SAFETY EVALUATION REPORT

DOCKET: 70-1151

LICENSE: SNM-1107

LICENSEE: Westinghouse Electric Company, LLC

SUBJECT: REQUEST FOR 10 CFR 20.2002 ALTERNATE DISPOSAL APPROVAL AND EXEMPTIONS FROM 10 CFR PART 30 AND 10 CFR PART 70 FOR DISPOSAL OF COLUMBIA FUEL FABRICATION FACILITY WASTE AT THE US ECOLOGY IDAHO FACILITY

INTRODUCTION

On May 8, 2020, Westinghouse Electric Company, LLC (WEC) requested that the U.S. Nuclear Regulatory Commission (NRC) approve an alternate disposal request (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20129J934), pursuant to Title 10 of the *Code of Federal Regulations (*10 CFR) Section 20.2002, "Method for obtaining approval of proposed disposal procedures," for the disposal of specified low-activity radioactive materials from the Columbia Fuel Fabrication Facility (CFFF). Characterization of the material identified byproduct material and special nuclear material (SNM). The U.S. Ecology, Inc. (USEI), in coordination with WEC, is also requesting corresponding specific exemptions from 10 CFR 30.3 and 10 CFR 70.3 pursuant to 10 CFR 30.11(a) and 10 CFR 70.17(a). The NRC's approval of the 10 CFR 20.2002 request, along with the requested exemptions, would allow WEC to transfer the specific waste for disposal at the USEI Resource Conservation and Recovery Act (RCRA) Subtitle C disposal facility, rather than requiring the disposal of the material in a 10 CFR Part 61 Low-Level Waste disposal facility.

The USEI facility is an RCRA Subtitle C hazardous waste disposal facility permitted by the Idaho Department of Environmental Quality, and is not an NRC licensee. It is located near Grand View, Idaho in the Owyhee Desert. The USEI facility maintains natural site features that limit the migration of disposed radioactive material such as a low precipitation rate (i.e., 18.4 cm/y (7.4 in. per year)) and a long vertical distance to groundwater (i.e., a 61-meter (203-ft) thick, on average, unsaturated zone below the disposal zone). As is usual with an RCRA Subtitle C site, a number of engineered features are also present to enhance confinement of contaminants over the long term. These features include an engineered cover, liners, and leachate monitoring systems. Operations at the site include a number of systems that minimize the potential for exposure to workers from any waste handled by the facility. These systems include a closed facility with filtered ventilation exhaust for processing incoming waste material from the shipping conveyance to trucks for transport to the cell, mechanized equipment for disposition of waste material in the cell, and the application of an asphaltic spray at the end of each day's operations. The site is permitted to receive non-Atomic-Energy-Act material or exempted radioactive material that meets site permit requirements.

In accordance with "Guidance for the Reviews of Proposed Disposal Procedures and Transfers of Radioactive Material Under 10 CFR 20.2002 and 40.13(a)" (ADAMS Accession No. ML18296A068), commonly referred to as the ADR guidance, NRC staff reviews the safety implications of disposing of unimportant quantities of material at disposal facilities that are not licensed by the NRC or an NRC Agreement State, as is the case for USEI. These reviews

consider the licensee's alternate disposal request in accordance with 10 CFR 20.2002 as well as specific exemptions included in the provisions of 10 CFR 30.11, 10 CFR 40.14, and 10 CFR 70.17, that allow non-licensed facilities to possess and dispose of such materials. Although the 10 CFR Part 20 dose limit for individual members of the public is 1 mSv/y (100 mrem/y) (10 CFR 20.1301), the NRC's practice is to approve 10 CFR 20.2002 requests that result in a dose not exceeding "a few millirem per year" because it is a fraction of the natural radiation dose (approximately one percent of the radiation exposure received by members of the public from background radiation), a fraction of the annual public dose limit, and an attainable objective in the majority of cases (see SRM-SECY-07-0060, Basis and Justification for Approval Process for 10 CFR 20.2002 Authorizations and Options for Change (ADAMS Accession No. ML071140279) and NUREG-1757, "Consolidated Decommissioning Guidance"). The NRC's review of a 10 CFR 20.2002 request for disposal of low-activity waste in an RCRA facility considers protection to individuals, inadvertent intruders, and the public. Given the types and concentrations of material being considered for disposal as well as the characteristics of the USEI disposal site, both which are discussed in detail below, the ADR guidance notes a conservative performance period of 1,000 years to be adequate.

