

14 WASTE CONFINEMENT AND MANAGEMENT EVALUATION

14.1 Conduct of Review

This chapter of the SER evaluates the waste management systems of the Facility. Chapter 6 of the SAR provides information about the waste confinement and disposal systems that are part of the Facility. The review objectives for this chapter are to establish that the Facility provides safe confinement and management of radioactive waste generated at the Facility, and the generation of radioactive waste and release of the radioactive material to the environment meet the regulatory standards.

14.1.1 Waste Sources

Review of the sources of radioactive waste described in Section 6.1 of the SAR included consideration of dry solid radioactive waste produced during operation of the Facility. The review considered how the SAR addresses the following regulatory requirements:

- 10 CFR 72.104(a) requires that, during normal operations and anticipated occurrences, the annual dose equivalent to any real individual beyond the controlled area must not exceed 0.25 mSv (25 mrem) to the whole body, 0.75 mSv (75 mrem) to the thyroid and 0.25 mSv (25 mrem) to any other organ, from various sources, including planned discharges of radioactive materials to the environment.
- 10 CFR 72.122(b)(4) requires that, for facilities located over an aquifer, measures be taken to preclude transport of radioactive materials to the environment through this pathway.
- 10 CFR 72.128(a)(5) requires that systems for handling radioactive materials in the ISFSI must be designed to minimize the quantity of radioactive wastes generated.

The SAR describes the radioactive waste sources, which are limited to those produced during the operation of the Facility. The solid waste will consist of anti-contamination clothing, rags, and associated health physics materials. This solid waste will be packaged and temporarily stored in the low-level waste holding cell at the Canister Transfer Building and then will be transferred to an offsite low-level waste disposal facility. The dual-purpose canisters arriving at the Facility are expected to have only minimal, if any, external surface contamination. A canister would not be permitted to be transported to the Facility if surveys performed at the originating power plant during loading indicated that the surface contamination levels exceed the acceptable limits for the specific canister design. A canister would not be accepted at the Facility if surveys conducted upon receipt indicated surface contaminations exceed the acceptable limits. The canisters, which are sealed by welding, would not be opened at the Facility. The welded canisters must be designed such that they are not breached under normal and off-normal conditions of transfer, handling, and storage. Therefore, no release of radioactive materials from inside the canister is expected under these conditions.

The staff finds that the SAR adequately describes waste sources and that there are no routine effluents discharged to the environment due to the operation of the Facility including normal and off-normal conditions. Since there are no liquid or gaseous effluents, the staff finds that the requirement of 10 CFR 72.122(b)(4) regarding precluding transport of radioactivity to an aquifer is met, and that the dose limits of 10 CFR 72.104(a) are met with respect to release of effluents. The generation of radioactive waste is limited because the surface contamination on canisters is limited, the canisters are welded closed, and the canisters are not opened at the Facility. Therefore, the staff has determined that the requirements of 10 CFR 72.128(a)(5) are met in that the design of the Facility systems will minimize the generation of radioactive waste.

14.1.2 Off-Gas Treatment and Ventilation

The review of Section 6.2 of the SAR regarding off-gas treatment and ventilation considered how the SAR addresses the following regulatory requirements:

- 10 CFR 20.2001 authorizes a licensee to dispose of radioactive materials only by certain methods, including transfer to an authorized recipient, and by limited release in effluents.
- 10 CFR 72.104(a) requires that, during normal operations and anticipated occurrences, the annual dose equivalent to any real individual beyond the controlled area must not exceed 0.25 mSv (25 mrem) to the whole body, 0.75 mSv (75 mrem) to the thyroid and 0.25 mSv (25 mrem) to any other organ, from various sources, including planned discharges of radioactive materials to the environment.
- 10 CFR 72.104(b) requires that operational restrictions be established to meet ALARA objectives for radioactive materials in effluents.
- 10 CFR 72.104(c) requires that operational limits for radioactive materials in effluents be established to ensure that the dose limits in 10 CFR 72.104(a) are met.
- 10 CFR 72.122(h)(3) requires that ventilation systems and off-gas systems must be provided where necessary to ensure confinement of airborne radioactive particles during normal or off-normal conditions.
- 10 CFR 72.126(c)(1) requires that, as appropriate for the handling and storage system, effluent systems must be provided, as well as methods for measuring the amount of radionuclides in the effluents.
- 10 CFR 72.126(d) requires that the ISFSI must be designed to limit effluents to ALARA levels.
- 10 CFR 72.128(a)(5) requires that systems for handling radioactive materials in the ISFSI must be designed to minimize the quantity of radioactive wastes generated.

- 10 CFR 72.128(b) requires that the ISFSI must have radioactive waste treatment facilities, and that provisions must be made for packing of site-generated low-level wastes in a form suitable for storage onsite awaiting transfer to disposal sites.

