.2 cm) increase in annual precipitation compared to that for 1991–2020 (USGCRP 2023-TN9762). Projections for runoff show a similar increase to precipitation, with an estimate of 0–0.5 in. (0–1.2 cm) increase over the course of the midcentury period for the RCP 4.5 scenarios (USGCRP 2023-TN9762). Under an intermediate scenario (RCP 4.5), projected changes for Wyoming by midcentury (2036–2065, relative to 1991–2020) indicate an annual actual evapotranspiration increase of 0–0.5 in. (0–1.3 cm), average soil moisture decrease of 0–0.05 in. (0–0.13 cm), and annual climatic water deficit (defined as the shortfall of water necessary to fully supply vegetation requirements) increase of 1–2 in. (2.5–5.1 cm) (USGCRP 2023-TN9762). Climate change is also expected to increase the number of hot days (≥95°F [35°C]) and the number of warm nights (≥70°F [21°C]), both of which could increase surface water temperatures and evaporation (USGCRP 2023-TN9762). However, it should be noted that observations for hot days show a 4.4-day reduction for 2002–2021 compared to 1901–1960 (USGCRP 2023-TN9762). Regulatory agencies would need to account for changes in water availability in their water resource allocation and environmental permitting programs. Regardless of water use permitting constraints, contactors for Kemmerer Unit 1 would have to account for any changes in water scarcity in construction practices and procedures.

<u>Socioeconomics</u>: Climate change can impact agricultural production, resource-based economies, and tourism/recreation through changing temperature and precipitation regimes. These impacts are most likely to affect rural and indigenous communities. The region is largely rural with expansive natural areas and relies on the agriculture, resource extraction, and tourism economies. In Wyoming, the majority of people live in rural areas that rely heavily on mineral extraction (including fossil fuels), agriculture (including livestock operations), and tourism as the base of regional economies. Climate change is expected to lengthen growing seasons and frost-free periods; however, increases in temperature and changes to precipitation patterns may stress crop production. Potential impacts from rising temperatures include heat and moisture stress on crops, increased weed competition and pest expansion, decrease in soil moisture, earlier snowmelt, increased evapotranspiration, and less water available for irrigation (USGCRP 2023-TN9762). Rangeland productivity may see less harm from climate change with longer growing seasons; however, increased drought-induced water limitations may reduce biomass production, thus limiting livestock production (USGCRP 2023-TN9762).

Tourism and recreation on public and private lands provide significant revenue to the region. Climate change is expected to affect ecosystem services, which in turn affect tourism revenue. Higher temperatures, drought, and wildfire have been linked to decreasing income for local and regional businesses within the region (USGCRP 2023-TN9762).

The region is largely dependent on energy revenue, with an extensive number of oil and gas wells, surface coal mines, and increasing wind turbine installations (USGCRP 2023-TN9762). Climate change impacts and mitigation efforts are expected to change energy demand within the region and country. Higher summer temperatures and extreme heat-related weather events are expected to increase energy demands, while higher winter temperatures and fewer extreme cold weather events are expected to decrease energy demands (USGCRP 2023-TN9762). Energy extraction and generation within the region are subject to external market and policy drivers that may affect the types of energy harvested. Communities dependent on coal extraction for revenue and jobs may experience losses to both as markets shift away from these resources (USGCRP 2023-TN9762). Lost revenue and job losses may be offset by the implementation of renewable energy production. Wind electricity generation tripled in the region between 2011 and 2021 (USGCRP 2023-TN9762). As discussed in Section 3.8 of this EIS, socioeconomic impacts from Kemmerer Unit 1 construction are expected to be beneficial by adding temporary jobs to the community, possibly offsetting job losses in other sectors.

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APPENDIX F

TERRESTRIAL HABITAT AND SPECIES ANALYSIS

F.1 Overview

The U.S. Nuclear Regulatory Commission (NRC or Commission) staff conducted an independent analysis of the terrestrial habitats and species in and around the Kemmerer Unit 1 site, which is summarized in Section 3.6 for purposes of understanding the potential for impacts from the proposed project. This appendix provides the results of detailed analyses for terrestrial habitats and species that may be affected by the proposed project. Specifically, quantitative habitat analyses and wetland delineations are provided. In addition, a description of important species that may occur in the area is presented in more detail. For federally protected species, see Appendix G. The NRC staff used the following sources of information in its independent analysis:

- the applicant's environmental report (ER) (TerraPower 2024-TN10896).
- the U.S. Department of Energy's (DOE's) environmental assessment for Kemmerer Unit 1 (DOE 2025-TN11602).
- the following applicant-provided terrestrial survey reports:
  - Terrestrial Visual Encounter Survey (TVES) (Tetra Tech 2023-TN11605)
  - Preconstruction bird surveys (Tetra Tech 2024-TN11128)
  - Wetland delineation report (Tetra Tech 2023-TN11124)
  - Ute's ladies' tresses reports (Tetra Tech 2023-TN11127, Tetra Tech 2024-TN11125, Tetra Tech 2024-TN11126)
- the applicant's geospatial data (TerraPower 2024-TN11608).
- 2023 land use/land cover data (USGS 2023-TN11609).
- 2023 LANDFIRE data (DOI 2024-TN11610).
- National Wetland Inventory data (FWS 2024-TN11617).
- Wyoming Game and Fish datasets:
  - Antelope Crucial Range (WGFD 2015-TN11611)
  - Mule Deer Crucial Range (WGFD 2021-TN10946)
  - Moose Crucial Range (WGFD 2021-TN10947)
  - Elk Crucial Range (WGFD 2021-TN10948)
  - Sage-grouse core areas (Whitford 2015-TN10945)
- correspondence with the Wyoming Game and Fish Department (TerraPower 2024-TN10896; W. Schultz 2024-TN11038)
- on-site visits and conversations with TerraPower and its consultants on July 16–17, 2024
- other publicly available information as specified below

Using the area boundaries described in Section 3.6.1 and described information sources, the NRC staff calculated area for land cover, vegetation types, and National Wetlands Inventory wetlands (Table F-1, Table F-2, and Table F-3). Unless otherwise specified, terrestrial analyses in Section 3.6 and in this appendix are based on these calculations.

F.2 Habitat Analyses

Habitat type areas in Table F-1, Table F-2, and Table F-3 were calculated using QGIS software (version 3.4.34 Prizen) and R, version 4.4.1 via the RStudio IDE (2024.09.0 Build 375) after clipping the extent of the original dataset to the area of interest. Table F-1 was generated using Table F-3 data and site information provided by National Wetlands Inventory (FWS 2024-TN11617) and USO boundary files (TerraPower 2024-TN11608).

