

**NON-PROPRIETARY REQUEST FOR SUPPLEMENTAL INFORMATION AND
OBSERVATIONS
WCS CISF
Docket No. 72-1050**

Multi-discipline RSIs

1.1 All non-copyright references should be provided by the applicant (e.g., TCEQ permit or license documents).

This information is needed to determine compliance with 10 CFR 72.24 and 10 CFR 72.90.

1.2 Explain, in detail, the process that will be used to verify that the conditions of the canister are within those conditions evaluated in the safety analyses of their respective Certification of Compliance (CoC)/license upon receipt at Waste Control Specialists LLC (WCS) Consolidated Interim Storage Facility (CISF) and therefore the canisters meet the conditions for storage at the facility.

The safety analyses in the approved design bases rely on the canister remaining within the CoC/license conditions during the licensed storage period. These safety analyses are appropriate for direct loading and storage from the spent fuel pool to the Independent Spent Fuel Storage Installation (ISFSI) pad. Since the canisters will be transported from their initial storage facility to WCS CISF by means that are out of the scope of the approved design bases, the staff expects the applicant to demonstrate that the canisters continue to meet the CoC/license conditions under which they were loaded prior to storage at WCS CISF. This should include addressing the following:

- a) Describe in Chapter 11, "Confinement evaluation," of the WCS safety analysis report (SAR) and in the associated appendices how the integrity of the confinement boundary is assured and meets the conditions for storage at WCS.

Language throughout Chapter 11 and in the associated appendices of the WCS SAR refers to the canister design at loading and leakage rate testing at that time and relies on that by referencing portions of each canister's final safety analysis report (FSAR). Canisters intended for storage at the Interim Storage Facility (ISF) will have been through storage and transportation which is not captured in each canister's FSAR for evaluation of confinement integrity. Leakage rate testing performed after storage and transportation as described in QP-10.02 Revision 1, "Post transport package evaluation," has not been described in Chapter 11 of the WCS SAR and in the associated appendices to demonstrate, in part, confinement integrity.

- b) Specify a method(s) in Chapter 11 of the WCS SAR and in the associated appendices that demonstrates how the integrity of the confinement boundary is assured considering the presence of non-confinement boundary, or redundant boundary components.

Enclosure 1

Leakage rate testing performed after storage and transportation as described in QP-10.02 Revision 1 may only be able to test the integrity of a portion of the confinement boundary after storage and transportation because the casks have been completely assembled for storage. Non-confinement boundary components or redundant boundary components may present a barrier to leakage rate testing described in QP-10.02 Revision 1, (e.g. outer top cover plate, structural lid, siphon/drain and vent port, shield plug, outer bottom cover plate) and confinement boundary components may not be able to be leak tested (e.g. inner lid, lid-to-shell closure weld, vent and drain port cover plates, vent and drain port cover plate welds, inner bottom cover plate). Therefore, it is not clear from the application how the integrity of the other portions of the confinement boundary is assured after storage and transportation.

This information is needed to determine compliance with 10 CFR 72.128

1. General Description

RSIs

1.1 Provide clear and consistent descriptions of the following:

- a. The proposed CISF environmental monitoring program; CISF SAR Section 9.6.2.4 only includes a statement that the program 'will be completed by WCS'
- b. The facility or facilities and equipment that will be available and used to perform the sampling described in Section 4.5 of the CISF SAR
- c. The programs listed on page 13-1 of the CISF SAR, which the SAR states 'will be adopted' as necessary
- d. The minimum qualification requirements of the Radiation Safety Officer (RSO)/Director of Health and Radiation Safety
- e. The maintenance activities for systems/facility structures, systems, and components (SSCs); CISF SAR Table 1-3 just states that such activities will be done under the quality assurance (QA) program

It is not clear that the SAR contains this information. In some instances, the information that is in the SAR does not appear to be consistent in addressing the items listed above. Programs necessary for the safe operations of the CISF, including monitoring the impacts of those operations on the public and personnel should be described in the SAR. The program descriptions should justify the adequacy of the program, or lack of need for a program if it is not needed, for CISF operations. Program descriptions should include the facility, equipment, and activity (for maintenance activities) sufficient to provide an understanding of program implementation and the activities, such as maintenance activities, to be performed.

This information is needed to determine compliance with 10 CFR 72.24, 72.28(c), 72.104, 72.122(f), and 10 CFR 20.1101.

1.2 Provide clear and specific references for information and analyses being incorporated by reference into the CISF SAR and how they support the CISF safety basis.

Several references are made to information located in the storage system FSARs and, in some cases, to the transportation package SARs. However, a number of these references are overly vague or broad in scope. For example, Section D.5.2.1, Step 21 of the CISF SAR includes a statement that the transport cask will be prepared per the applicable transportation license.

Also, references given in Section D.9.2.1 point to the entire NUHOMS FSAR. References should be clear and specific, pointing to the particular section(s) of the storage systems' FSARs and transport packages' SARs that are relevant to the part of the CISF SAR where the reference is made.

This information is needed to determine compliance with 10 CFR 72.18 and 10 CFR 72.24.

Observations

1.1 Clarify Table 1.4, "Table of Topical Reports Incorporated by Reference," for the Applicable SARs citation for Chapters C.3, D.3, C.7, and D.7 to recognize that the transportation cask MP197 is also used as a transfer cask for DSC loading and unloading operations.

Table 1.1, "Storage Systems at the WCS CISF," cites Docket No. 71-9302 for using the MP197 or MP197HB transportation cask for dry shielded canister (DSC) loading and unloading operations. The staff notes that, in Section D.3.1.4, MP197HB is used as a transfer cask (Docket No. 71-9302) for the 61BTH DSC. Similarly, MP197HB is also cited in C.3.1.4 for the 61BT DSC. The applicable SARs should be reflected in SAR Table 1.4.

This information is needed to determine compliance with 10 CFR 72.24.

1.2 Provide the Electric Power Research Institute (EPRI) report cited in the application that contains the CISF construction cost estimate, and the estimated operating and labor costs of the facility. Also, explain whether the contract with Department of Energy (DOE) referenced in the application currently exists; and if not, the anticipated time frame for finalizing the contract

In its submittal, the applicant stated, in part, that the EPRI estimated the cost for construction of the CISF to be approximately \$170 million. Additionally, the applicant stated, in part, that EPRI estimated operating and labor costs at the CISF for 40 years to be \$394,612,500. Further, the application states, in part, that WCS will obtain funds to operate the CISF pursuant to a contract with the DOE.

This information is needed to determine compliance with 10 CFR 72.22(e) and 10 CFR 72.30.

1.3 Provide justification for the request for a 40 year license for Waste Control Specialists LLC. (WCS) considering storage systems have already been licensed for 20 years, but canister final safety analysis reports (FSARs) describe a 50 year design life.

Canister FSARs describe a 50 year design life. It is not clear how this is resolved with storage systems that are licensed for 20 years and the request to license the WCS for 40 years which would in total exceed the 50 year design life.

This information is needed to determine compliance with 10 CFR 72.24(c).

2. Site Characteristics

RSIs

2.1 Provide the details of present and future projected population distributions within 5-miles of site including density, and population centers and distances from the site in accordance with the guidance, and acceptance criteria provided in NUREG-1567, Section 2.4.1.3.

The acceptance criteria specified in NUREG-1567, Section 2.4, regarding the requirements of 10 CFR 72.98 and 10 CFR 72.100 covering the present and future projected population distribution information, is not addressed in WCS CISF SAR, as per the guidance provided in subsection 2.4.1.3. There is a reference to the Environmental Report (ER), Attachment A (it appears to be labelled Appendix A), covering Socioeconomic Impact Assessment including census data. There is reference of the closest population centers being Andrews, Texas and Eunice, New Mexico, and other nearby population centers in the ER. However, the application does not provide the details of population numbers for clarity and perception for the size of population. The closest population center having 25,000 or more people is identified in CISF SAR Section 2.1 to be Hobbs, NM, which is 17.5 miles northwest of the WCS CISF. Though the population seems to be less than 25,000, the cities of Andrews and Eunice are misrepresented as population centers in ER Section 1.1. The population distribution presented in the ER addressed the present and future projected population distribution for five counties (Andrews, Gaines, Winkler and Ector in Texas, and Lea in New Mexico) covering the 30-mile Region of Interest (ROI) for ER consideration. This population distribution in the ER is referenced without any summary of pertinent population distribution information by sector and direction within 5 miles of the site as required for the CISF SAR 2.1 Neither the total population within 5 miles of site nor population of nearest city nor population center to the site is presented. No summary/conclusion is presented for present and future population distribution in the region of the site. For observation, the Private Fuel Storage Facility (PFSF) FSAR Chapter 2, Section 2.1.3 may serve as an example, where the content pertaining to population distribution is presented following the guidance NUREG-1567, Section 2.4.1.3, which has been accepted by the staff for review.

