

Analysis of NRC's Requests for Supplemental Information and Observations Regarding the WCS Application for a CISF License – Consolidated Interim Storage Facility - for High-Level Radioactive Waste Storage

Key points summarized by SEED Coalition

Some of the NRC findings are summarized here:

- **General Description:** NRC requested clear, consistent descriptions of the proposed environmental monitoring program since the application only said the program “will be completed by WCS,” the facilities and equipment that would be used for the sampling, the minimum requirements of the Radiation Safety Officer, and the maintenance activities for related structures, systems and components. (1.1, Page 2)
- Clarify references for information being incorporated by reference since some are vague. (1.2, Page 2)
- Provide the EPRI report cited in the application that contains the consolidated interim storage facility construction cost, operating and labor cost estimates. (1.2, Page 3)
- Provide justification for a 40-year license. Storage systems have already been licensed for 20 years. This adds up to 60 years, which would exceed the 50-year design life, described in final safety analysis reports. (1.3, Page 3)
- **Site Characteristics:** Provide future population information within 5 miles of the site, as required. Present and future projected population data is inadequate for technical review of the demography of the proposed site. (2.1, Page 4)
- A description of the meteorological measurement program is needed, including instrumentation that was used, how it was placed, types of sensor and data acquisition and reduction methods. (2.2, Page 4)
- More information is needed regarding the diversion berms and the collection ditch, including exact locations and the impact of these structures on design basis and PMF floods, as well as the impact of the structures on proposed site safety structures. (2.3, Page 5)
- Consolidate slope stability information. The application states that no slopes are “close enough” that their failure would adversely affect these facilities. NRC asked for a definition of “close enough” and justification of why their failure would not adversely affect CISF facilities. (2.2, Page 5)
- **Operations:** Clarify the rate or frequency of sampling the holding tanks and explain how limits are still met for off-normal conditions. (3.1, Page 6)

- **SSC and Design Criteria:** Provide references for confinement design criteria and design bases and address any impact of storage and transportation. The application lacked significant discussion of the method of sealing or that regulations for redundant sealing are met, and that canister maximum leakage criteria and dose rates for normal, off-normal and accident conditions were met. (4.1, Page 6)
- In addition to high-level radioactive waste, WCS' application requests storage of Greater Than Class C reactor waste. The NRC said that the application failed to characterize this waste or its containers, or to specify limits to the amount of waste, noting that safety evaluations don't support storage of an unlimited quantity of this waste. (4.2, Page 7)
- Drawings of the proposed cask transfer system and details about confinement structures and reinforced concrete structures are lacking, including details about radioactive waste confinement, radiation shielding, structural support, floors and protection against natural phenomena and accidents. More detail is requested regarding site layout, transfer routes, barriers, restricted areas, health physics facilities and radiation monitoring around the facility and where the high-level radioactive waste would be handled, transferred or stored. (Sec. 4.3, Page 7)
- Analysis and design information is needed regarding the transfer casks that would be used for all storage systems, including shielding design information, design drawings, and dose rate analyses and results. (4.4, Page 8)
- Provide references to design drawings and descriptions of all overpacks, storage modules and canisters to be used. Details regarding radiation shielding features are still needed for some canisters and a storage module. (4.5, Page 8)
- Provide design criteria for the proposed fuel handling building (FHB), to demonstrate that it is structurally adequate "to prevent massive collapse of building structures or the dropping of heavy objects on to spent fuel cask systems"...or GTCC waste of on to structures need for safety. (4.7, Page 9)
- Provide a clear and consistent description of the spent fuel to be stored at the site; clarify inconsistencies to show whether high burnup fuel will or will not be precluded. (4.8, page 9)
- Provide an 80" cask drop analysis for the MP197 transportation cask, without the limiter protection mitigating the inertia loading on the cask. (4.2, Page 10)
- **Installation and Structural:** Describe the entire canister confinement boundary, not only of the canister shell and closure welds. (5.1, Page 10)