Because this 10 CFR 20.2002 disposal request includes both byproduct material and SNM, the NRC staff also considered nuclear criticality safety in addition to the potential doses to the workers and members of the public from the requested radioactive waste disposal.

BACKGROUND

The WEC CFFF, located near Columbia, South Carolina, fabricates low-enriched uranium fuel assemblies for commercial light-water nuclear reactors. The fabrication process involves the chemical conversion of uranium hexafluoride (UF_6) to uranium dioxide (UO_2) using the Ammonium Diuranate (ADU) Process. The resulting UO_2 is formed into ceramic pellets used in nuclear fuel assemblies.

Activities associated with these processes have produced multiple materials that WEC is requesting to be disposed of at USEI. This includes materials dredged from the East Lagoon settling pond, which receives effluents from various process areas as well as rainwater from other containment areas such as the chemical tank farm. It also receives overflows from other lagoons for containment in the event of a spill or other emergency. Based on past wastewater treatment area operations and the age of the lagoon liner, the East Lagoon is scheduled for closure and remediation in accordance with a consent agreement and regulations set by the South Carolina Department of Health and Environmental Control (SCDEC). Incorporated into this process is the removal and disposal of the lagoon liner and an estimated equal volume of subsurface soils from below the liner to address potential contamination resulting from leaks in the liner. In addition to disposing of the material associated with the closure and remediation of the East Lagoon, WEC is also requesting approval to dispose of solid Calcium Flouride (CaF_2) sludge previously dredged from the Calcium Fluoride Lagoons on the site and placed in a storage pile. This material is known to contain SNM with less than 0.5 weight percent U-235. WEC also intends to dispose of 526 obsolete UF_6 transportation cylinders that are no longer in service. Despite having gone through an internal wash/rinse process following their last use, the UF_6 cylinders are internally contaminated with SNM.

SOURCE TERM

As noted above, this 10 CFR 20.2002 request considers the packaging, shipping, and disposal of two separate waste streams. The first waste stream, referred to as aggregated waste,

includes waste from the East Lagoon, the East Lagoon liner, soils excavated from below the liner, and previously excavated CaF_2 sludge. The second waste stream consists of cylinders previously used for shipping UF_6. This review considers these two waste streams individually since they consist of different material and are proposed to be shipped using different transportation methods. Doses associated with each stream, however, are combined in order to consider potential exposure from the requested disposal in light of the NRC standards noted above.

Aggregated Waste

As outlined in Enclosure 1 of the submittal and clarified in the response to the Request for Additional Information (RAIs) (ADAMS Accession No. ML20266G550), the aggregated waste being considered for disposal at USEI includes the soil and sludge excavated from the East Lagoon, the East Lagoon liner, subsurface soils collected from below the liner during excavation and remediation activities determined to contain radioactive material, CaF_2 sludge previously dredged from the Calcium Fluoride Lagoons, and Portland cement used to stabilize the material for shipment. Based on systematic grid sampling of the East Lagoon, WEC determined that approximately 1,275 cubic meters (m^3; 45,000 cubic feet (ft^3)) of soil and sludge would be removed from the East Lagoon for disposal under this request. Table 3.1 of the submittal (ADAMS Accession No. ML20129J936) provides a summary of radionuclide concentration sample data. As discussed in WEC's response to the RAIs (ADAMS Accession No. ML20266G550), the East Lagoon liner is incorporated into the volume of soil and sludge being removed from the East Lagoon for disposal. WEC determined the liner volume is less than 1 percent of the East Lagoon total waste volume and did not warrant considering the material type in the Site-Specific Dose Assessment (SSDA) dose calculations to be debris instead of soil.