Table F-1 Area of Land Use or Land Cover Types Documented in the Kemmerer Unit 1 Site, Macro-Corridors-, Vicinity, and Region

Description[(a)]	Site Acres	Corridor Acres	Vicinity Acres	Region Acres
Barren Land (Rock/Sand/Clay)	-	-	208.25	106,757.93
Cultivated Crops	-	-	-	22,962.26
Deciduous Forest	-	-	7.15	76,930.40
Developed, High Intensity	-	-	26.61	474.45
Developed, Low Intensity	0.07	1.31	800.76	23,072.42
Developed, Medium Intensity	-	0.24	249.24	4,271.02
Developed, Open Space	0.18	0.22	203.34	24,491.97
Emergent Herbaceous Wetlands	0.03	5.21	562.90	98,635.40
Evergreen Forest	-	-	4.25	307,387.99
Grassland/Herbaceous	-	1.00	28.41	16,678.76
Mixed Forest	-	-	-	1,269.94
Open Water	-	1.23	365.72	94,975.03
Pasture/Hay	-	-	9.84	183,012.06
Perennial Ice/Snow	-	-	-	0.67
Shrub/Scrub	289.61	501.72	69,507.86	4,030,992.51
Woody Wetlands	0.14	0.45	408.17	34,574.29
Totals	290.04	511.38	72,382.49	5,026,487.12

(a) Data sources used in analysis: 2023 Land Use Land Cover Data (USGS 2023-TN11612), USO boundary files (TerraPower 2024-TN11608).
"-" denotes no data in table cell.

Table F-2 Area of Vegetation Types Documented in the Kemmerer Unit 1 Site, Macro-Corridors, and Vicinity, Using 2023 Bureau of Land Management LANDFIRE Data Vegetation Type[(a)]

2023 BLM LANDFIRE Types[(a)]	Site Acres	Corridor Acres	Vicinity Acres	Region Acres
Colorado Plateau Mixed Bedrock Canyon and Tableland	-	-	-	930.12
Colorado Plateau Pinyon-Juniper Woodland	-	-	-	8,611.93
Developed-High Intensity	-	0.64	63.37	973.40
Developed-Low Intensity	-	2.25	294.10	7,058.24 (
Developed-Medium Intensity	-	2.66	207.32	2,607.67
Developed-Roads	0.08	3.92	1,286.45	43,767.08
Great Basin & Intermountain Introduced Annual and Biennial Forbland	-	0.88	85.00	2,796.79
Great Basin & Intermountain Introduced Annual Grassland	-	-	-	477.46
Great Basin & Intermountain Introduced Perennial Grassland and Forbland	-	8.18	334.94	18,294.86
Great Basin & Intermountain Ruderal Shrubland	0.22	0.22	415.46	30,612.62
Inter-Mountain Basins Active and Stabilized Dune	-	-	8.03	8,323.02
Inter-Mountain Basins Alkaline Closed Depression	-	-	-	7.80
Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland	-	-	-	42,195.61
Inter-Mountain Basins Big Sagebrush Shrubland	202.02	360.25	37,936.04	1,456,589.44
Inter-Mountain Basins Big Sagebrush Steppe	11.32	10.62	1,336.25	218,390.07
Inter-Mountain Basins Cliff and Canyon	0.22	0.09	314.35	41,435.32
Inter-Mountain Basins Curl-leaf Mountain Mahogany Shrubland	-	-	-	4.46
Inter-Mountain Basins Curl-leaf Mountain Mahogany Woodland	-	-	35.92	22,952.51
Inter-Mountain Basins Greasewood Flat	13.30	6.37	429.30	40,581.67
Inter-Mountain Basins Mat Saltbush Shrubland	21.79	4.70	1,834.18	193,299.06
Inter-Mountain Basins Mixed Salt Desert Scrub	0.22	1.11	224.45	33,322.77
Inter-Mountain Basins Montane Sagebrush Steppe	0.28	9.35	8,193.79	1,153,890.02

Table F-2 Area of Vegetation Types Documented in the Kemmerer Unit 1 Site, Macro-Corridors, and Vicinity, Using 2023 Bureau of Land Management LANDFIRE Data Vegetation Type[a] (Continued)

2023 BLM LANDFIRE Types[a]	Site Acres	Corridor Acres	Vicinity Acres	Region Acres
Inter-Mountain Basins Playa	-	-	11.61	21,124.12
Inter-Mountain Basins Semi-Desert Grassland	-	-	55.55	12,161.61
Inter-Mountain Basins Semi-Desert Shrub-Steppe	0.45	3.84	326.83	102,767.97
Inter-Mountain Basins Shale Badland	-	0.03	1,020.73	116,932.15
Inter-Mountain Basins Subalpine Limber-Bristlecone Pine Woodland	-	-	-	5,306.54
Interior West Ruderal Riparian Forest	-	-	-	15.61
Interior West Ruderal Riparian Scrub	-	0.15	0.67	222.45
Interior Western North American Temperate Ruderal Grassland	-	-	-	4,711.75
Interior Western North American Temperate Ruderal Shrubland	-	0.22	2.01	1,370.40
Middle Rocky Mountain Montane Douglas-fir Forest and Woodland	-	-	-	45,666.11
North American Arid West Emergent Marsh	1.03	0.42	195.94	18,299.76
Northern Rocky Mountain Lower Montane-Foothill-Valley Grassland	-	-	18.97	7,305.92
Northern Rocky Mountain Montane-Foothill Deciduous Shrubland	-	-	-	467.99
Northern Rocky Mountain Subalpine-Upper Montane Grassland	-		-	11,414.21
Northern Rocky Mountain Subalpine Deciduous Shrubland	-	-	-	179.13
Northern Rocky Mountain Subalpine Woodland and Parkland	-	-	-	10,308.82
Open Water	-	6.93	704.97	104,970.14
Quarries-Strip Mines-Gravel Pits-Well and Wind Pads	14.51	34.46	2,866.88	7,826.44
Rocky Mountain Alpine-Montane Wet Meadow	-	-	4.69	6,099.70
Rocky Mountain Alpine Bedrock and Scree	-	-	-	309.60
Rocky Mountain Alpine Dwarf-Shrubland	-	-	-	3,294.00
Rocky Mountain Alpine Fell-Field	-	-	-	153.75
Rocky Mountain Alpine Turf	-	-	-	310.80

Table F-2 Area of Vegetation Types Documented in the Kemmerer Unit 1 Site, Macro-Corridors, and Vicinity, Using 2023 Bureau of Land Management LANDFIRE Data Vegetation Type[(a)] (Continued)