According to the SAR, there will be no gaseous release from the storage systems at the Facility, as the Facility will only handle sealed canisters. The staff finds that under normal operations, no radioactive materials will be released to the environment as gaseous effluents. Because there are no gaseous effluents, no special off-gas or ventilation systems are needed, and the requirements of 10 CFR 72.122(h)(3), 72.126(c)(1), 72.126(d), 72.128(a)(5), and 72.128(b) are met. Since there are no gaseous effluents, the staff finds that the design and operation of the ISFSI meet 10 CFR 72.104(a), (b), and (c) with regard to off-site doses from effluents.

14.1.3 Liquid Waste Treatment and Retention

The review of Section 6.3 of the SAR regarding liquid waste treatment and retention considered how the SAR addresses the following regulatory requirements:

- 10 CFR 20.2001 authorizes a licensee to dispose of radioactive materials only by certain methods, including transfer to an authorized recipient, and by limited release in effluents.
- 10 CFR 20.2003 authorizes a licensee to dispose of radioactive materials by discharge into sanitary sewerage, with certain restrictions.
- 10 CFR 72.104(a) requires that, during normal operations and anticipated occurrences, the annual dose equivalent to any real individual beyond the controlled area must not exceed 0.25 mSv (25 mrem) to the whole body, 0.75 mSv (75 mrem) to the thyroid and 0.25 mSv (25 mrem) to any other organ, from various sources, including planned discharges of radioactive materials to the environment
- 10 CFR 72.104(b) requires that operational restrictions be established to meet ALARA objectives for radioactive materials in effluents.
- 10 CFR 72.104(c) requires that operational limits for radioactive materials in effluents be established to ensure that the dose limits in 72.104(a) are met.
- 10 CFR 72.122(b)(4) requires that, for facilities located over an aquifer, measures be taken to preclude transport of radioactive materials to the environment through this pathway.
- 10 CFR 72.126(c)(1) requires that, as appropriate for the handling and storage system, effluent systems must be provided, as well as methods for measuring the amount of radionuclides in the effluents.

- 10 CFR 72.126(d) requires that the ISFSI must be designed to limit effluents to ALARA levels.
- 10 CFR 72.128(b) requires that the ISFSI must have radioactive waste treatment facilities, and that provisions must be made for packing of site-generated low-level wastes in a form suitable for storage onsite awaiting transfer to disposal sites.

According to the SAR, liquid wastes will not be routinely generated at the Facility under normal operations. Drain sumps are provided in the Canister Transfer Building to catch and collect water that may drip from the shipping cask. The collected water will be sampled and analyzed for radioactive contamination prior to release. If the water is found to be contaminated, it will be collected in a suitable container and then solidified by a suitable agent so that it qualifies as solid waste. The solidified waste will be stored temporarily in the low-level waste holding cell and then transported to the offsite low-level waste disposal facility.

The staff finds that there are no special liquid radioactive waste treatment and retention systems needed at the Facility. The applicant has identified and described an appropriate method for treating contaminated liquids, should it be needed, and therefore the staff finds that the requirements of 10 CFR 72.128(b) are met for contaminated liquids. There are no liquid radioactive effluents that will be discharged to the environment under normal operations. Because there are no liquid effluents, the requirements of 10 CFR 20.2001, 20.2003, 72.122(b)(4), and 72.126(c)(1) and (d) are met with respect to possible release of radioactive material in liquid effluents. Since there are no liquid effluents, the staff finds that the design and operation of the ISFSI meet 10 CFR 72.104(a), (b), and (c) with regard to doses from liquid effluents. The proposed method of handling contaminated liquid meets the requirements of 20.2001 for off-site disposal.

14.1.4 Solid Wastes

Review of the handling of solid wastes described in Section 6.4 of the SAR included the description of collection, packaging, and storage of solid wastes. The review considered how the SAR addresses the following regulatory requirements:

- 10 CFR 72.104(a) requires that, during normal operations and anticipated occurrences, the annual dose equivalent to any real individual beyond the controlled area must not exceed 0.25 mSv (25 mrem) to the whole body, 0.75 mSv (75 mrem) to the thyroid and 0.25 mSv (25 mrem) to any other organ, from various sources, including planned discharges of radioactive materials to the environment.
- 10 CFR 72.104(b) requires that operational restrictions be established to meet ALARA objectives for radioactive materials in effluents.
- 10 CFR 72.104(c) requires that operational limits for radioactive materials in effluents be established to ensure that the dose limits in 10 CFR 72.104(a) are met.