As such the staff considers that the information presented by the applicant pertaining to the present and future projected population data in the WCS CISF FSAR is not adequate to perform the review of this section covering the demography of the proposed site.

This information is needed to determine compliance with 10 CFR 72.98 and 10 CFR 72.100.

2.2 Provide a description of the onsite meteorological measurement program consistent with Regulatory Guide 1.23, which is cited in NUREG-1567.

Section 2.3.3 of the WCS SAR provides a listing of the meteorological variables measured, and at which heights. Other information is needed to access accuracy, resolution, and range; such as a description the meteorological instrumentation that was used, detail on its emplacement and operation, types of sensors, instrument surveillance plans, and data acquisition and reduction methods.

This information is needed to determine compliance with 10 CFR 72.90.

2.3 Provide complete descriptions of the diversion berms and the collection ditch in the SAR Sections 2.4.1 and 2.4.2, Hydrological Description and Floods, respectively. Please provide the following supplemental information:

- a) Exact locations of the diversion berms and the collection ditch;
- b) Design information of the two structures;
- c) Impact of the two structures on design basis and PMF floods; and
- d) Impact of the two structures on safety structures of the proposed site.

Similar information for a separate diversion ditch on the low-level waste site was provided to the Texas Commission on Environmental Quality (TCECQ License #R04100).

This information is needed to determine compliance with 10 CFR 72.90 and 10 CFR 72.92.

Observations

2.1 There is no basis provided in the SAR that the selected offsite meteorological station represents meteorological conditions at WCS. There is only a short record of meteorological data from onsite stations, and the time period of this data does not significantly overlap the data reported from the offsite stations. Weather stations from four cities surrounding the WCS site are listed in Table 2-1 of the SAR along with elevation and distance from WCS. But, only data from Andrews, TX, is reported for temperature and precipitation summaries. The footnote for Table 2-1 of the WCS SAR implies that an analysis of the meteorological data from each station may have been performed (“compiled data for climatological analyses”), though no climatological analysis is found in the WCS SAR comparing the four stations for the designated time period in the table. No basis was provided for Andrews, TX, being more representative of conditions at WCS than the other weather stations listed in Table 2-1 of the SAR.

This information is needed to determine compliance with 10 CFR 72.103 and 10 CR 72.90.

2.2 Consolidate information in SAR Section 2.6.5 “Slope Stability.” The staff identified additional sections within the application that contains information applicable to the slope stability of the site. Clarify SAR Section 2.6.5 to include relevant information to the slope stability of the site including:

- a) Information about water resources in the site vicinity along with a description of its location; such as dams, natural or manmade ponds.
- b) Information about natural slope and finished grade of the site.
- c) The stability of all natural and man-made slopes, both cut and fill, the failure of which could adversely affect the site.
- d) Information and summary of the static and dynamic properties of embankment and foundation soil and rock underlying the slopes.

SAR Section 2.7 indicates: “There are no slopes, natural or manmade, close enough to the proposed WCS CISF facilities that their failure would adversely affect these facilities”. Define the words “close enough” relative to the WCS CISF facilities and justify why their failure would not adversely affect WCS CISF facilities.

SAR Figure 2-1 “WCS Facility Site Plan” presents a CISF rail side track and is it not clear whether it includes an embankment or not. Indicate and describe the presence of any embankments, the failure of which could adversely affect the site.

This information is needed to determine compliance with 10 CFR 72.103.

3. Operation Systems

Observations

3.1 Clarify the expected rate or frequency for sampling the holding tanks that is meant by the term ‘periodically’ in CISF SAR Section 4.5 and explain how the overall sampling program described in that section of the SAR will ensure limits are still met for off-normal conditions.

This information is needed to confirm compliance with 10 CFR 72.24(e and I), 10 CFR 72.44(d), and 10 CFR 72.122(h).

4. SSC and Design Criteria

RSIs

4.1 Describe or provide clear and specific references with regards to confinement design criteria and design bases in the following Sections of the WCS SAR appendices regarding safety protection systems and principal design criteria: A.3.4.4, B.3.4.4, C.3.4.4, D.3.4.4, E.3, F.3, and G.3. In addition, ensure any impact of storage and transportation is addressed.

In the aforementioned Sections of the WCS application, there is no significant discussion of the method of sealing or that regulations for redundant sealing are met, and the canister maximum leakage rate criterion and that the dose rates for normal, off-normal, and accident conditions were met. Specific Sections of the FSARs or other portions of the WCS SAR could be referenced, but should also consider any impact of storage and transportation: This should be addressed in the following Sections of the WCS SAR appendices:

- A.3.4.4, “Shielding/Confinement/Radiation Protection,”
- B.3.4.4, “Shielding/Confinement/Radiation Protection,”
- C.3.4.4, “Shielding/Confinement/Radiation Protection,”
- D.3.4.4, “Shielding/Confinement/Radiation Protection,”
- E.3, “PRINCIPAL DESIGN CRITERIA,”
- F.3, “PRINCIPAL DESIGN CRITERIA,” and
- G.3, “PRINCIPAL DESIGN CRITERIA,” of the WCS safety analysis report appendices.

(See Sections 4.4.3.4 and 4.5.3.4, “Shielding and Confinement” in NUREG-1567)

This information is needed to determine compliance with 10 CFR 72.24, 10 CFR 72.104, 10 CFR 72.106, 10 CFR 72.120, 10 CFR 72.122, and 10 CFR 72.126.

4.2 Provide a characterization of the greater than Class C (GTCC) waste proposed for storage at the WCS CISF, and provide a description, including drawings, of the storage containers for the GTCC waste.

The application indicates an intention to store GTCC waste at the proposed CISF. However, the SAR does not include, either explicitly or by reference, any kind of characterization of the GTCC waste to be stored at the CISF. The SAR also lacks any description, either explicit or by reference, of the containers that will be used to store the GTCC waste at the CISF. The description of the containers should include drawings and discussion of features in terms of the functions they perform (e.g., shielding, confinement). The GTCC waste should be limited to solid reactor-related GTCC waste since only this type of waste may be stored under a 10 CFR Part 72 specific license. The description of the waste should also include a specific limit as to the amount of GTCC waste to be stored at the site as the SAR evaluations do not support storage of an unlimited quantity of this waste.

This information is needed to determine compliance with 10 CFR 72.18, 10 CFR 72.104(a), 10 CFR 72.106(b), 10 CFR 72.120(a-c), 10 CFR 72.122(b) and (c), 10 CFR 72.126(a), and 10 CFR 72.128(a).

4.3 Provide drawings for the facility and facility SSCs relied on for facility operations.

The application provides a description of the proposed CISF that includes a few high-level overview sketches of the facility and artist renderings of facility SSCs such as the cask transfer system (CTS). However, details regarding the facility and facility SSCs (including buildings) remain unclear. Adequately detailed drawings for the facility and facility SSCs are needed to enable staff's review of the proposed CISF, including these facility and facility SSC details. NUREG-1567 Sections 5.4.1.1, 5.4.3.1, 5.4.4.1, 5.4.5.1, 5.5.1.1, 5.5.3.1, 5.5.4.1, and 5.5.5.1 provide guidance regarding details of the facility and facility SSCs for which drawings are needed. These details include items such as the confinement structures; reinforced concrete structures and other SSCs both important to safety and not important to safety that perform functions including confinement, radiation shielding, structural support, floors, protection against natural phenomena and accidents, and other functions and features as identified in the cited SRP sections. The drawings help to define the facility and facility SSC configurations. Drawings should also provide information regarding the site layout and layout of the facility structures where spent fuel and GTCC waste containers are handled, transferred, or stored (e.g., cask handling building). This layout information should include items such as transfer routes (e.g., cask handling building to pad and/or off-normal holding area), barriers, identification of the 10 CFR Part 72 controlled area boundary and distances from facility features and structures to the 10 CFR Part 72 controlled area boundary and the restricted area boundary, identification of health physics facilities, area radiation monitoring around the facility and in facility structures/areas where spent fuel and GTCC waste containers are handled, transferred or stored. See Sections 11.4.2.2, 11.4.2.5, and 11.4.4.2 of NUREG-1567 for additional guidance.