Given the history of the East Lagoon and the potential for the liner to have leaked, CFFF anticipates that some soil underlying the East Lagoon will be contaminated. Since soil characterization below the liner has not been possible, WEC assumes that radionuclide concentrations in the soil below the liner would not exceed the values measured in the soil and sludge samples. WEC also makes the assumption that the volume of underlying soil required for disposal will not exceed the volume of material removed from the East Lagoon. Once the liner is removed, WEC intends to perform a radiological survey and systematic sampling of the subsurface soil. Subsurface soil identified as containing concentrations of radionuclides will either be shipped to USEI on its own, incorporated with the other East Lagoon and CaF_2 waste, or if necessary, shipped to a licensed low-level radioactive waste disposal site. If the volume of soil containing radioactive material below the East Lagoon exceeds the volume requested in the request under consideration, CFFF would either need to dispose of the waste at a licensed low-level radioactive waste disposal site or request a new alternate disposal procedure under 10 CFR 20.2002 for NRC review and approval.

In addition to the material associated with the East Lagoon, the aggregated waste also includes 1,430 m^3 (50,400 ft^3) of previously dredged CaF_2 sludge that has been stored on the site. WEC plans to mix this CaF_2 sludge with the material removed from the East Lagoon and 10 percent by volume of Type 2 Portland cement. The Portland cement, which is expected to add approximately 355 m^3 (12,500 ft^3) to the volume of aggregated waste being shipped to USEI, will assist with stabilizing the material. Table 1, adapted from Table 4.2 in the submittal, summarizes the volumes and concentrations of radionuclides associated with the aggregated waste.

Table 1. Aggregated waste characteristics

Waste	Volume		Mass	U-234	U-235	U-238	Tc-99
	m^3*	ft^3	g	pCi/g	pCi/g	pCi/g	pCi/g
CaF_2	1,428	50,400	2.28E+09	45.6	1.7	6.7	0
East Lagoon	1,268	44,776	2.23E+09	971	41	158	13
Underlying Soil	1,268	44,776	2.23e+09	971	41	158	13
Portland Cement	354	12,500	5.10e+08	0	0	0	0
	Totals			Weighted Average			
Aggregated Waste	4,318	152,452	7.26E+09	611.4	25.5	99.2	8.0

*m^3 volume values were calculated from the ft^3 values provided in the submittal and rounded up

The radiological characterization data indicates that each constituent of the proposed aggregated waste could be individually packaged and shipped to USEI in accordance with the State of Idaho's Waste Acceptance Criteria (WAC). However, WEC proposes comingling of the waste to ensure concentration limits are met as well as to stabilize the material and maximize transport efficiency.

UF_6 Transportation Cylinders

In addition to the aggregated waste, WEC also proposes to dispose of up to 546 obsolete UF_6 cylinders that were previously used as transportation containers. The empty containers, which were cleaned following their last use, will be downsized to reduce void space prior to shipping offsite. Although emptied and cleaned, the cylinders are internally contaminated with SNM and U-238.

WEC performed a radiological survey and characterization of 15 randomly selected UF_6 cylinders. This review involved cutting the cylinders in half, performing a visual inspection to determine if any scale or product material remained, and performing a radiological survey. The radiological survey included using a gamma-sensitive NaI 2x2 probe to evaluate the exterior of the container and an alpha-sensitive frisker to evaluate the interior. Each cylinder was also smeared to determine the amount of removable activity. Average uranium concentrations from the cylinders evaluated are included in Table 2.