2023 BLM LANDFIRE Types[(a)]	Site Acres	Corridor Acres	Vicinity Acres	Region Acres
Rocky Mountain Aspen Forest and Woodland	-	-	78.77	137,959.47
Rocky Mountain Bigtooth Maple Ravine Woodland	-	-	-	1,530.77
Rocky Mountain Cliff Canyon and Massive Bedrock	-	-	41.05	7,748.90
Rocky Mountain Foothill Limber Pine-Juniper Woodland	-	1.11	358.82	116,330.87
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	-	-	-	4,631.63
Rocky Mountain Lodgepole Pine Forest	-	-	0.89	72,439.58
Rocky Mountain Lower Montane-Foothill Riparian Shrubland	3.25	15.42	778.00	45,120.56
Rocky Mountain Lower Montane-Foothill Riparian Woodland	0.40	1.10	223.85	25,876.76
Rocky Mountain Lower Montane-Foothill Shrubland	-	-	24.99	13,632.09
Rocky Mountain Poor-Site Lodgepole Pine Forest	-	-	-	129.68
Rocky Mountain Subalpine-Montane Limber-Bristlecone Pine Woodland	-	-	-	1,302.05
Rocky Mountain Subalpine-Montane Mesic Meadow	-	-	187.65	23,645.47
Rocky Mountain Subalpine-Montane Riparian Shrubland	-	-	-	4,205.56
Rocky Mountain Subalpine-Montane Riparian Woodland	-	-	-	8,551.91
Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	-	-	-	100,447.28
Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland	-	-	-	1,881.56
Southern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Woodland	-	-	1.12	13,135.51
Southern Rocky Mountain Mesic Montane Mixed Conifer Forest and Woodland	-	-	-	5,475.55
Southern Rocky Mountain Montane-Subalpine Grassland		-	564.40	17,531.86
Southern Rocky Mountain Ponderosa Pine Woodland	-	-	-	66.92

Table F-2 Area of Vegetation Types Documented in the Kemmerer Unit 1 Site, Macro-Corridors, and Vicinity, Using 2023 Bureau of Land Management LANDFIRE Data Vegetation Type[(a)] (Continued)

2023 BLM LANDFIRE Types[(a)]	Site Acres	Corridor Acres	Vicinity Acres	Region Acres
Western Cool Temperate Close Grown Crop	-	0.41	28.55	46,660.49
Western Cool Temperate Developed Deciduous Forest	-	-	-	63.79
Western Cool Temperate Developed Evergreen Forest	-	-	1.12	93.23
Western Cool Temperate Developed Herbaceous	-		6.02	1,588.84
Western Cool Temperate Developed Mixed Forest	-	-	0.22	137.62
Western Cool Temperate Developed Shrubland	-	-	96.85	1,484.58
Western Cool Temperate Fallow/Idle Cropland	-	-	1.78	470.48
Western Cool Temperate Orchard	-	-	-	16.73
Western Cool Temperate Pasture and Hayland	2.81	1.11	180.08	240,617.39
Western Cool Temperate Row Crop	-	-	-	85.20
Western Cool Temperate Row Crop - Close Grown Crop	-	0.13	20.07	3,322.19
Western Cool Temperate Urban Deciduous Forest	-	0.40	19.41	877.98
Western Cool Temperate Urban Evergreen Forest	-	-	9.59	568.99
Western Cool Temperate Urban Herbaceous		0.72	426.49	5,049.90
Western Cool Temperate Urban Mixed Forest	-	-	3.80	302.27
Western Cool Temperate Urban Shrubland	-	0.68	214.42	6,574.19
Western Cool Temperate Wheat	-	-	-	333.24
Western North American Ruderal Wet Meadow & Marsh	-	-	2.45	6,531.94
Western North American Ruderal Wet Shrubland	-	-	2.01	1,013.26
Wyoming Basins Dwarf Sagebrush Shrubland and Steppe	18.10	32.93	10,879.64	300,101.42
Totals	290.02	511.33	72,359.82	5,025,878.63

(a) Data sources used in analysis: 2023 BLM LANDFIRE Existing Vegetation Type data (DOI 2024-TN11610), USO boundary files (TerraPower 2024-TN11608).

“-” denotes no data in table cell.

Note: While the total acreage for the site and macrocorridor are 290 and 511 ac, respectively, the area of short-term/temporary disturbance on each would be 218 and 216 ac, respectively.

Table F-3 Area of National Wetland Inventory Features Documented in the Kemmerer Unit 1 Site, Macro-Corridors, and Vicinity

Wetland or Water Feature[a]	Site Acres	Corridor Acres (ha)	Vicinity Acres (ha)
Freshwater Emergent Wetland	0.49	2.94	237.22
Freshwater Pond	0.21	7.88	243.86
Riverine	3.00	3.09	713.23
Freshwater Forested/Shrub Wetland	-	-	203.29
Lake	-	-	125.05
Totals	3.70	13.91	1,522.66

Data sources used in analysis: National Wetlands Inventory (FWS 2024-TN11617), USO boundary files (TerraPower 2024-TN11608).
"-" denotes no data in table cell.