This information is needed to determine compliance with 10 CFR 72.24(a-c), 10 CFR 72.104, 10 CFR 72.106, 10 CFR 72.126, and relevant requirements in 10 CFR Part 20.

4.4 Provide analyses and design information, including design criteria, for the transfer casks used for all of the storage systems intended to be used at the CISF.

The CISF SAR should include information for all of the storage systems' SSCs. It is not clear that the SAR includes the relevant information for the transfer casks that will be used at the CISF. For example, Appendix D of the CISF SAR indicates that the MP197HB transportation packaging will be used as the transfer cask for the NUHOMS storage system with the 61BTH Type 1 canister. However, Appendix D does not include information or analyses for this packaging as the transfer cask by reference or otherwise. Appendix D should include analyses and design information for the MP197HB as the transfer cask such as the shielding design information (materials and dimension specifications), design drawings, dose rate analyses and results, appropriate descriptions in Chapter D.4, off-normal and accident analyses in Chapter D.12, and relevant information for Section D.3.4 pertaining to the MP197HB as the transfer cask and the 61BTH canister in this transfer cask. The applicant should ensure that all appendices include the appropriate information for the SSCs to be used as the transfer casks for the storage systems described in the appendices.

This information is needed to determine compliance with 10 CFR 72.18, 10 CFR 72.24(a-c), 10 CFR 72.104, 10 CFR 72.106, and 10 CFR 72.126(a).

4.5 Provide clear and specific references to design drawings and descriptions, including description of the shielding design, of the overpacks, storage modules, and canisters to be used at the CISF.

A review of the SAR indicates that the CISF SAR does not include all of the necessary information to describe all of the SSCs for the storage systems used at the proposed facility. For example, Section D.9.1 of the WCS SAR references Section 7.3.2.1 of the NUHOMS FSAR for information on the 61BTH Type 1 canister and the HSM Model 102 storage module. That section of the NUHOMS FSAR describes the radiation shielding features of these items and references details and drawings for the HSM and canister that exist in Chapter 4 and Appendix E of the FSAR. However, the references do not include details, drawings and descriptions of radiation shielding features specific to the 61BTH Type 1 canister (which exist in specific sections of Appendix T of the NUHOMS FSAR). The applicant should ensure the CISF SAR includes clear and specific references to information for all of the SSCs for each storage system to be used at the CISF.

This information is needed to determine compliance with 10 CFR 72.18, 10 CFR 72.24(b), (c), and (e).

4.6 Identify the SSCs that are important to safety (ITS) for the different storage systems intended for use at the proposed CISF.

Section 1.4.3.4 of the CISF SAR states that the SSC classifications are the same as was identified in the casks' FSARs. The CISF SAR should include the classifications. Doing so through incorporation by reference is acceptable, but the reference must be clear and specific. The references also need to capture any transportation package SSCs that are used at the site for storage operations (e.g., the MP197HB packaging, which is used as a transfer cask).

This information is needed to determine compliance with 10 CFR 72.18 and 72.24.

4.7 Provide design criteria for the Fuel Handling Building (FHB) in Table 1-3, “Summary of WCS CISF Principal Design Criteria,” and corresponding SAR text. Provide FHB SSC designs in the SAR to demonstrate that the FHB is structurally adequate to prevent massive building collapse or dropping of heavy objects on to spent fuel cask systems and related ITS SSCs.

72.122(b)(2)(ii) states, “[T]he ISFSI or MRS also should be designed to prevent massive collapse of building structures or the dropping of heavy objects as a result of building structural failure on the spent fuel, high-level radioactive waste, or reactor-related GTCC waste or on to structures, systems, and components important to safety.” As such, the applicant must provide a design basis and criteria evaluation for the FHB and submit its design in the SAR accordingly.

This information is needed to determine compliance with 10 CFR 72.122(b)(2)(ii).

4.8 Provide a clear and consistent description of the spent fuel to be stored at the proposed site and ensure the SAR evaluations support and are consistent with that description. Also see RSI 8-1

The SAR includes descriptions regarding the spent fuel contents in sections in addition to those specifically designated for describing the spent fuel contents. Considering these descriptions, it is not clear what the applicant proposes to store at the CISF and that SAR evaluations are consistent with and support the proposed contents descriptions. For example, Section D.5.1.1 of the SAR includes a note with Paragraph 7 that states that the CISF is “not authorized to accept high burnup fuel assemblies in the 61BTH Type 1 DSC at this time.” However, Section D.3.2 simply refers to CoC 72-1004 Technical Specifications Table 1-1t and Section T.2.1 of the NUHOMS FSAR to describe the contents of the 61BTH Type 1 DSC. Both of these references include high burnup fuel in the 61BTH Type 1 DSC’s contents. Thus, either the contents descriptions for the 61BTH Type 1 DSC in the CISF SAR should clearly preclude high burnup fuel, or the evaluations for this DSC should address high burnup fuel.

This information is needed to determine compliance with 10 CFR 72.24 and 10 CFR 72.120.

Observations

4.1 Clarify the design criteria for the transfer equipment described in the CISF SAR.

This information is needed to determine compliance with 10 CFR 72.24(b-d).

4.2 Provide an 80-inch cask drop analysis for the MP197 transportation cask without the impact inertia load protection accorded by the impact limiters as a basis for either Note 2 or Note 3 of SAR Tables B.3-1, C.3-1, and D.3-1.

The staff notes that the inertia loadings associated with the MP197 transportation cask have been determined for the analyzed configuration that the cask is protected by impact limiters for the hypothetical accidents 30-ft free drops. The 80-inch accident drop analysis has been performed on transfer casks with loaded DSC. However, there appears to be no analysis performed of the MP197 for a drop distance of 80 inches without the impact limiter protection for mitigating the inertia loading imposed on the cask. The loading equivalence statement, “75 g vertical, 75 g horizontal and 25 g corner,” must be substantiated by an analysis due to the different design features associated with the transfer casks evaluated in Docket No. 72-1004 and the MP197 transport cask presented in Docket No. 71-9302.

This information is needed to determine compliance with 10 CFR 72.24 and 10 CFR 72.122(b)(2).

5. Installation and Structural

RSIs

5.1 Describe the confinement boundary SSCs in Section 7.2, “Confinement SSCs” of the WCS SAR.

Section 7.2 of the WCS SAR states, “The ITS WCS CISF confinement SSCs are the canister shells and closure welds.” The components of the entire canister confinement boundary are ITS SSCs, not only the canister shells and closure welds. See Sections 5.4.1.1 and 5.5.1.1, “Description of Confinement Structures” of NUREG 1567.

This information is needed to determine compliance with 10 CFR 72.24.

5.2 Provide specific application chapter sections, specific appendices sections, and summarize the deltas where actual site parameters exceed the bounds of those assumed in the individual cask certificates. Also address that the confinement SSCs and confinement integrity are maintained during normal, off-normal, and accident conditions.

Section 7.2, “Confinement SSCs” of the WCS safety analysis report states, “Only NRC approved storage systems are used at the WCS CISF. The proposed cask systems to be utilized at the WCS CISF are evaluated against site parameters and generally shown to bound the site parameters (see Chapter 3 and referenced appendices). Where the actual site parameters exceed the bounds of those assumed in the individual cask certificates of compliance, the delta is addressed for those areas affected by the variations and are documented in the appropriate Chapter, and associated appendices.” Specific pointers to chapter sections and associated appendices of the WCS SAR have not been provided in Section 7.2 of the WCS SAR, nor has a summary of deltas where actual site parameters exceed the bounds of those assumed in the individual cask certificates been provided. It also has not been summarized in Section 7.2 of the WCS SAR that confinement integrity is maintained during normal, off-normal, and accident conditions. See Sections 5.4.1.2 and 5.5.1.2, “Design Criteria for Confinement Structures” in NUREG 1567.