Table 2. Average uranium concentrations associated with UF6 transportation cylinders

Concentration (pCi/g)		
U-234	U-235	U-238
23.2	1.3	3.8

DOSE EVALUATION

WEC supplied a description of the various waste forms intended for disposal and dose calculations for reasonably foreseeable exposure scenarios to evaluate doses to individuals associated with the disposal of these materials. These scenarios include transportation workers and USEI workers, post-closure doses associated with potential exposures to the general

public, and doses from different intrusion scenarios. Doses were evaluated using USEI's Site-Specific Dose Assessment, Version 3a, methodology. The SSDA is incorporated into a Microsoft Excel spreadsheet developed by USEI. NRC staff reviewed and approved the original version of the SSDA for use when evaluating doses associated with disposals at USEI in 2015 (ADAMS Accession Nos. ML15125A364 [cover letter] and ML15125A466 [TER]) and an updated version in 2018 (ADAMS Accession Nos. ML18164A073 [cover letter] and ML18164A071 [TER]).

In order to more accurately assess the doses associated with the material being proposed for disposal, this review considers the two waste streams separately before combining their overall dose contribution for consistency with NRC requirements and guidance. As discussed in WEC's response to the NRC's RAIs (ADAMS Accession No. ML20266G550), doses to CFFF workers, including USEI personnel and other sub-contractors on the site, are monitored in accordance with requirements stated in CFFF's NRC license and a Radiation Work Permit (RWP) developed to document personnel monitoring requirements and Health Physics oversight associated with performing this work. As a result, doses associated with these individuals are not considered in this disposal request review.

Scenarios, Modeling, and Results

The dose calculations for this 10 CFR 20.2002 request were made using USEI's SSDA, Version 3a. Specific inputs required to use the SSDA for evaluating these disposal actions include the volume of waste, type of waste (e.g., soil or debris), the waste density, the method of shipment, whether the waste is shipped bulk or containerized, the distance from the waste generator to USEI, the time required to complete the project, the percentage of waste requiring treatment, and the concentration of the individual radionuclides present in the waste. For this request, WEC submitted individual SSDA dose analyses to address the differences in the materials and the proposed transportation and disposal activities for the aggregated waste and the UF_6 cylinders. In addition to transportation and USEI workers involved, the SSDA also calculated post-closure doses and potential inadvertent intruders at USEI.

Table 3 summarizes the SSDA inputs for both waste streams. The table includes a list of key information used in the analysis but does not include all of the specific values considered in the calculation. Additional details related to the exposure scenarios are discussed below.

Table 3. Summary of key SSDA parameter values used calculate worker doses, post-closure doses, and inadvertent intruder doses associated with the transport and disposal of aggregated waste and UF_6 containers

Waste Stream Information	Aggregated Waste	UF_6 Cylinders
Volume of waste (ft^3)	152,452	23,144
Primary waste form	Soil	Debris
Method of shipment	Rail and Truck	Truck
Containerized or bulk shipping	Bulk	Bulk
Waste density (lb/ft^3)	93	31.8
Does waste contain source material?	No	No
Does waste contain special nuclear material?	Yes	Yes
Radionuclide concentrations (pCi/g)		

Tc-99	8.0	
U-234	611.4	23.2
U-235	25.5	1.7
U-238	99.2	3.8

Transportation and USEI Worker Doses

Since USEI is not an NRC licensee, USEI workers, along with the transportation workers responsible for transporting the material from CFFF to USEI, are considered members of the public. WEC's proposal to use different transportation methods for the two waste streams also means doses to different transportation workers and USEI workers involved in processing the material upon arrival need to be considered. Table 4 provides a summary of the workers used for each shipping method, the worker contact time and estimated repetitions involved with transporting and disposing of the two types of waste, and the SSDA-calculated doses. This table is adapted from Table 5.1 in WEC's submittal.

The aggregated waste is planned to be shipped using a combination of trucks and railcars. The aggregated waste will be placed in 9 cubic yard /10 ton IP-1 bags and loaded on to 50 cubic yard / 22 ton capacity dump trucks. Two bags will be placed in each truck and a tarp will be placed on top and the material will be driven 8 kilometers (km; 5 miles (mi)) to the railyard where the bags will be lifted into lined gondola railcars. As previously noted, doses associated with these activities are monitored in accordance with CFFF's RWP. Measures taken to package and transport the material via gondola railcars are expected to result in low doses to the train personnel and the public and are consistent with both NRC and Department of Transportation regulations. Upon arrival at the Rail Transfer Facility (RTF), the short contact times and processes in place for transferring the material from the gondola cars to trucks used to transport the waste to the disposal cell are expected to result in minimal doses to USEI workers.