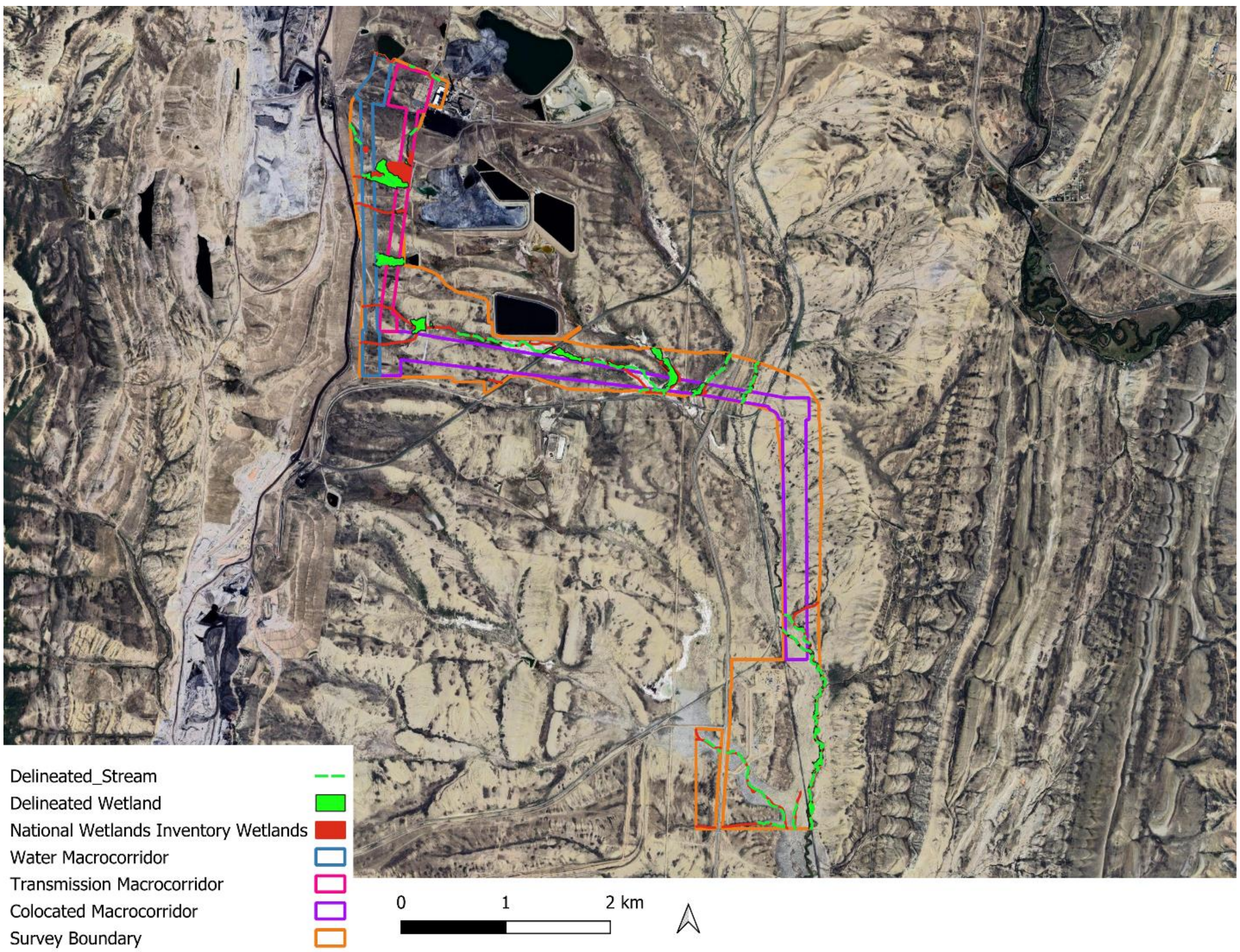

Figure F-1 Comparison of National Wetland Inventory Features and Delineated Wetlands and Streams Within the Survey Area and Macro-Corridors

F.3 <u>Other Important Terrestrial Species</u>

Table F-4 summarizes the occurrence of non-federally protected important terrestrial species on the site, macro-corridors, and surrounding area, based on the following:

- known species locations presented in ER Table 2.3-3 (TerraPower 2024-TN10896)
- TVES (Tetra Tech 2023-TN11605)
- species identified by Wyoming Game and Fish Department (W. Schultz 2024-TN11038)

TVES and bird preconstruction nest surveys occurred within the survey boundary, as described in Section 2.3.1 of the ER (TerraPower 2024-TN10896) and documented within the TVES report (Tetra Tech 2023-TN11605) and nest survey report (Tetra Tech 2024-TN11128).

Table F-4 Occurrence of Other Important Terrestrial Species Within the Site, Macro-Corridors, and Surrounding Area

Group	Species[a,b,c]	Site	Macro-Corridors	Surrounding Area
Amphibian	Great Basin spadefoot (*Brachylagus idahoensis*)[b]	-	-	-
Amphibian	Greater short-horned lizard (*Phrynosoma hernandesi*)[b]	-	-	-
Amphibian	Northern leopard frog (*Lithobates pipiens*)[b]	-	-	-
Bird	Bald eagle (*Haliaeetus leucocephalus*)[b]	-	-	X
Bird	Brewer's sparrow (*Spizella breweri*)	X	X	X
Bird	Burrowing owl (Athene cunicularia)[b]	-	-	X
Bird	Clark's grebe (*Aechmophorus clarkii*)	-	-	X
Bird	Common yellowthroat (*Geothylpis trichas*)	X	-	-
Bird	Ferruginous hawk (*Buteo regalis*)[b]	-	X	X
Bird	Franklin's gull (*Leucophaeus pipixcan*)	-	X	-
Bird	Golden eagle (*Aquila chrysaetos*)[a,b]	-	X	X
Bird	Great blue heron (*Ardea herodias*)	X	X	-
Bird	Greater sage-grouse (*Centrocercus urophasianus*)[c]	X	X	-
Bird	Loggerhead shrike (*Lanisus ludovicianus*)	X	X	X
Bird	Prairie falcon *(Falco mexicanus*)	-	-	-
Bird	Sage thrasher (*Oreoscoptes montanus*)	-	-	X
Bird	Swainson's hawk (*Buteo swainsonii*)[b]	-	X	-
Bird	Western grebe (*Aechmophorus occidentalis)*	-	-	X
Bird	White pelican (*Pelecanus erythrorhynchos*)	-	X	
Bird	Willet (*Tringa semipalmata inornata*)			X
Mammal	Pronghorn (*Antilocapra americana*)[c]	X	X	X
Mammal	Pygmy rabbit (*Brachylagus idahoensis*)[b]	-	-	-
Mammal	White-tailed prairie dog (*Cynomys leucurus*)[b]	X	X	X

SGCN = Species of Greatest Conservation; WGFD = Wyoming Game and Fish Department.
"-" denotes absent, "X" denotes present.
(a) SGCN species with nest known to occur within 1 mi of the project vicinity (TerraPower 2024-TN10896).
(b) SGCN with specific habitat requirements described by WGFD (TerraPower 2024-TN10896).
(c) Wyoming species with designated crucial range or core areas on or within 1 mi of site (WGFD 2015-TN11611) WGFD 2021-TN10946).

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APPENDIX G

BIOLOGICAL ASSESSMENT

The U.S. Nuclear Regulatory Commission (NRC or Commission) staff structured its biological assessment in accordance with definitions from 50 *Code of Federal* Regulations (CFR) 402.12(f) (TN4312). Sections 0 and 3.6.1.2 of the environmental impact statement (EIS) define and describe the action area and state that no critical habitat for listed species occurs within it. The NRC staff defined the action area as the proposed Kemmerer Unit 1 site and the offsite macro-corridors, including the land covers and terrestrial habitats described in Section 3.6.1.1 of the EIS, plus a 6 mi (9.7 km) radius around the proposed reactor to reflect possible indirect effects on habitats in the surrounding landscape. Table G-1 describes each terrestrial and aquatic Endangered Species Act-protected species potentially present in the action area, assesses the potential effects of the proposed action on each species, and presents the NRC's effect determination for each species. Impacts from the proposed action for aquatic species are addressed in Sections 3.5.2 through Section 3.5.4 of the EIS. Section 3.6.2 through Section 3.6.4 of the EIS presents the effects of the proposed action for terrestrial species.