This information is needed to determine compliance with 10 CFR 72.24.

5.3 Provide clear and specific sections with regards to the WCS CISF design criteria detailed in Chapter 3 of WCS SAR.

Section 7.2, “Confinement SSCs” of the WCS SAR states, “For purposes of the WCS CISF design, the cask systems have been evaluated against the WCS CISF design criteria detailed in Chapter 3.” Specific pointers to sections of Chapter 3 of the WCS SAR have not been provided. See Sections 5.4.1.2 and 5.5.1.2, “Design Criteria for Confinement Structures” in NUREG-1567.

This information is needed to determine compliance with 10 CFR 72.24 and 10 CFR 72.122.

5.4 Provide design details and bases for the concrete storage pads.

Sections D.4.1.1 and D.4.1.2 only state that these items will be designed later and list some considerations that the applicant will take into account in designing the concrete storage pads, including the basemat thickness and the approach slab. For a facility license application, the SAR should describe the design and the design bases for the storage pads. The applicant should address this RSI question for the storage pads used with all the storage systems intended for use at the CISF.

This information is needed to determine compliance with 10 CFR 72.24(a-c).

5.5 Provide an analysis and evaluation of the design and performance of the Cask Transfer System (CTS) and Vertical Cask Transporter (VCT), including determination of:

- The margins of safety during normal operations and expected operational occurrences during the life of the ISFSI; and
- The adequacy of SSCs provided for the prevention of accidents and the mitigation of the consequences of accidents, including natural and manmade phenomena and events.

The proposed design of the CTS and VCT in Section 7.5 of the WCS CISF SAR are identified as important to safety. However, the staff found the description of these cask handling systems inadequate to demonstrate capability to prevent accidents. Specifically, the introduction provided in Section 7.5.1.1 stated that the following sections provided necessary information to demonstrate compliance with NUREG-0554, “Single-Failure-Proof Cranes for Nuclear Power Plants,” but the information was not adequate to demonstrate compliance with the included single-failure-proof design attributes. Also, the proposed Technical Specifications identify NUREG-0612 guidelines as governing the design, fabrication, testing, inspection, and maintenance of these systems, but the NUREG-0612 guidelines address lifting devices and interfacing lift points in addition to the crane.

On the basis of the above, the applicant should address the following staff-identified issues:

- Referenced standards and guidelines should be appropriate to the design. The referenced crane standards (ASME NOG.1) and guidelines (NUREG-0554) are applicable to overhead cranes with top-running trolleys using wire rope hoists, but the proposed CTS and VCT do not use this technology.
- If a high-reliability hoisting system is intended to satisfy the intent of NUREG-0612 guidelines, a failure modes and effects analysis appropriate to the design should be provided when the design does not conform to NUREG-0554 guidelines. The analysis provided for the CTS was inadequate because it failed to include hydraulic system

failures other than a complete loss of pressure and control system failures, such as single position sensor failures.

- The adequacy of the design of the chain hoist to prevent accidents was not adequately supported. The staff does not accept an increased factor of safety alone as protection against load drop accidents for active components such as hoists that are subject to wear and/or fatigue. As discussed above, a failure modes and effects analysis appropriate to the design should be provided.
- Although the CTS rail was identified as an interface with the CTS seismic restraints, the design standard applied to the CTS rails was not specified.

This information is needed to determine compliance with 10 CFR 72.24(d).

5.6 Provide the following referenced reports to facilitate staff review of SAR Section 7.6.1, "Storage Pads," Section 7.6.2, "Settlement and Soil Liquefaction," and Section 7.6.3, "Soil Structure Interaction."

- Ref. 7.26, "Calculation NAC004-CALC-04, Rev. 0, "Soil Structure Interaction Analysis of Independent Spent Fuel Storage Installation (ISFSI) Concrete Pad at Andrews, TX."
- Ref. 7-30, "Drawing NAC004-C-001, Rev. 0, "ISFSI Pad Licensing Design General Arrangement & Geotechnical."
- Ref. 7-37, "Drawing NAC004-C-002, Rev. 0, "ISFSI Pad Licensing Design Structural Concrete Plan, Sections, and Details."
- Ref. 7.41, "Data Package LSI-ZS-VCT.2012, Rev. 0, "Lift Systems, Inc. Vertical Cask Transporter, Part Number CT201072."
- Ref. 7.48, "Calculation NAC004-CALC-02, Rev. 0, "Liquefaction Potential and Elastic Settlement Evaluation for Independent Spent Fuel Storage Installation (ISFSI) Concrete Pad at WCS Site in Andrews, TX."

The SAR only provides summary information on the storage pad design for the NAC storage systems. Detailed calculations related to storage pad design and corresponding seismic environments are also needed for the pad surface and cask center-of-gravity locations. The staff notes that amplified seismic environments could result from soil structure interaction between the pad and its underlying soil, referring to the SAR Figure 1.5 site-specific free-field ground surface response spectra. The soil-structure interaction evaluations as documented in the above references for the design basis earthquake event are needed for review by the staff.

This information is needed to determine compliance with 10 CFR 72.24, 10 CFR 72.103 and 10 CFR 72.122(b).

5.7 Provide design calculations and soil-structural interaction analysis for the NUHOMS NITS storage pads in SAR Section 7.6.4 to characterize seismic motions at the pad surface and HSM center-of-gravity locations suitable for evaluating seismic stability and structural integrity of the NUHOMS ITS HSMs.

Technical Specification, Paragraph 4.3.3.11, Standardized NUHOMS, Amendment 11 provides that the storage pad location shall be evaluated for the effects of soil structure interaction which may affect the response of the loaded HSMs. The applicant asserted that the SSI analysis in Section 7.6.3, which is performed for NAC storage pad, is considered applicable to the NITS storage pad for the HSMs. The assertion was based on noting the small differences in mass

and center-of-gravity locations between the NUHOMS HSMs and NAC VCCs. However, considering the seismic motion response spectra for the NUHOMS system seismic reconciliation analyses, it's unclear how the NAC storage pad SSI analysis results can be considered applicable to the HSMs without a substantive SSI analysis performed on an actual HSM storage pad design. For instance, referring to Figure A.7-1 for the Rancho Seco canisters, there appears no consideration of the potentially amplified seismic motions at the ICSF pad surface and HSM center-of-gravity locations; the same WCS site-specific ground motion response spectra without amplification are seen to be used for seismic reconciliation evaluation of the NUMOHS SSCs ITS. Similarly, in Figure C.7-25, neither was the SSI analysis considered for evaluating the 61 BT DSC as loaded in its HSM. Other evaluation anomalies are also displayed in Figure D.7-4 for the "Previous Site Specific" spectra. The reported peak storage pad seismic motions at about 0.2 g and 0.14 g are seen to be lower than the 0.25 g and 0.175 g associated with the free-field horizontal and vertical ground response spectra, respectively, which are not physically realizable. The NUHOMS storage pad seismic motions must be appropriately characterized for seismic reconciliation analysis of the HSMs deployed on the ICSF storage pads.

This information is needed to determine compliance with 10 CFR 72.24 and 10 CFR 72.122(b).

Observations

5.1 Clarify, as appropriate, the Section 7.1 description of the casks used for HSM loading and unloading of the various DSC models by recognizing that transfer cask OS197 was approved for the NUHOMS 61 BT transfer operation with HSM Model 102.

Sections B.7-1 and C.7-1 appear to suggest that OS197 transfer cask (Docket No. 72-1004), in addition to MP197, is also used for the AHSM and HSM operations, respectively, at the interim consolidated storage facility (ICSF).

This information is needed to determine compliance with CFR 72.24.

6. Thermal

RSIs

6.1 Provide thermal evaluation, analysis, and results to demonstrate that all casks systems meet the WCS CISF site specific environmental conditions.