For the UF_6 cylinders, CFFF plans to use lined 50 cubic yard / 23 ton aluminum end dump trucks. These trucks differ from the trucks incorporated into the SSDA calculations. The NRC staff evaluated this issue, which is discussed below, and determined that this discrepancy does not impact this review's findings. The UF_6 cylinders will be cut in half prior to being loaded on to the trucks and then driven approximately 4,056 km (2,520 mi) to USEI for disposal. External doses to the truck drivers are expected to be minimal due to the low average radionuclide concentrations, the physical distance between the truck driver and the UF_6 cylinders, and the shielding associated with the walls of the truck cab and trailer. The low doses to the truck drivers conservatively bound any doses to other members of the public.

The analysis of the USEI workers involved assumes a specific number of workers will be available to carry out each of the job functions, and that the dose is divided equally among all workers for a specific job function. Specific job functions are not shared among the excavator operator, truck driver, and landfill cell operator groups because the work crews are not assumed to overlap. However, the groups of gondola surveyors, gondola cleanout crews, and truck surveyors may include the same individual employees. Table 4 summarizes the job function scenario assumptions. The minutes assigned is the amount of time for one person to perform each function one time. A review of the calculated doses for job functions in which workers may overlap indicate that even if one worker carried out all of the tasks for all three functions, an impossible scenario, the resulting project dose would be not be significant.

Table 4. Summary of doses and related details for transportation workers and USEI workers involved with the transport, treatment, and disposal of the aggregated waste and UF_6 cylinders

Job Function	Minimum Number of Workers	Waste Contact Time (hr)	Total Number of Repetitions	Total Project Dose per Worker (mrem/y)[1]
Project Dose – Transport and Disposal of Aggregated Waste				
Front-End Dray Truck Drivers	4	0.09	355	8.06E-03
Gondola Railcar Surveyors	4	0.16	71	1.96E-03
Bulk/IMC Truck Surveyors (RTF)	4	0.08	209	3.27E-03
RTF Excavator Operator	2	0.75	71	7.19E-01
Gondola Railcar Cleanout	4	0.16	71	7.71E-02
Back-End Dray Truck Drivers	8	0.75	209	1.96E-02
Landfill Cell Operators	2	0.25	142	4.74E-01
Project Dose – Transport and Disposal of UF_6 Cylinders				
Long-Haul Truck Drivers	5	45.45	20	1.03E-02
Bulk/IMC Truck Surveyors (Disposal Site)	4	0.08	20	1.83E-05
Landfill Cell Operators	2	0.25	8	1.04E-03
Total Project Dose				
Long-Haul Truck Drivers				1.03E-02
Front-End Dray Truck Drivers				8.06E-03
Gondola Railcar Surveyors				1.96E-03
Bulk/IMC Truck Surveyors (RTF)				3.27E-03
RTF Excavator Operator				7.19E-01
Gondola Railcar Cleanout				7.71E-02
Back-End Dray Truck Drivers				1.96E-02
Landfill Cell Operators				4.75E-01

[1]Multiply mrem/y by 0.01 to convert doses to mSv/y

Post-Closure and Intruder Dose

In addition to evaluating worker scenarios, WEC included a long-term post-closure analysis assuming a residential scenario, a site-specific exposure scenario incorporated into the SSDA that considers an individual residing on the site following closure and includes ingestion, inhalation, and external dose pathways except for the ingestion of aquatic foods, as well as analyses for three inadvertent human intruder scenarios. These include a construction scenario, a well-drilling scenario, and driller occupancy scenario. These analyses were performed using the SSDA with the same input parameters used to calculate the doses to transportation and USEI workers. Table 5 summarizes the doses calculated for the post-closure and inadvertent intruder scenarios. Although doses associated with the inadvertent intruder construction scenario are larger than the other inadvertent intruder scenarios, the NRC staff does not consider this scenario to be feasible due to the configuration of the disposal cells, and USEI disposal practices (e.g., waste is disposed deeper than the excavation depth assumed in the scenario).