Table G-1 Biological Assessment of Federally Listed Terrestrial and Aquatic Species that May Occur Near the Proposed Kemmerer Unit 1 Site

Species	NRC Staff Evaluation[a,b]	Conclusion[c,d]
Western DPS Yellow-billed Cuckoo (*Coccyzus americanus*)	**Baseline information:** The yellow-billed cuckoo is a neotropical migrant bird that winters in South America and breeds in North America (79 FR 59992-TN11616). The breeding range occupied by the western DPS includes suitable riparian habitats west of the crest of the Rocky Mountains in Canada, Mexico, and the U.S. Breeding western yellow-billed cuckoos require riparian woodlands for foraging and nesting (Halterman et al. 2016-TN10943). Nests are almost always in large, mature trees in low to moderate elevation woodlands (<6,000 ft, <1829 m) that are at least 50 ac (20 ha) within arid to semiarid lands with vegetation dominated by willows or cottonwoods but can consist of other native or non-native trees. Cuckoos forage from inconspicuous perches and consume a variety of prey, including insects, spiders, frogs, and lizards. The decline of the species is primarily from riparian habitat loss and degradation. Other threats include nest predation and climate change. **Action Area Occurrence:** The yellow-billed cuckoo is unlikely to occur within the site or macro-corridors portion of action area given the lack of suitable foraging and nesting habitat but could potentially pass through on way to more suitable habitat. Riparian habitats present on the site or in off-site macro-corridors lack the required vegetation structural complexity and extent (Tetra Tech 2023-TN11124). The nearest suitable habitat is along Hams Fork River, more than 2.5 mi (4.0 km) away but	NLAA

Table G-1 Biological Assessment of Federally Listed Terrestrial and Aquatic Species that May Occur Near the Proposed Kemmerer Unit 1 Site (Continued)

Species	NRC Staff Evaluation[a,b]	Conclusion[c,d]
	there have been no species sightings along Hams Fork River according to Section 2.3 of the ER (TerraPower 2024-TN10896). Although there is final critical habitat for this species, the action area does not overlap (FWS 2024-TN11193; FWS 2025-TN11675). Impacts: No project activities would take place in or adjacent to suitable habitat for this species. USO would adhere to all required permit conditions and BMPs, which would protect adjoining terrestrial resources as described in Sections 4.11 and 5.11 of the ER (TerraPower 2024-TN10896). Increased human activities and noise could displace dispersing individuals to surrounding riparian areas (Table F-1, Table F-2, and Table F-3). Collisions with tall structures and transmission lines may be possible but unlikely. The NRC staff recognizes that individuals could be affected by noise and collisions, but it is the staff's professional judgment that the adverse effects on populations would be insignificant or discountable.	
North American Wolverine (*Gulo gulo luscus*)	**Baseline information:** The north American wolverine is a highly mobile, carnivorous mammal requiring large territories at high elevations with rugged topography, limited human activity, and deep snowpack (FWS 2023-TN10950). Current breeding populations in the U.S. are located within the Rocky Mountains of Idaho, western Montana, and northwestern Wyoming (Figure G-1). Wolverines consume a variety of seasonally variable prey, including rodents, ungulates, and carrion. Females select maternal denning areas that are climatically cold and provide deep snow, which provides for longer storage of cached food. Dispersing wolverines (particularly males) are able to disperse over tens or hundreds of miles, sometimes traversing through low-quality habitats. Threats to wolverines include declining snowpack from climate change, effects from multilane highways, disturbance from backcountry winter activities, and other human disturbances and development. No critical habitat has been designated for wolverine (FWS 2024-TN11193; FWS 2025-TN11675). **Action Area Occurrence:** The wolverine species is unlikely to occur within the action area given the low elevation habitats present (Table F-1 and Table F-2). Dispersing individuals could rarely traverse to more suitable, higher elevation habitats with less human activity and deep snow present within the region (Table F-2; Figure G-1, FWS 2025-TN11675). Despite historic occupancy in southern Wyoming, recent observations are rare (FWS 2023-TN11618). Two individuals have been observed in Lincoln County, Wyoming since 1977 (TerraPower 2024-TN11009): 1) a road-killed individual in 2004 in the mountains 8 mi	NLAA

Table G-1 Biological Assessment of Federally Listed Terrestrial and Aquatic Species that May Occur Near the Proposed Kemmerer Unit 1 Site (Continued)

Species	NRC Staff Evaluation[a,b]	Conclusion[c,d]
	(12.9 km) northwest of the site and 2) a live individual observed in 1977 in the mountains 25 mi (40.2 km) north of Kemmerer. Wolverine occurrences data show an additional wolverine occurrence in Lincoln County between 2017 and 2023 (FWS 2023-TN11618). The action area is not in core habitat or areas of greatest habitat connectivity but also not in lowest connectivity (Figure G-1; action area appears to be within habitat connectivity area marked as blue or green and lies between core habitats to the north and south [black]). **Potential Impacts:** No project activities would take place in or adjacent to habitat for high elevation habitat for wolverines. USO would adhere to all required permit conditions and BMPs and has identified specific measures and controls to limit adverse impacts as described in Sections 4.11 and 5.11 of the ER (TerraPower 2024-TN10896), which would protect terrestrial resources. Increased human activities and noise have the potential to displace any transient individuals moving to surrounding areas with more suitable habitats (Table F-1 and Table F-2). The NRC staff recognizes that moving individuals transiently present in the action area could be affected but based on the abundance of undeveloped habitats in the vicinity, it is the NRC staff's professional judgment that the adverse effects on populations would be insignificant or discountable.	
Ute's ladies'-tresses (*Spiranthes diluvialis*)	**Baseline information:** Ute's ladies'-tresses are herbaceous perennial orchid plants found in wetlands, streambanks, wet meadows, borrow pits, and agricultural ditches where hydrology provides regular surface or subsurface water (FWS 2023-TN10951). This species can remain dormant for 11 or more years, and needs habitat in which hydrology provides regular surface or subsurface water, other flowering plants present to attract pollinators, and an open canopy for sunlight access. **Action Area Occurrence:** Ute's ladies'-tresses are unlikely to occur within the area of the site or in the macro-corridors. Criteria for potential habitat includes the presence of perennial hydrology or a near-surface water table, certain stream terrace and related stream features, certain soil types and conditions, common associate species, and certain sun exposure and vegetation density features. USO reviewed NWI wetlands and streams, delineated wetlands, and identified potential habitat within the survey area (Figure F-1; Tetra Tech 2023-TN11124; Tetra Tech 2023-TN11127, Tetra Tech 2024-TN11125, Tetra Tech 2024-TN11126). Qualified surveyors identified the potential habitat and surveyed it for three years, according to established protocol (Tetra Tech 2023-TN11127, Tetra Tech 2024-TN11126), and no individuals	NLAA

Table G-1 Biological Assessment of Federally Listed Terrestrial and Aquatic Species that May Occur Near the Proposed Kemmerer Unit 1 Site (Continued)