Appendices A.8, B.8, C.8, and D.8 of the application provide a normal ambient temperature range of 97°F to 101°F for the NUHOMS-MP197, Standardized Advanced NUHOMS, and Standardized NUHOMS casks systems, respectively. Appendices E.8, F.8, and G.8 of the application state that for the NAC-MPC, NAC-UMS, and MAGNASTOR, the maximum average yearly temperatures allowed are 75°F, 76°F, and 76°F, respectively. However, in Appendices A.8, B.8, C.8, and D.8 of the application, it is stated that "As specified in Table 1.2, normal ambient temperature is considered in the range of 0°F to 110°F." This indicates that a temperature of 110°F should be considered to perform the thermal evaluations for these cask systems because the ambient temperature defined in the previous thermal evaluations does not bound the site specific normal ambient temperature. Other factors such as elevation, effects from other casks, low speed wind, etc. should also be considered, as applicable. See also NUREG.2174, "Impact of Variation in Environmental Conditions on the Thermal Performance of Dry Storage Casks," for a discussion of environmental factors that could affect

the cask thermal performance.

The staff needs this information to perform the thermal evaluation of these casks systems for the WCS CISF site to have assurance allowable thermal limits are not exceeded.

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

6.2 Provide accident analysis and results which consider adiabatic heat up or clarify why analysis of this accident is not necessary.

Section 12.2 of the application provides a list of accident considered for each of the cask systems. However, adiabatic heat up is not included. The staff needs the thermal analysis and results for this postulated accident to verify allowable limits are not exceeded.

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

6.3 Provide consistent bounding site specific ambient temperatures which consider seasonal variations.

Table 1-2 of the application provides a normal ambient temperature range of 41.1 to 81.5°F. However, Section A.8.3.1 of the application states: "*As specified in Table 1-2 the normal ambient temperature is considered in the range of 0°F to 110°F.*" Also, Section A.8.3.2 of the application states: "...the daily average ambient temperatures of 95°F and 105°F for normal and off-normal conditions, respectively at the WCS CISF." The staff needs to have information regarding the normal average ambient temperature to make sure the considered cask systems bound WCS CISF site specific parameters. Also, seasonal variations are necessary because ambient temperature may persist for prolonged periods of time for the cask systems to reach steady state conditions which may differ from the use of an annual average, as analyzed in the respective FSARs.

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

7. Shielding

RSIs

7.1 Provide dose rate and dose analyses for a facility design that is consistent with the design for which a license is requested.

It is unclear that the analysis in Chapter 9 of the CISF SAR is for the same facility design, particularly in terms of the facility size and boundaries, for which a license is currently being requested. Figure 9-1 of the SAR shows a much larger facility than is shown in the Chapter 1 figures. The dose rate and dose analyses should be done for the size of facility for which a license is sought. If that facility is more like the figures in Chapter 1, then the analysis should be done for a facility configuration that is consistent with those figures and drawings provided in response to the RSI question about facility drawings.

This information is needed to determine compliance with 10 CFR 72.104, 10 CFR 72.106 and 10 CFR 20.1301.

7.2 Provide a calculation package for the analysis that supports the SAR Chapter 9 radiation protection evaluations and includes sample input and output files.

The calculation package should include information and analyses that support the evaluations described in Chapter 9 of the SAR. It should include such items as the basis for the increase in HSM surface dose rates and the amount of increase chosen, the use of nonfuel hardware multiplication factors for MAGNASTOR surface currents, information demonstrating how the analysis considered the UMS and MPC systems (including surface currents for both systems), how the systems and site were modeled, and calculations for demonstrating compliance with 10 CFR Part 20 limits (including for individuals on site that are not radiation workers, such as the 2 mrem in an hour limit in 10 CFR 20.1301(a)(2)).

This information is needed to determine compliance with 10 CFR 72.104, 10 CFR 72.106, 10 CFR 72.126 and 10 CFR 20.1101, 10 CFR 20.1201, and 10 CFR 20.1301.

8. Criticality

RSIs

8.1 Specify which fuel types are to be stored within the NAC UMS and NAC MAGNASTOR dry storage systems at the WCS CISF. Also see RSI 4-8.

Section 2.1 of the WCS Interim Storage Facility proposed Technical Specifications, "Functional and Operating Limits," includes a list of storage system Technical Specification sections incorporated by reference, describing the fuel to be stored in an horizontal storage module (HSM) or ventilated concrete cask (VCC) at the WCS CISF. Section 2.1 references the entire Technical Specifications Appendix B Section B 2.1 for the NAC UMS system, and the entire Technical Specifications Appendix B Sections 1.0 and 2.0 for the NAC MAGNASTOR system. However, Sections G.10 and F.10, for the NAC UMS and NAC MAGNASTOR systems, respectively, discuss only a subset of fuel authorized by the Technical Specifications for these systems (Maine Yankee fuel for the UMS and PWR fuel for the MAGNASTOR). Either the SAR should discuss the complete set of fuel types authorized by the NAC UMS and NAC MAGNASTOR Technical Specifications, or the facility Technical Specifications should refer to the section of the NAC UMS and NAC MAGNASTOR Technical Specifications that describes the specific fuel types to be stored at the WCS facility.

This information is needed to determine compliance with 10 CFR 72.24.

8.2 Identify the correct revision of Amendment 0-3 for NAC MAGNASTOR in Enclosure 9 to the WCS CISF Application.

Revision 0 of Amendments 0, 1, 2, and 3 to the NAC MAGNASTOR CoC No. 1031 have been superseded by Revision 1 to these amendments. Revision 1 to the amendments need to be examined for compatibility with the site parameters, and if compatible, it should be referenced instead of Revision 0.

This information is needed to determine compliance with 10 CFR 72.18 and 10 CFR 72.24.

8.3 Provide the licensing bases which ensure that, before a nuclear criticality accident is possible, at least two unlikely, independent, and concurrent or sequential changes have occurred in the conditions essential to nuclear criticality safety.

The WCS CISF SAR does not identify the cask design or the site features that ensure that a criticality is not caused by two unlikely, independent, and concurrent or sequential events. The SAR should include such a discussion, which should consider the likelihood of possible events (e.g., canister failure, flooding) over the 40-year license period.

This information is needed to determine compliance with 10 CFR 72.124(a).

Observations

8.1 The staff recommends revising Appendices A through G to have consistent organization and information in the criticality safety chapters.

The organization and information contained within the Appendices for the TN storage systems is inconsistent with the organization and information contained within the Appendices for the NAC storage systems. Appendices A through D have sections for Discussion and Results, Package Fuel Loading, Model Specification, Criticality Calculation, and Critical Benchmark Experiments. Appendices E through F have a single section for each of the canister types to be stored in each of the NAC storage systems. Revising these Appendices to have consistent organization and information would streamline the review process.

This information is needed to determine compliance with 10 CFR 72.24.

9. Confinement

RSIs

9.1 Provide the Sections of the Technical Specifications that outline the requirements for preventing the leakage of radioactive materials and list the codes and standards for design, fabrication, and inspection of the:

- NUHOMS MP187 FO-, FC-, and FF- DSCs in Appendix A.11, “CONFINEMENT EVALUATION NUHOMS®-MP187 Cask System,”
- 24PT1 DSC in Appendix B.11.2, “Requirements for Normal Conditions of Storage,” B.11.3, “Confinement Requirements for Hypothetical Accident Conditions,”
- 61BT DSC in Appendix C.11.1, “Confinement Boundary,” C.11.2, “Requirements for Normal Conditions of Storage,” C.11.3, “Confinement Requirements for Hypothetical Accident Conditions,”
- 61BTH Type 1 DSC in Appendix D.11.2, “Requirements for Normal Conditions of Storage,” D.11.3, “Confinement Requirements for Hypothetical Accident Conditions,”
- NAC-MPCs in Appendix E.11, “CONFINEMENT EVALUATION NAC-MPC,”
- NAC-UMS TSCs in Appendix F.11, “CONFINEMENT EVALUATION NAC-UMS,” and
- MAGNASTOR TSC in Appendix G.11, “CONFINEMENT EVALUATION NAC-MAGNASTOR,” of the WCS SAR.

Although some of the appendices refer to the Technical Specifications in general and some do not, the specific sections of the Technical Specifications were not provided in the Chapter 11 appendices of the WCS SAR. Clarify which specific Technical Specifications are being referred to in the WCS SAR.

This information is needed to determine compliance with 10 CFR 72.24.