- WCS claimed that some site parameters exceed the bounds of those assumed in cask certificates, but NRC requested that specific references be provided, along with analysis of the deltas, and to address how confinement integrity is maintained during normal, off-normal and accident conditions. (5.2, Page 10)
- The application stated that concrete storage pads will be designed later, but NRC said the applicant must describe the design bases for the storage pads with all storage systems they plan to use, as part of their application. (5.5, Page 11)
- Cask handling systems were deemed “inadequate to demonstrate capability to prevent accidents.” The referenced crane standards apply to overhead cranes with top-running trolleys using wire rope hoists, but this didn’t match the proposed technology. The staff questioned the adequacy of the chain hoist to prevent load drop accidents. (5.5, page 11)
- Detailed calculations are needed for the storage pad design and seismic environment. The staff said that “amplified seismic environments could result from soil structure interaction between the pad and its underlying soil...” and that evaluations were needed for a design basis earthquake event. Detailed information is needed about the pad surface and cask center-of-gravity locations. Especially regarding NUHOMS ITS HSMs. (5.7, page 12)
- **Thermal:** Thermal evaluation is needed to demonstrate that all cask systems meet the environmental conditions at WCS, which include temperatures up to 110 degrees, the temperature that should bound ambient air temperature. Elevation and low wind speed should be considered too. Appendices list the normal ambient temperature range of 97 – 101 degrees F for NUHOMS cask systems. Staff needs to be able to perform thermal evaluation to assure that thermal limits are not exceeded. (6.1, Page 13 and 6.3, Page 14)
- The list of accidents considered for each cask system did not include adiabatic heat up. Staff requested accident analysis and results for this postulated accident or clarification of why it isn’t necessary. (6.2, Page 13-14)
- **Shielding:** Dose rate and dose analysis for a facility design should be provided that are consistent with the design for which a license is requested.
- **Criticality:** The NRC wants more information about the fuel types to be stored in the NAC dry cask storage systems. (8.1, Page 15)
- The application does not “identify the cask design of the site features that ensure that a criticality is not caused by two unlikely, independent, and concurrent of sequential events. The SAR (Safety Analysis Report) should include a discussion, which should consider the likelihood of possible events)e.g., canister failure, flooding) over the 40-year license period.” (8.3, page 16)

- **Confinement:** Specific Technical Specification sections related to design and inspection of dry cask storage systems in preventing leaks of radioactive materials were requested, as well as clarification of the confinement boundary and redundant closure for each canister. (9.1, Page 17)
- The design of the “ventilation, filtration and off-gas systems that acceptably ensure the confinement of airborne radioactive particulate materials during normal, off-normal, or accident conditions during post transport package evaluation or transportation package unloading in general has not been described. (9.4, Page 18)
- Provide information about the site monitoring systems to “measure radionuclides under normal and accident conditions. This includes all areas where there is the potential for significant releases to the environmental and may include storage casks and waste management facility during transportation package unloading of canister contents and storage conditions.” (9.5, Page 18)
- Information is needed regarding “how site specific criteria are met using general license facility criteria with **respect to acceptable measures that minimize the potential for transport of radioactive materials to the environment through the aquifer due to the design and proposed operations.**” (Sec. 9.6, Page 19)
- **Materials:** WCS’ application says that transportation packages may be repaired onsite. NRC asked them to “describe the facilities and operation of the facilities to be used to conduct these repairs and maintenance activities... and include appropriate provisions for contamination control and minimization of occupational exposures.” (10.2, Page 20)
- WCS’ application states that casks arriving via rail car will be visually inspected for damage prior to entering the Cask Handling Building. The NRC requests a description of the equipment procedures and monitoring systems for components important to safety that ensure radiological protection, shielding, confinement, monitoring effluents and protection for the spent fuel cladding.” (10.4, Page 20)
- **Conducts of Operations:** The emergency plan should provide a “description of each type of radioactive material accident for which actions may be needed to prevent or minimize exposure from radiation and/or radioactive materials to onsite personnel.” It should include the “means of mitigating the consequences for each type of accident, including those provided to protect workers onsite and the program for maintaining the equipment.” Furthermore, the accidents analyzed should match the accidents described for the casks to be stored, and not only accidents or unusual conditions that could occur during operation of the low-level radioactive waste and mixed waste storage and processing at the site. The emergency plan should address a cask drop accident. (11.1, Page 21)