Species	NRC Staff Evaluation[a,b]	Conclusion[c,d]
	of the species was found. The rest of the action area (6 mi [9.7 km]) from proposed reactor) not surveyed for this species, because disturbance from proposed action that would affect this species limited to site and macro-corridors). No critical habitat has been designated for this species (FWS 2024-TN11193; FWS 2025-TN11675). **Potential Impacts:** The only wetlands subject to disturbance are in the macro-corridors, and no individuals were found during surveys conducted to protocol by qualified surveyors. Wetland impacts are summarized in Sections 3.6.2–3.6.4. USO would adhere to all required permit conditions and BMPs and has identified specific measures and controls to limit adverse impacts in Sections 4.3.1.2, 4.11 and 5.12 of the ER (TerraPower 2024-TN10896), which would protect wetland habitats by controlling sedimentation, runoff, and stormwater impacts. It is the NRC staff's professional judgment that the adverse effects on populations would be insignificant or discountable.	
Monarch butterfly (*Danaus Plexippus*)	**Baseline information:** The monarch butterfly is a flying insect, dependent on milkweed plants for egg laying and as larval food source (87 FR 26152-TN8591). Monarchs are dependent on variety of flowering plants as adult nectar source (Rudolph et al. 2006-TN10956), and are found in fields, meadows, wetlands, roadsides, and weedy areas. Threats to the monarch include loss and degradation of habitat from conversion of grasslands to agriculture, widespread use of herbicides, logging and thinning at overwintering sites in Mexico, senescence and incompatible management of overwintering sites in California, urban development, drought, exposure to insecticides, and climate change effects (87 FR 26152-TN8591). **Action Area Occurrence:** USO indicates in Section 4.3 of the ER that monarchs may pass through Lincoln County during seasonal migration (TerraPower 2024-TN10896) and that showy milkweed (Asclepias speciosa) is known to occur in the county (iNaturalist 2024-TN11667). In Section 2.3 of the ER, USO states that surveys found no monarch butterflies or milkweed plants within the site and macro-corridors (TerraPower 2024-TN10896). Although there is proposed critical habitat for this species, the action area does not occur within critical habitat (FWS 2024-TN11193, FWS 2025-TN11675). **Potential Impacts:** No project activities would take place in areas known to support milkweed. However, milkweed is a common, quick-growing herbaceous plant that could potentially colonize disturbed areas within the site or macro-corridors. USO would adhere to all required permit conditions and herbicide use BMPs and has identified	NLAA

Table G-1 Biological Assessment of Federally Listed Terrestrial and Aquatic Species that May Occur Near the Proposed Kemmerer Unit 1 Site (Continued)

Species	NRC Staff Evaluation(a,b)	Conclusion(c,d)
	specific measures and controls to limit adverse impacts in Sections 4.11 and 5.12 of the ER (TerraPower 2024-TN10896), which would protect terrestrial resources. It is the NRC staff's professional judgment that the adverse effects on monarch butterfly populations resulting from the proposed action would be insignificant or discountable.	
Suckley's cuckoo bumblebee (*Bombus suckleyi;* SCB)	**Baseline information:** According to a species status assessment (FWS 2024-TN11622), SCB is a flying insect that requires diverse native floral resources for nutrition (pollen and nectar), with limited information known regarding key forage plants. The SCB is an obligate social parasite dependent on other social host bumble bee species (*Bombus* spp.) including western bumble bee (*B. occidentalis*), Nevada bumble bee (*B. nevadensis*), and possibly four other bumblebee species for reproduction. SCB lacks a pollen-carrying apparatus on its hind legs, does not produce a worker caste, and produces insufficient wax for nest construction. Four of the six confirmed and potential host *Bombus* spp. are also in decline (FWS 2024-TN11622). SCB nests occur in host nests, which SCB invades. Western and Nevada bumbles nest primarily underground, such as in old animal nests (MNHP Undated-TN11619, USDA undated). The SCB is known from wide variety of habitats including prairies, grasslands, meadows, woodland, and urban and agricultural areas. Known occurrences are across the U.S. and concentrated in the western areas. Both known host species occur broadly throughout the western U.S., with western bumblebees associated with forests, meadows, and developed areas, and Nevada bumblebees most often with grasslands, as well as meadows and forests. Western bumble bees have often been found on plants with small flowers, like spirea, lupine, and goldenrod (Xerces Society 2024-TN11620). Nevada bumble bees favor vetch, penstemons, and lupines (Xerces Society 2024-TN11621). The indiscriminate cuckoo bumblebee (*Bombus insularis*) has been found to disperse up to 7.0 km (4.3 mi). Threats to SCB include host species decline, pathogens, pesticides, habitat conversion and fragmentation, and climate change effects. No proposed critical habitat has been designated for this species (FWS 2025-TN11675). SCB has not been observed in the contiguous U.S. since 2016 (FWS 2024-TN11622) and in the Cold Desert Level II Ecoregion since 2011 (FWS 2024-TN11622). **Action Area Occurrence:** Potential habitat for SCB is present. SCB and its known hosts are associated with a wide range of habitats, which may include shrubland and grassland areas found onsite, in the macro-corridors, and	NLAA

Table G-1 **Biological Assessment of Federally Listed Terrestrial and Aquatic Species that May Occur Near the Proposed Kemmerer Unit 1 Site (Continued)**

Species	NRC Staff Evaluation[a,b]	Conclusion[c,d]
	vicinity. ER Section 2.3 describes prairie dog burrows being present on the site and in the macro-corridors (TerraPower 2024-TN10896). The action area lies within the Cold Desert Level II Ecoregion; EPA Level II Ecoregions are the analytical units for the species status assessment (FWS 2024-TN11622). There are multiple known SCB occurrence records in Wyoming, and most are before 2000 (Figure G-2). The SCB was proposed for listing in December 2024 after field surveys were completed (89 FR 102074-TN11623). **Potential Impacts:** Project activities would occur in areas containing potentially suitable habitat for the SCB and its host species. Construction activities on the site or in macro-corridors may result in habitat loss and disturbance. Operational vegetation management and pesticide application activities may also impact SCB and its host bumblebees should they occur. Although the action would disturb potentially suitable habitat, there is an abundance of potentially suitable habitat for this habitat generalist in the surrounding landscape (Table F-1; Table F-2). Loss of a few hundred acres of potentially suitable habitat is unlikely to noticeably affect populations of this species or its host species. It is the NRC staff's professional judgment that the adverse effects on SCB populations resulting from the proposed action would be insignificant or discountable.	
Bonytail (*Gila elegans*)	**Baseline Information:** The bonytail is a fish native to the Colorado River Basin that has been observed in pools and eddies of mainstem rivers. They have a gray or olive-colored back, silver sides, and a white belly and are a member of the minnow family (FWS 2025-TN11006). **Site Occurrence:** The bonytail was extirpated from Wyoming due to the construction of the Flaming Gorge Reservoir in 1950s; per the U.S. Fish and Wildlife Service (FWS) it is not known to or believed to occur in Wyoming (WGFD 2010-TN11015; FWS 2023-TN11007). **Potential Impacts:** No proposed project construction, operations, or decommissioning activities would take place in or adjacent to habitat for the bonytail, which is not known to or believed to occur in Wyoming.	NE
Colorado pikeminnow (*Ptychocheilus lucius*)	**Baseline Information:** Colorado pikeminnow is a fish species endemic to warm-water, large rivers of the Colorado River Basin and is the largest minnow native to North America. They are long, silvery white in color, with creamy-white bellies (FWS 2025-TN11008). **Site Occurrence:** The Colorado pikeminnow was extirpated from Wyoming due to the construction of the Flaming Gorge Reservoir in 1950s; per FWS, it is not known to or believed to occur in Wyoming (WGFD 2010-TN11015; FWS 2023-TN11010).	NE