9.2 Provide a clear and specific reference to a figure(s), or provide the figure(s) in each of the appendices of Chapter 11, “Confinement Evaluation” of the WCS SAR that shows the confinement boundary and redundant closure for each canister.

It is not clear what the confinement boundary and redundant closure is for each canister, this is often shown in a figure(s). This information was not provided in the following sections of the WCS safety analysis report appendices:

- A.11.1, “Confinement Boundary,”
- B.11.1, “Confinement Boundary,”
- C.11.1, “Confinement Boundary,”
- D.11.1, “Confinement Boundary,”
- E.11.1.1, “Confinement Boundary,” and E.11.2.1, “Confinement Boundary,”
- F.11.1, “Confinement Boundary,” and
- G.11.1.1 “Confinement Boundary.” (Specifically for Section G.11.1.1 of the WCS safety analysis report ensure the redundant boundary is shown in the figure)

This information is needed to determine compliance with 10 CFR 72.18 and 72.24.

9.3 Address the protection of stored materials from degradation.

See Sections 9.4.4 and 9.5.4, "Protection of stored materials from degradation" of NUREG 1567. This was not addressed in Chapter 11 appendices:

- A.11, "CONFINEMENT EVALUATION NUHOMS®-MP187 Cask System,"
- B.11, "CONFINEMENT EVALUATION Standardized Advanced NUHOMS® System,"
- C.11, "CONFINEMENT EVALUATION Standardized NUHOMS®-61BT System," and
- D.11, "CONFINEMENT EVALUATION Standardized NUHOMS®-61BTH Type 1 System."

This information is needed to determine compliance with 10 CFR 72.24 and 72.122.

9.4 Provide site waste management facilities in Chapter 11, "Confinement Evaluation," and the associated appendices, or other sections of the WCS SAR as appropriate.

See Sections 9.4.1.2, "Pool and waste management facilities," 9.4.2.2, "Pool and waste management facilities," 9.4.4.2, "Pool and waste management facilities," 9.5.3.2, "Pool or waste management facilities," 9.5.4.2, "Pool or waste management facilities," 14.4.2, "Off-Gas Treatment and Ventilation," and 14.5.2, "Off-Gas Treatment and Ventilation," of NUREG-1567. Leakage rate testing described in Quality Plan (QP).10.02 Revision 1, "Post transport package evaluation" could result in possible emissions of radioactive gases; the design of the CISF 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.

This information is needed to determine compliance with 10 CFR 72.24, 10 CFR 72.44, 10 CFR 72.122, 10 CFR 72.126, and 10 CFR 72.128.

9.5 Provide site monitoring systems that measure radionuclides released under normal and accident conditions in Section 11.2, "Confinement monitoring," of the WCS SAR, and other sections of the WCS SAR as appropriate. The site monitoring systems should address: 1) transportation package unloading of canister contents and 2) storage conditions.

See Sections 9.4.3, "Confinement monitoring," 9.4.3.2, "Effluents," 9.5.3, "Confinement monitoring," and 9.5.3.2, "Pool or waste management facilities" of NUREG 1567. Section 11.2 of the WCS SAR does not address a system to measure radionuclides released to the environment under normal and accident conditions. This includes all areas where there is the potential for significant releases to the environment and may include storage casks and waste management facilities during transportation package unloading of canister contents and storage conditions.

This information is needed to determine compliance with 10 CFR 72.24, 10 CFR 72.104, 10 CFR 72.106, and 10 CFR 72.126.

9.6 Provide in Chapter 11 of the WCS SAR, or other sections of the WCS SAR, 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 at the ISF.

This information is necessary to make evaluation finding F9.4 in NUREG-1567, this type of finding is not in NUREG-1536. This information was not described in Chapter 11 of the WCS SAR.

This information is needed to determine compliance with 10 CFR 72.122(b).

9.7 Explain in Appendix A.11, "CONFINEMENT EVALUATION NUHOMS®-MP187 Cask System," how the radionuclide inventory, in addition to the CRUD source based on 140 $\mu\text{Ci}/\text{cm}^2$ for Co-60, 24 spent nuclear fuel assemblies per canister, and 21 canisters are bounding for all fuel and GTCC waste in FO-, FC-, and FF- DSCs.

It is not clear from Appendix A.11 of the WCS SAR how it was determined that the radionuclide inventory in Table A.11.1, "SNF Assembly Activities" of the WCS SAR, in addition to the CRUD source based on 140 $\mu\text{Ci}/\text{cm}^2$ for Co-60, the analysis with 24 spent nuclear fuel assemblies per canister, and the analysis with 21 canisters, were determined to be bounding for all fuel and GTCC waste in FO-, FC-, and FF- DSCs.

This information is needed to determine compliance with 10 CFR 72.104 and 10 CFR 72.106.

9.8 Verify if a transportation package ensures confinement in Appendix A.11, or if the FO-, FC-, and FF- DSCs ensure confinement.

Appendix A.11 is entitled, "CONFINEMENT EVALUATION NUHOMS®-MP187 Cask System," yet the MP187 is a transportation package. It should be clarified that the FO-, FC-, and FF- DSCs or canisters should be designed to ensure confinement.

This information is needed to determine compliance with 10 CFR 72.24, 10 CFR 72.104, and 10 CFR 72.106.

10. Materials

RSIs

10.1 Provide sufficient information on the process and actions taken including additional monitoring that may be necessary for Off-Normal Recovery described in SAR Section 1.3.1.5. Include a description of equipment procedures and monitoring systems for components important to safety that ensure radiological protection, shielding, confinement, monitoring effluents, and protection of the spent fuel cladding.

This information is needed to determine compliance with 10 CFR 72.122(h)(1), 10 CFR 72.126(a), 10 CFR 72.126(b), 10 CFR 72.126(c), and 10 CFR 72.128(a).

10.2 Provide sufficient information in Section 4.6, “Transportation Cask Repair and Maintenance” of the CISF SAR to address shipping cask repair and maintenance as discussed in NUREG-1567 Section 3.4.7, “Shipping Cask Repair and Maintenance.”

Section 4.6 of the CISF SAR indicates that repairs or maintenance of transportation packages may be done onsite (i.e., in situ). Thus, the SAR should describe the facilities and operation of the facilities to be used to conduct these repairs and maintenance activities. The description should include appropriate provisions for contamination control and minimization of occupational exposures. Further, the description should be clear that repairs and maintenance will be conducted in accordance with the maintenance program descriptions and requirements in the respective transportation packages’ SARs’ Chapter 8. The meaning of ‘another appropriate location’ in the current CISF SAR text should also be clarified.

This information is needed to determine compliance with 10 CFR 72.128.

10.3 Provide sufficient information on the WCS CISF Principal Design Criteria for NAC-MPC, NAC-UMS, and NAC-MAGNASTOR. Include all information that is presented in Tables A.3-1, B.3-1, C.3-1 and D.3-1 noting observation 10.2 of this review below.

This information is needed to determine compliance with 10 CFR 72.120(a), 10 CFR 72.122(a), and 10 CFR 72.122(b).

10.4 Provide sufficient information on the off normal holding area described in SAR Section 4.1.2.11 which states: *Any casks arriving on-site via rail car are visually inspected for any damage prior to entry into the Cask Handling Building. If damage is noted, the transportation cask will be assessed and the transportation cask will be held in the Cask Handling Building or on the rail spur within the OCA until a recovery plan is implemented.* Include a description of equipment procedures and monitoring systems for components important to safety that ensure radiological protection, shielding, confinement, monitoring effluents, and protection of the spent fuel cladding.

This information is needed to determine compliance with 10 CFR 72.122(h)(1), 10 CFR 72.126(a), 10 CFR 72.126(b), 10 CFR 72.126(c), and 10 CFR 72.128(a)

Observations

10.1 WCS CISF SAR Section 7.2 states: Spent nuclear fuel (SNF) characteristics addressed in the individual canister/cask system thermal safety evaluations which are provided in Appendices A.8, B.8, C.8, D.8, E.8, F.8 and G.8, depending on the canister/cask system. A nearly identical statement is made in SAR Section 8.2. The statement in Section 7.2 should refer to Appendices A.7, B.7...G.7 for the structural evaluation.

This information is needed to determine compliance with 10 CFR 72.128(a).