Table 5. Projected post-closure and inadvertent intruder doses

Scenario	Aggregated Waste (mrem/y)[1]	UF6 Cylinders (mrem/y)	Project Total (mrem/y)
Post-Closure Residential Dose	4.20E-01	4.87E-05	4.20E-01
Inadvertent Intruder Doses			
Construction Scenario	8.67E+00	1.22E-01	8.79E+00
Well Driller Scenario	9.67E-01	3.70E-02	1.00E+00
Driller Occupancy	1.65E-01	2.66E-03	1.68E-01

[1]Multiply mrem/y by 0.01 to convert doses to mSv/y

Regulatory Analyses

WEC requested that NRC approve an alternate disposal request in accordance with 10 CFR 20.2002, that would allow CFFF to dispose of 4317 m^3 (152,452 ft^3) of aggregated waste and 655 m^3 (23,144 ft^3) of UF_6 transportation cylinders at USEI.

WEC has provided an adequate description of both waste streams and sufficient details to describe the methods used to transport and dispose of the material. NRC staff finds that the projected doses to transportation workers and for the individual job functions associated with actions performed by USEI workers were appropriately calculated using the SSDA methodology and meet the NRC's alternate disposal requirement of contributing a dose of not more than "a few millirem per year" to any member of the public and are as low as reasonably achievable (ALARA). NRC staff reviewed and confirmed the analyses performed by WEC in the submittal and performed additional analyses to address potential concerns based on these findings. The NRC staff's evaluation of doses to other members of the public, including inadvertent intruder scenarios, is below.

NRC staff reviewed the details regarding the volumes and concentrations of radionuclides associated with both waste types. Initial confusion regarding the volumes of aggregated waste were clarified in WEC's response to the NRC's RAIs. Although the waste being disposed of as aggregate waste included a variety of materials, including soil, sludge, the lagoon liner, and Portland cement, NRC staff finds WEC's justification for evaluating the dose associated with the aggregated waste as soil in the SSDA analysis appropriate, as the assumption is not risk-significant. NRC staff did perform a separate analysis to consider the aggregated waste to be debris. Results, summarized in Table 6, showed minimal differences in doses associated with the specific job functions and no changes to the post-closure and inadvertent intruder scenario doses.

Table 6. Comparison of doses when evaluating aggregated waste as soil versus debris

Job Function	Aggregated Waste as Soil (mrem/y)[1]	Aggregated Waste as Debris (mrem/y)[1]
Front-End Dray Truck Drivers	8.06E-03	6.85E-03
Gondola Railcar Surveyors	1.96E-03	3.72E-03
Bulk/IMC Truck Surveyors (RTF)	3.27E-03	2.88E-03
RTF Excavator Operator	7.19E-01	7.19E-01
Gondola Railcar Cleanout	7.71E-02	7.63E-02
Back-End Dray Truck Drivers	1.96E-02	1.66E-02
Landfill Cell Operator	4.74E-01	4.74E-01

Post-Closure Dose	4.20E-01	4.20E-01
Inadvertent Intruder Doses		
Construction Scenario	8.67E+00	8.67E+00
Well Driller Scenario	9.67E-01	9.67E-01
Driller Occupancy Scenario	1.65E-01	1.65E-01

[1]Multiply mrem/y by 0.01 to convert doses to mSv/y

During its review of SSDA dose calculations for the UF_6 cylinders the NRC staff identified a discrepancy between the number of repetitions for the "Long-Haul Truck Drivers" and "Bulk/IMC Truck Surveyors (Disposal Site)" job functions reported by WEC in their submittal and the number of repetitions calculated by the SSDA, based on the information provided in the submittal. USEI acknowledged that the values used for the "Total Number of Repetitions" in the SSDA dose calculation for these two job functions were modified and manually entered into the form to account for the use of a different size truck to transport the material. NRC staff confirmed that this change does not impact the dose for these two job functions.