- 10 CFR 72.122(h)(3) requires that ventilation systems and off-gas systems must be provided where necessary to ensure confinement of airborne radioactive particles during normal or off-normal conditions.
- 10 CFR 72.128(b) requires that the ISFSI must have radioactive waste treatment facilities, and that provisions must be made for packing of site-generated low-level wastes in a form suitable for storage onsite awaiting transfer to disposal sites.

The SAR included a description of collection, packaging, and storage of solid wastes. The solid waste at the Facility will be generated from decontamination activities. A small amount of solid waste will be generated in the form of smears, disposable clothing, tape, blotter paper, rags, and related health physics material. The solid waste will be identified and packaged in suitable low-level waste containers. The solid waste will be temporarily stored at the low-level waste holding cell at the Canister Transfer Building and will then be transferred to an offsite low-level waste disposal facility. Because the solid waste will typically be generated due to an off-normal or accident event, the volume of solid waste is expected to be minimal.

The staff agrees that the provisions for handling solid wastes are appropriate and meet the requirements of 10 CFR 72.128(b). The method described would not be expected to produce radioactive effluents, and therefore meets the requirements of 10 CFR 72.104(a), (b), and (c) with respect to doses from effluents, and meets 10 CFR 72.122(h)(3) with respect to release of effluents.

14.1.5 Radiological Impact of Normal Operations

Review of the summary of radiological impacts of normal operations in Section 6.5 of the SAR considered how the SAR addresses the following regulatory requirements:

- 10 CFR 20.1101 requires that a licensee, as part of the radiation protection program, establish a constraint for air emissions of radioactive materials to the environment such that a member of the public is not expected to receive a total effective dose equivalent in excess of 10 mrem (0.1 mSv) per year.
- 10 CFR 20.1301(a) establishes dose limits for a member of the public, including a total effective dose equivalent of 0.1 rem (1 mSv) in a year, and a maximum dose in any unrestricted areas of 0.002 rem (0.02 mSv) in an hour.
- 10 CFR 20.1301(b) requires that the licensee comply with the environmental radiation standards in 40 CFR Part 190.
- 10 CFR 20.1302(b) requires that the licensee show compliance with the limits in 10 CFR 20.1301, by either demonstrating compliance with the dose limit to an individual by calculation or measurement, or by demonstrating that radioactivity in gaseous and liquid effluents do not exceed the values in table 2 of Appendix B to Part 20, and the dose from external sources would not exceed 0.002 rem (0.02 mSv) in an hour and 0.05 rem (0.5 mSv) in a year.

- 10 CFR 72.40(a)(13)(i) states that the Commission will issue a license under 10 CFR Part 72 upon a determination that the application for a license meets the standards and requirements of the Act and the regulations of the Commission, and upon finding that, among other things, the activities authorized by the license can be conducted without endangering the health and safety of the public.

The SAR included a summary of radiological impact of normal operations. Under all normal and off-normal conditions of transfer, handling, and storage, the welded canisters will remain sealed and no radioactive material will be released from inside the canister. Additionally, the practices and procedures that have been proposed to limit and control contamination at the Facility will assure that radiological impacts are minimized and that ALARA principles are maintained. No release of radioactive material to the environment is expected during normal Facility operations and no liquid or gaseous effluents are anticipated from the Facility. The radiological impacts to the environment from the normal operations at the Facility will be minimal. The staff has determined that the radiological impact of the Facility under normal operations has been adequately and appropriately described, and that the radiological impacts from releases will be minimal and will not endanger the health and safety of the public. Based on these considerations, the staff has determined that the requirements of 10 CFR 20.1101 have been met with respect to potential releases of radioactive materials under normal operations, and that 10 CFR 72.40(a)(13)(i), 20.1301 and 20.1302 have been met with respect to doses to members of the public from potential releases of radioactive materials under normal operations. The dose to members of the public is evaluated in Chapters 7, 9, and 11 of this SER.

14.2 Evaluation Findings

The staff has reviewed Sections 6.1 through 6.5 of the SAR and has determined that the waste confinement and management of the proposed Facility:

- meet the requirements of 10 CFR 20.2001, 20.2003, 72.104(b), 72.104(c), 72.122(b)(4), 72.122(h)(3), 72.126(c)(1), and 72.126(d) with respect to the potential release of effluents to the environment;
- meet the radioactive waste management and minimization requirements of 10 CFR 72.128(a)(5) and 72.128(b);
- meet the dose limits for members of the public of 10 CFR 20.1101, 20.1301, 20.1302, and 72.104(a) with respect to radioactive materials released as effluents; and
- will not endanger health and safety of the public as required by 10 CFR 72.40, with respect to radioactive materials released as effluents.

14.3 References

Private Fuel Storage Limited Liability Company. 2000. *Safety Analysis Report for Private Fuel Storage Facility*. Revision 18. Docket No. 72-22. La Crosse, WI: Private Fuel Storage Limited Liability Company.