10.2 For the WCS CISF SAR appendices tables A.3-1, B.3-1, C.3-1, and D.3-1, provide specific SAR sections for Dead Weight, Internal and External Pressure Loads, Design Basis Thermal Loads, Operating Loads, Confinement, and Nuclear Criticality.

This information is needed to determine compliance with 10 CFR 72.122(a) and 10 CFR 72.128(a).

11. Conduct of Operations

RSIs

11.1 Provide, in the emergency plan, 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. Include in the descriptions 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. The accidents to be analyzed should be the accidents described in the FSARs for the casks to be stored at the CISF, or the accidents described in the CISF SAR, if those accidents bound the accidents described in the cask's FSARs.

Consolidated Emergency Response Plan (CERP) Section 2.1, "Description of Postulated Accidents," is not consistent with Chapter 12, "Accident Analysis," of the CISF SAR, which contain analyses specific to dry cask storage. Specifically, the CERP only addresses accidents and unusual operational conditions that could occur during the operation of the low level radioactive waste and mixed waste storage and processing component of the site but the SAR Section B.12.2.2 describes a cask drop accident.

Spent Fuel Project Office Interim Staff Guidance 16, Emergency Planning, 3.3, Types of Accidents states in part:

The emergency plan should identify and describe 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 for an ISFSI...

This information is needed to determine compliance with 10 CFR 72.32(a)(2) and 10 CFR 72.32(a)(5).

11.2 Provide justification for the inconsistencies between the description of the emergency plan in Chapter 11 of the license application, Chapter 13.5 of the CISF SAR and the CERP submitted as part of the license application.

The license application, Chapter 11, "Emergency Plan," states, *[t]here is a single emergency classification level for events at the CISF, the Alert classification* and Chapter 13.5 of the CISF SAR states that *there is a single emergency classification level (Alert) for events at the WCS CISF*. However, this is inconsistent with the CERP, as follows:

- a. CERP Section 3.1, "Classifications of Accidents," states, *[e]mergencies are classified as an Alert or Site Area Emergency*; and
- b. CERP Table B, "CISF Malfunction Initiating Condition Matrix," provides *initiating conditions for a Notice of Unusual Event and Alert classifications*.

This information is needed to determine compliance with 10 CFR 72.32(a)(6).

Observations

11.1 The CERP provides emergency preparedness for material and activities not licensed by the U.S. Nuclear Regulatory Commission (NRC). The approval of the Part 72 license application would be based in part on an emergency plan for an ISFSI and should not be a consolidated plan that includes non NRC-licensed activities and materials.

If the plan were approved as written, it would be subject to NRC regulations in its entirety, including the change process of 10 CFR 72.44(f), which states:

A licensee shall follow and maintain in effect an emergency plan that is approved by the Commission. The licensee may make changes to the approved plan without Commission approval only if such changes do not decrease the effectiveness of the plan. Within six months after any change is made, the licensee shall submit, in accordance with § 72.4, a report containing a description of any changes made in the plan addressed to Director, Division of Spent Fuel Management, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, with a copy to the appropriate NRC Regional Office shown in appendix D to part 20 of this chapter. Proposed changes that decrease the effectiveness of the approved emergency plan must not be implemented unless the licensee has received prior approval of such changes from the Commission.

This information is needed to determine compliance with 10 CFR 72.44 (f)

11.2 Section 5.9 of the Consolidated Emergency Plan describes an emergency planning zone (EPZ) defined as a 6 km (3.7 mile) radius circle centered on the site. 10 CFR 72.106 requires establishment of a controlled area, based on radiation doses from design basis accidents, with the nearest boundary at least 100 meters from the spent fuel or radioactive waste handling and storage facilities. The CERP will have to differentiate between the two distinct planning zones for protective action decisions.

This information is needed to determine compliance with 10 CFR 72.106

11.3 CERP Table B, "CISF Malfunction Initiating Condition Matrix," provides a note that references the Nuclear Energy Institute (NEI) document NEI 99-01, "Methodology for Development of Emergency Action Levels," dated January 2003, which is Revision 4. The current revision of NEI 99-01 is Revision 6, dated November 2012, which should be used for the development of an emergency action level (EAL) scheme. In addition, CSIF Table B is not consistent with the guidance in any revision of NEI 99-01. 10 CFR 72.32(a)(3) requires a classification system for classifying accidents as "alerts".

This information is needed to determine compliance with 10 CFR 72.32 (a)(3)

11.4 The CERP is not specific to emergencies that could occur at the WCS CISF, but rather is specific to operations at waste management facilities. The CERP only addresses accidents and unusual operational conditions could occur during the operation of the low level radioactive waste and mixed waste storage and processing component of the site.

This information is needed to determine compliance with 10 CFR 72.32(a)(2).

11.5 In the license application, Chapter 11, “Emergency Plan,” states, *[t]he comments and WCS’ [Waste Control Specialists] resolutions are provided with this LA [license application].* However, it is not clear to the staff where the comments and resolutions are located. The CISF SAR Chapter 13.5, “Emergency Response Planning,” states, *[c]omments received from off-site response agencies are included as an attachment to the Emergency Response Plan.* However, there is no attachment with this information included in the CERP.

10 CFR 72.32(a)(14) requires the licensee to allow offsite response organizations expected to respond in case of an accident 60 days to comment on the initial submittal of the emergency plan prior to submitting it to the NRC.

This information is needed to determine compliance with 10 CFR 72.32(a)(14).

11.6 Remove CISF SAR Chapter 13 text related to 72.48 reviews on page 13-1 and 72.48 changes performed by other entities (vendors or general licensees) in Section 13.4.4.2. The statements on page 13-1 are inconsistent with the intent and purpose of 72.48. Also, 72.48 does not necessarily apply to all programs described in Chapter 13. Furthermore, the specific licensee for the WCS CISF will always need to confirm that the contents of any package it receives, including the canister containing the contents, meets the CISF license conditions for storage at its site, regardless of whether or not a general licensee or a vendor may have made changes to the storage system under 72.48. Further, the CISF licensee cannot automatically use changes made by other entities under 72.48. The CISF licensee will need to go through the appropriate 72.48 process for adopting the changes for its specific license, as described in NEI 96-07, Appendix B (see page 82).

This information is needed to determine compliance with 10 CFR 72.24, 10 CFR 72.44(e), 10 CFR 72.44(f), 10 CFR 72.48, 10 CFR 72.120, 10 CFR 72.140(c), and 10 CFR 72.186.

11.7 Modify the operations descriptions to address monitoring of dose rate/radiation levels during package receipt inspections (per 20 CFR 1906(b)(2) and (3)) and to include proper considerations for As Low As Reasonably Achievable (ALARA). Operations descriptions should demonstrate appropriate consideration of ALARA, including descriptions of the kinds of ALARA practices that should be employed (e.g., supplemental shielding, positioning of personnel during operations). Note that operations descriptions incorporated by reference from transportation package CoCs likely do not include ALARA consideration information because the purpose of the operations descriptions for 10 CFR Part 71 are only to ensure the package is operated in a way that it will perform consistent with its design basis. Therefore, incorporation of package operations by reference may be insufficient to address this issue.

This information is needed to determine compliance with 10 CFR 20.1906(b) and 10 CFR 72.24(e) and (h), 10 CFR 72.104(b), and 10 CFR 72.126.

11.8 Modify language in the operations descriptions that is unclear. This includes wording such as is in Appendix D.5 of the CISF SAR that indicates the descriptions are how operations ‘may’ be performed and that they aren’t ‘intended to be limiting.’ The operations descriptions should be a description of how the operations are to be performed. The level of detail should be appropriate to clearly convey what is to be done and how but leave enough flexibility for the development of detailed standard operating procedures based on the descriptions in the SAR.

This information is needed to determine compliance with 10 CFR 72.24 and 10 CFR 72.40(a).

11.9 Verify and fix any conflicts between the operations descriptions in the CISF SAR and the relevant package operations descriptions from the transportation package SARs. The applicant should submit as part of the license application package operations descriptions in the CISF SAR that are consistent with the relevant package operations in the SARs for those approved packages. 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.

This information is needed to determine compliance with 10 CFR 72.24 and 10 CFR 72.40(a).