- NRC asked for justification of inconsistencies regarding whether there is a single emergency Alert classification level or also a Site Area Emergency. (11.2, Page 21)
- The application describes an emergency planning zone with a 3.7 mile radius centered on the site. Federal code requires establishment of a controlled area, with the nearest boundary at least 100 meters from the spent fuel or radioactive waste handling and storage facilities. The emergency plan needs to differentiate between the two distinct planning zones. (11.2, Page 22)
- The emergency plan is not specific to emergencies that could occur at the high-level waste consolidated storage facility, but addresses only accidents and unusual conditions that could occur during the operation of the low-level radioactive waste and mixed waste storage and processing component of the site. (11.4, Page 22)
- Licensees must allow offsite emergency responders to have 60 days to comment on the initial submittal of the emergency plan prior to submitting it to the NRC, but the attachment with this information was not included in the WCS application. (11.5, Page 23)
- "The applicant should not submit operations descriptions in the license application that conflict with or are inconsistent with the relevant operations for the approved packages, waiting until after a license is granted to fix any conflicts or inconsistencies, as statements in Appendix D.5 indicate is the applicant's current intention." (11.9, Page 24)
- **Radiation Protection:** Operations descriptions need to include proper As Low As Reasonably Achievable (ALARA) considerations, and practices that should be employed, such as supplemental shielding and positioning and personnel during operations. (12.3, Page 25)
- Supplemental information is needed to address contamination control areas and describe radiation monitors and airborne monitoring instrumentation. "The information should be included for the facility and areas in facility structures where spent fuel and GTCC waste containers are handled, transferred or stored (e.g., cask handling building) and other CISF structures as appropriate for ensuring compliance with dose limits for personnel, members of the public, and non-radiation worker personnel and individuals on site such as CISF administration and security staff and railroad personnel involved in the delivery to and shipment from the CISF of transport packages. The limits for members of the public apply to this third group of people (i.e., personnel and individuals that are not radiation workers) even while on site." (12.1, Page 24)
- Information is needed regarding health physics/ radiation protection facilities to

be shared with the existing low-level radioactive waste site. (12.2, Page 24)

- NRC asked for dose contributions from other radioactive materials sites including the LES National Enrichment Facility and WCS' low-level radioactive waste site, and analysis of annual doses to members of the public working around the WCS site. Dose limits should include a whole body dose limit and limits for the thyroid and any other critical organs not included in the application's Safety Analysis Report (SAR). Dose evaluations for unloading a canister, loading it into a transportation package and preparing the package for shipment were missing. (12.4 -12.6, Page 25 - 26)
- **Waste Confinement and Management:** Inconsistencies need to be addressed. They include:
 - a. Application Table 4-1 states there are no radioactive waste streams, while the SAR discusses the generation and storage of some quantities of solid radioactive wastes (e.g., SAR Chapter 6);
 - b. The application states that radioactive effluent releases are not credible, while there is an evaluated leak rate for the canisters coming from the Rancho Seco ISFSI; and,
 - c. SAR Figure 9-2 shows a 'wash down pad' and Section 4.2.1 discusses potential decontamination activities, while Chapter 6 states no liquid radioactive effluents or wastes will be generated (15.1, Page 26)
- **Environmental Report:** WCS' application is to store up to 5,000 MTU in Phase 1, but eight phases would be constructed over 20 years, with one phase being completed approximately every 2.5 years. The NRC said that is unclear from the impact analysis whether the impact analysis has address the integrated effects of construction and operation of all eight phases, stating that it should include operation and construction of the eight phases anticipated in the 20 year period. (18.1, Page 28)
- WCS discusses transportation of spent nuclear fuel to WCS, the roads and rail lines to be used and the proposed rail spur to the WCS site. NRC said that they did not identify the existing levels or transportation on local roads or rails to which the proposed action would affect, nor the existing levels of transportation associated with ongoing activities at the WCS site related to waste storage and disposal. (18.2, Page 29)
- Observation: Ecology surveys were performed in 1997, 2003, 2004, 2007 and 2008, but recent surveys were not provided to show present conditions, vegetation and wildlife observed around the WCS site. (18.1, Page 29)
- NRC asked that all information in environmental reviews be made publicly available, as required by federal code. (18.4, Page 30)