Table 7. Comparison of "Total Number of Repetition" values and the resulting doses

	Calculated dose (mrem/y)[1]	
Job Function	20 Repetitions	31 Repetitions
Long-Haul Truck Drivers	1.03E-02	1.59E-02
Bulk/IMC Truck Surveyors (Disposal Site)	1.83E-05	2.84E-05

[1]Multiply mrem/y by 0.01 to convert doses to mSv/y

CRITICALITY SAFETY ASSESSMENT

A Criticality Safety Assessment was performed due to the inclusion of SNM in the material being proposed for disposal at USEI. A site-specific criticality safety assessment for USEI was previously performed as part of a prior 10 CFR 20.2002 alternate disposal request by Westinghouse for the Hematite site (License No. SNM-0033; Docket No. 070-36).

The "Nuclear Criticality Safety Assessment of the US Ecology (USEI) Site for the Land Fill Disposal of Decommissioning Waste from the Hematite Site, Rev. 2 (NSA, 2011)" (ADAMS Accession No. ML12135A301) concluded that waste containing U-235 may be sent to USEI for disposal on the basis that very large margins of safety have been incorporated into the normal operating conditions associated with these wastes and the probability for serious abnormal conditions is acceptably small. The report establishes a maximum fissile concentration of 0.1 grams of U-235 per liter, which corresponds to an equivalent concentration of 216 pCi/g in soil. This concentration exceeds USEI's Waste Acceptance Criteria value of 167 pCi/g, meaning the WAC is the limiting factor with regards to whether the material can be accepted for disposal at USEI. The range of material types and forms (i.e., soils and debris) to be disposed in this review are similar to the 2011 evaluation and the practices at USEI have not appreciably changed since the 2011 review. Therefore, the determination that the WAC adequately manages any concern for criticality is still valid.

By aggregating the waste containing SNM during packaging, WEC further ensures that low concentrations of U-235 in the waste will be maintained. As discussed in the submittal, WEC also plans to sample the aggregated waste prior to shipping to verify that the concentrations are acceptable for disposal at USEI. Due to the low concentrations of uranium expected (see

Tables 1 and 2) and the established safety measures, NRC staff finds that criticality is not an issue for this alternate disposal request.

REGULATORY FINDINGS

20.2002 Criteria

NRC staff reviewed the information provided by WEC to support their 10 CFR 20.2002 alternate disposal request and for corresponding specific exemptions from 10 CFR 30.3 and 10 CFR 70.3 in order to dispose of aggregated waste and UF_6 cylinders at USEI.

Section 20.2002, "Method for obtaining approval of proposed disposal procedures," provides that:

> A licensee or applicant for a license may apply to the Commission for approval of proposed procedures, not otherwise authorized in the regulations in this chapter, to dispose of licensed material generated in the licensee's activities. Each application shall include:
>
> > (a) A description of the waste containing licensed material to be disposed of, including the physical and chemical properties important to risk evaluation, and the proposed manner and conditions of waste disposal; and
> >
> > (b) An analysis and evaluation of pertinent information on the nature of the environment; and
> >
> > (c) The nature and location of other potentially affected licensed and unlicensed facilities; and
> >
> > (d) Analyses and procedures to ensure that doses are maintained ALARA and within the dose limits in this part.

As documented above and consistent with Section 20.2002(a), the NRC staff concludes that WEC provided an adequate description of the materials and the proposed manner and conditions of waste disposal. Consistent with Section 20.2002(b), the NRC staff also concludes that the use of the SSDA methodology to evaluate the projected doses associated with the transportation and disposal of the waste streams are an acceptable basis for evaluating the disposal environment. Specific site features, including its arid climate, low average precipitation rate, and thick unsaturated zone below the disposal zone as well as the administrative controls put in place satisfy the requirements in Section 20.2002(c).