Table G-1 Biological Assessment of Federally Listed Terrestrial and Aquatic Species that May Occur Near the Proposed Kemmerer Unit 1 Site (Continued)

Species	NRC Staff Evaluation[a,b]	Conclusion[c,d]
	Potential Impacts: No proposed project construction, operations, or decommissioning activities would take place in or adjacent to habitat for the Colorado pikeminnow, which is not known to or believed to occur in Wyoming.	
Humpback chub (*Gila cypha)*	**Baseline Information:** The humpback chub is a native species of the Colorado River and is only found in warm-water canyons of the Colorado River Basin, with swift turbulent water (FWS 2025-TN11011). **Site Occurrence:** If the humpback chub was ever present in the Green River Basin, it was likely a rare migrant that is now cut off by the Flaming Gorge Reservoir. Per FWS, it is not known to or believed to occur in Wyoming (FWS 2024-TN11012). **Potential Impacts:** No proposed project construction, operations, or decommissioning activities would take place in or adjacent to habitat for the humpback chub, which is not known to or believed to occur in Wyoming.	NE
Razorback sucker (*Xyrauchen texanus)*	**Baseline Information:** The razorback sucker is native only to the warm-water portions of the Colorado River Basin of the southwestern U.S. Razorback sucker are found throughout the basin in both lake and river habitats but are most common in backwaters, floodplains, flatwater river sections, and reservoirs (FWS 2025-TN11013). **Site Occurrence:** The razorback sucker was extirpated from the State of Wyoming due to the construction of the Flaming Gorge Reservoir in 1950s; per FWS, it is not known to or believed to occur in Wyoming (WGFD 2010-TN11015; FWS 2023-TN11014). **Potential Impacts:** No proposed project construction, operations, or decommissioning activities would take place in or adjacent to habitat for the razorback sucker, which is not known to or believed to occur in Wyoming.	NE

BMP = best management practice; DPS = Distinct Population Segment; EIS = environmental impact statement; EPA = U.S. Environmental Protection Agency; FWS = U.S. Fish and Wildlife Service; IPaC = Information for Planning and Consultation; NLAA = not likely to adversely affect; NE = No Effect; NWI = National Weather Inventory; SCB = Suckley's cuckoo bumblebee USO = US SFR Owner, LLC.

(a) All species in this table identified as potentially occurring within the action area via FWS IPaC report (FWS 2025-TN11675).

(b) Applicable generic impacts considered, along with species-specific factors: (1) habitat loss, degradation, disturbance, or fragmentation; and associated effects; (2) behavioral changes resulting from construction, operation, decommissioning or other site activities; (3) mortality or injury from collisions with nuclear power plant buildings, structures, and vehicles; (4) vegetation management and pesticide application; and (5) other landscape maintenance activities, stormwater management, other ongoing operations and maintenance activities.

(c) The NRC staff makes its effect determinations for federally listed species in accordance with the language and definitions specified in the FWS and National Marine Fisheries Service (NMFS) Endangered Species Consultation Handbook (FWS and NMFS 1998-TN1031).

(d) Conclusions address project activities.

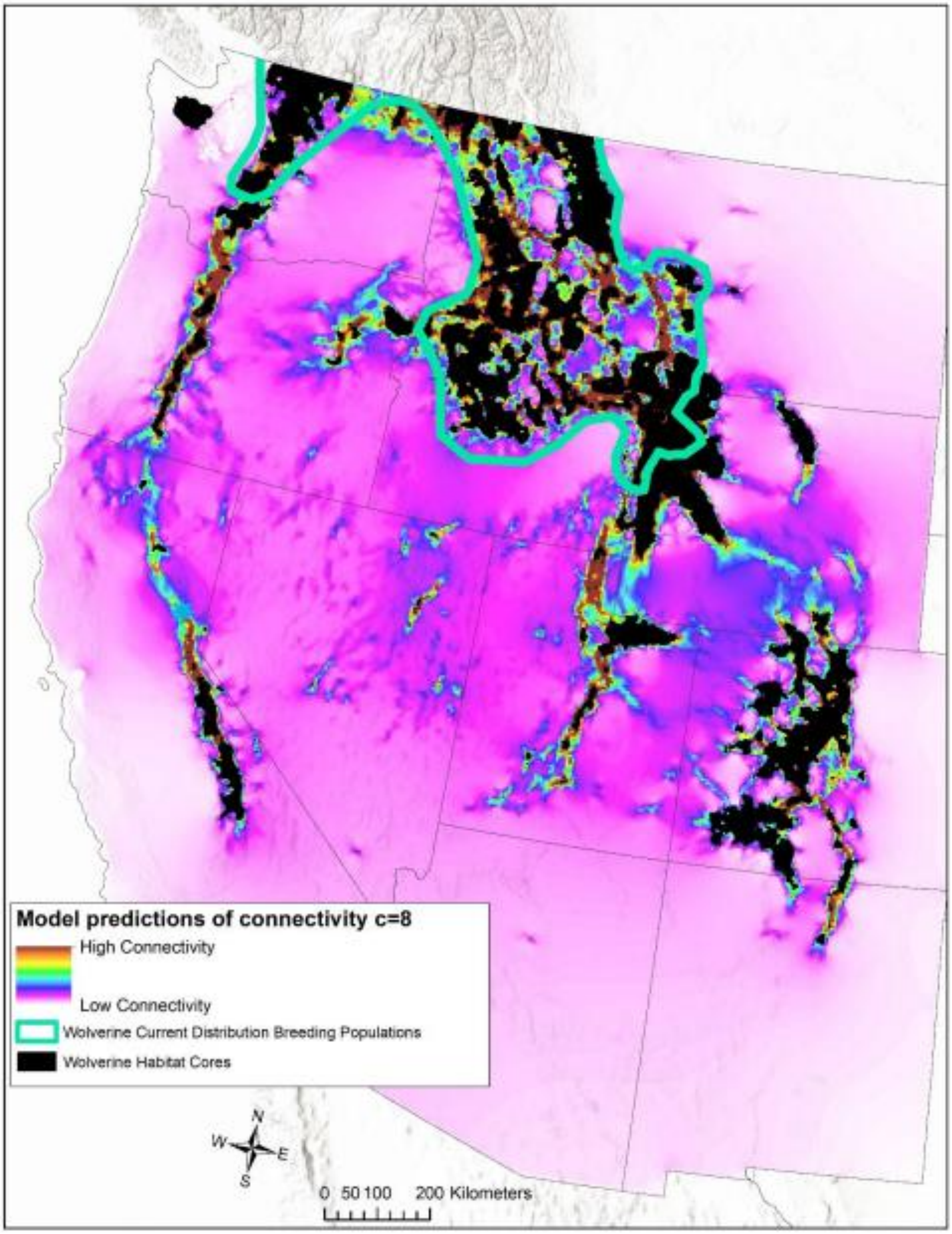

Figure G-1 Wolverine Habitat (Habitat Cores [Black] and Modeled Landscape Connectivity). Source: FWS 2023-TN11618.