The NRC staff also concludes that, consistent with Section 20.2002(d), the input parameters included in the modeling are appropriate for the scenarios considered and that the potential doses associated with transportation, waste handling and disposal have been appropriately estimated, are not more than "a few millirem per year" to any member of the public, and are ALARA. The NRC staff also concludes that the projected doses for the post-closure and intruder scenarios are also within "a few millirem per year" over a period of 1,000 years. The NRC staff also notes that WEC's proposal includes further evaluation and measurement as

appropriate, including the analysis of subsurface soils once the East Lagoon liner is removed and the mixing of aggregated waste with Portland cement to stabilize the material for shipping to ensure the evaluation of potential risks not able to be considered at this time.

Exemption Criteria

Pursuant to 10 CFR 70.17(a) and 10 CFR 30.11, the Commission may, upon application of any interested person or upon its own initiative, grant such exemptions from the requirements of 10 CFR part 70 and Part 30 respectively, as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest.

The Exemption is Authorized by Law

The proposal provides that the material described above would be transported in compliance with U.S. Department of Transportation (DOT) regulations to USEI in Idaho, which is a Subtitle C Resource Conservation and Recovery Act hazardous waste disposal facility permitted by the State of Idaho. As such, the material will be removed per State and local regulations, will be shipped per existing Federal regulations to a location approved by the State of Idaho to receive the material, and such disposal is not otherwise contrary to NRC requirements, and is therefore authorized by law.

The Exemption Will Not Endanger Life, Property and Is Consistent With the Common Defense and Security

NRC staff reviewed the information provided by WEC to support their 10 CFR 20.2002 alternate disposal request and for the specific exemptions from 10 CFR 30.3 and 10 CFR 70.3 and associated license amendment in order to dispose of aggregated waste and UF_6 cylinders at USEI. As documented in this SER, the NRC staff concludes that, consistent with 10 CFR 20.2002, WEC provided an adequate description of the materials and the proposed manner and conditions of waste disposal. The NRC staff also concluded that the use of the site-specific dose assessment methodology to evaluate the projected doses associated with the transportation and disposal of the waste streams at USEI are acceptable. The NRC staff reviewed the input parameters included in this modeling and found that they are appropriate for the scenarios considered. The NRC staff also evaluated the potential doses associated with transportation, waste handling, and disposal and found that the projected doses have been appropriately estimated and are demonstrated to meet the NRC's alternate disposal standard of contributing a dose of not more than "a few millirem per year" to any member of the public and are ALARA. The NRC staff also concluded that the projected doses from the post-closure and intruder scenarios at USEI are also within "a few millirem per year" over a period of 1,000 years. Lastly, because of the presence of SNM, the NRC evaluated potential criticality in its SER, and found no concerns. Therefore, the NRC concludes that issuance of the exemption is will not endanger life, property, and is consistent with the common defense and security.

The Exemption is in the Public Interest

Issuance of the exemptions to WEC and USEI is in the public interest because it would provide for the efficient and safe disposal for the subject waste material, would facilitate the decommissioning of the East Lagoon at the CFFF site consistent with the consent agreement between CFFF and SCDHEC, and would conserve low-level radioactive waste disposal capacity at licensed low-level radioactive disposal sites, while ensuring that the material being

considered is disposed of safely in a regulated facility. Therefore, based upon the evaluation above, an exemption is appropriate pursuant to 10 CFR 30.11 and 10 CFR 70.17.

CONCLUSION

Based on these findings, NRC staff concludes that the requested alternate disposal of this material is acceptable under 10 CFR 20.2002. In addition, as provided in 10 CFR 30.11 and 10 CFR 70.17, the NRC staff finds that issuance of the exemptions is otherwise authorized by law, will not endanger life or property and is consistent with the common defense and security, and that authorizing such alternate disposal is in the public interest. Therefore, the 10 CFR 20.2002 request should be approved, WEC's license should be amended, and exemptions to sections 30.3 and 70.3 should be granted to WEC and USEI as described above.

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