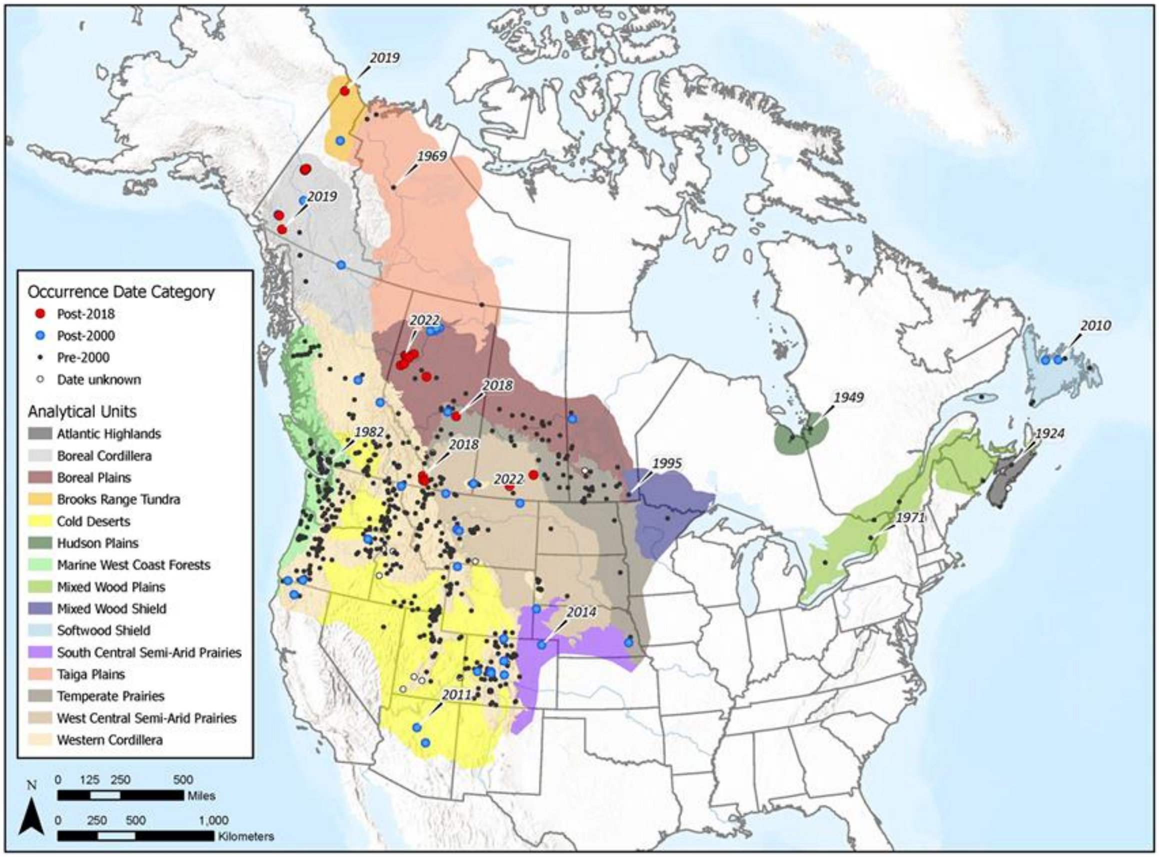

Figure G-2 Suckley's Cuckoo Bumblebee Occurrence in North America and Analytical Units, Based on United States Environmental Protection Agency Level II Ecoregions. Source: FWS (FWS 2024-TN11622). Bumblebee Occurrences Are Marked as Post-2018 (Red Closed Circle), Post 2000 (Blue Closed Circle), Pre-2000 (Black Closed Circle), or Unknown Date (Open Circle). Action Area Located Within Cold Deserts Ecoregion (Yellow Analytical Unit).

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NRC FORM 335 (12-2010) NRCMD 3.7 — U.S. NUCLEAR REGULATORY COMMISSION **BIBLIOGRAPHIC DATA SHEET** ***(See instructions on the reverse)***	1. REPORT NUMBER **(Assigned by NRC, Add Vol., Supp., Rev., and Addendum Numbers, if any.)** NUREG-2268
2. TITLE AND SUBTITLE Environmental Impact Statement for the Construction Permit Application for Kemmerer Power Station Unit 1 Draft for Comment	3. DATE REPORT PUBLISHED MONTH: June — YEAR: 2025 4. FIN OR GRANT NUMBER
5. AUTHOR(S) See Appendix A	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

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

Docket No NRC-2043-0078

11. ABSTRACT (200 words or less)

The U.S. Nuclear Regulatory Commission (NRC) prepared this environmental impact statement (EIS) in response to an application submitted by TerraPower, LLC (TerraPower) on behalf of US SFR Owner, LLC (USO), a wholly owned subsidiary of TerraPower, for a construction permit (CP) for a Natrium advanced reactor at a site in Lincoln County, Wyoming designated as Kemmerer Power Station Unit 1 (Kemmerer Unit 1). USO plans to build and operate Kemmerer Unit 1 to demonstrate the Natrium advanced reactor while ultimately replacing electricity generation capacity in the PacifiCorp service area following planned retirement of existing coal-fired facilities. This EIS evaluates the environmental impacts of the proposed action and the following alternatives to the proposed action: (1) the no-action alternative (i.e., denying the CP application) and (2) building the proposed Natrium advanced reactor at a different location. After weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering reasonable alternatives, the NRC staff recommends, unless safety issues mandate otherwise, that the NRC issue the requested CP to USO.

12. KEY WORDS/DESCRIPTORS (List words or phrases that will assist researchers in locating the report.)	
TerraPower Kemmerer Unit 1 Power Station US SFR Owner (USO) Draft Environmental Impact Statement National Environmental Policy Act (NEPA)	13. AVAILABILITY STATEMENT unlimited 14. SECURITY CLASSIFICATION *(This Page)* unclassified *(This Report)* unclassified 15. NUMBER OF PAGES 16. PRICE

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NUREG-2268, Draft **Environmental Impact Statement for the Construction Permit Application for Kemmerer Power Station Unit 1** **June 2025**