12. Radiation Protection

RSIs

12.1 Provide information to:

- a. Address contamination control areas
- b. Describe the types, capabilities and parameters of area radiation monitors and airborne monitoring instrumentation for the site

It is not clear that the SAR addresses this information. Guidance regarding these aspects of the facility is provided in NUREG-1567 Sections 11.4.2.2 and 11.4.2.5. 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.

This information is needed to determine compliance with 10 CFR 72.24(e), 10 CFR 72.126 and 10 CFR 20.1301(b).

12.2 Provide information regarding the health physics/radiation protection (HP) facilities that are to be shared with the existing low-level radioactive waste (LLRW) facilities at the WCS site.

The SAR states that some HP facilities will be shared with those for the existing LLRW facilities. The SAR should still include a description of these HP facilities, including equipment they contain and functions they serve, as appropriate. The information should be adequate to demonstrate that the facilities are appropriate and adequate for the purposes they are intended to serve for the CISF.

This information is needed to determine compliance with 10 CFR 20.1101.

12.3 Provide a description of the ALARA design and operation considerations for the facility beyond those described for the storage systems.

The SAR includes, by reference, descriptions of the ALARA considerations for design and operations of the storage systems. However, the SAR does not appear to address ALARA considerations for the design and operations aspects of the CISF that are in addition to the storage systems. These considerations should be described for facility aspects such as the off-normal holding area, the cask handling building, and the wash down pad/area in terms of items such as facility and building layout, operations of facility equipment, locations verse the controlled area boundary and locations where personnel or individuals that are not radiation workers would be likely to be or are permitted to be.

This information is needed to determine compliance with 10 CFR 72.126(a) and 10 CFR 20.1101.

12.4 Provide the following:

- a. the dose contributions from other radioactive material facilities to the annual doses for the proposed CISF
- b. an analysis of annual doses to members of the public working around the proposed CISF
- c. information or analysis to address all of the annual dose limits in 10 CFR 72.104(a)

The annual dose limits specified in 10 CFR 72.104 include contributions not only from the proposed facility but also other facilities in the region. The limits in 10 CFR 72.104(a) are similar to those in 40 CFR 191.03, which also apply to the proposed CISF. The region around the CISF includes facilities such as the LES National Enrichment Facility and the existing WCS low level radioactive waste facilities (the red, yellow, blue, and green areas of SAR Figure 2-1). The area around the proposed CISF includes operations such as a quarry, a public landfill and the WCS's RCRA and TSCA operations. The SAR should demonstrate that the annual dose limits for members of the public are met for individuals employed at these facilities. Additionally, along with a whole body dose limit, 10 CFR 72.104(a) includes dose limits for the thyroid and any other critical organ, which have not been addressed in the SAR.

This information is needed to determine compliance with 10 CFR 72.104(a) and 40 CFR 191.03.

12.5 Describe how compliance with 10 CFR 20.1301 limits will be ensured and doses will be maintained ALARA for personnel/individuals on site that are not radiation workers.

It is not clear that the SAR addresses radiation protection for individuals and personnel that are or may be on site but are not radiation workers. The 10 CFR Part 20 dose limits for members of the public apply to these individuals even on site. Such individuals include security and administrative staff that are not trained radiation workers and individuals such as railroad personnel delivering or picking up spent fuel and GTCC waste transport packages.

This information is needed to determine compliance with 10 CFR 20.1101 and 10 CFR 20.1301.

12.6 Provide an evaluation of the doses for unloading a canister from a storage system at the WCS CISF, loading it into a transportation package, and preparing the package for shipment.

A review of Chapter D.9 of the SAR indicates that the dose evaluations for the described operations are missing for the spent fuel and GTCC waste storage containers intended to be used at the proposed CISF.

This information is needed to determine compliance with 10 CFR 72.24(e) and 10 CFR 72.126.

Observations

12.1 Clarify how monitoring for neutron doses/dose rates is to be done. The CISF SAR discusses the use of OSL detectors. It is staff's understanding that OSL detectors only measure gamma radiation.

This information is needed to determine compliance with 10 CFR 72.44(d) and 10 CFR 72.126(c).

14. Decommissioning

Observations

14.1 Preliminary Decommissioning Plan, Appendix B of the license application, Section 2.2, Paragraph 3, discusses what the Final Decommissioning Plan will address but this does not track with the specific requirements of 10 CFR 72.54(g).

This information is needed to determine compliance with 10 CFR 72.54(g).

15. Waste Confinement and Management

RSIs

15.1 Address the following apparent inconsistencies, modifying the application and the SAR as appropriate.

- 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.

This information is needed to determine compliance with 10 CFR 72.126(c) and (d) and 10 CFR 72.128(b).

16. Accident Analysis

RSIs

16.1 Address the following accidents for each canister:

- Accidents at nearby sites.
- Building structural failure onto structures, systems, and components (SSCs). Some operations are conducted in the cask handling building; thus, this accident scenario should be evaluated for those operations and the SSCs involved in those operations.

This information was not provided for each canister.

This information is needed to determine compliance with 10 CFR 72.24, 10 CFR 72.90, 10 CFR 72.92, 10 CFR 72.94, 10 CFR 72.106, 10 CFR 72.122, 10 CFR 72.124, 10 CFR 72.126, and 10 CFR 72.128.

17. Technical Specifications

RSIs

17.1 Provide Technical Specifications for design features of the Cask Transfer System (CTS) and Vertical Cask Transporter (VCT) that will have a significant effect on safety if altered or modified.

The proposed design of the CTS and VCT described in Section 7.5 of the WCS CISF SAR identified these items as important to safety. Proposed Technical Specification (TS) 4.4.1, "Lifting," included the following statement:

The CTS and VCT lifting devices shall be designed, fabricated, tested, inspected, and maintained in accordance with the guidelines of NUREG-0612 with the following clarifications:

- The CTS cranes shall be classified as Type 1 cranes in accordance with ASME NOG.1, 1995. Allowable stresses used in the crane designs shall be in accordance with ASME NOG.1. These cranes shall be of single-failure-proof design and meet the requirements of NUREG-0554, "Single-Failure-Proof Cranes for Nuclear Power Plants," May 1970 and NUREG-0612.
- The VCT with CANISTER lifting devices used with the CTS shall be designed, fabricated, operated, tested, inspected and maintained in accordance with NUREG-0612, Section 5.1

The staff determined the proposed design of the CTS and VCT described in Section 7.5 of the WCS CISF SAR are not consistent with these clarifications because neither the CTS nor the VCT include an overhead crane with multiple girders and a top-running trolley, which is the crane design specified in NUREG -0554, ASME NOG.1, and crane design and inspection standards referenced in NUREG-0612. Provide a revision to TS 4.4.1 that accurately reflects the important to safety design features of the CTS and VCT and that satisfies the intent of NUREG-0612 guidelines for safe handling of heavy loads with the potential to damage irradiated fuel.

This information is needed to determine compliance with 10 CFR 72.44(c).

Observations

17.1 Clarify Section B.3.1.1 of the SAR with regard to the use of the STC package with the HSM; this combination does not seem to be consistent with descriptions in the rest of the SAR regarding packages used as transfer casks for the TN storage systems.

This information is needed to determine compliance with 10 CFR 72.24(b), 10 CFR 72.26, and 10 CFR 72.44(c).

17.2 Clarify, as appropriate, the second paragraph text in Section 4.3.2, “Concrete Storage Pad Properties to Limit CANISTER Gravitational Loadings Due to Postulated Drops,” to recognize that VCC systems of individual Dockets may be associated with multiple sets of storage pad design properties, which may not have been bounded by design criteria for the CISF storage pad.

The TS language lacks clarity on establishing bounding pad parameters for incorporated by reference to evaluate the cask drop accident performance. The current text states, “[F]or concrete storage pads loaded with NAC-MPC, NAC-UMS, and/or MAGNASTOR VCC System the storage pad shall meet the concrete storage pad properties presented in CoC No. 1025...1015,...1031...” The staff notes that Technical Specifications Section B 3.4 for NAC-MPC (Docket No. 72-1025) prescribes individual sets of pad thickness, concrete density, soil stiffness, and soil modulus of elasticity for Yankee-MPC and CY-MPC cask systems. Similar information, however, is not identified in Technical Specifications for NAC-UMS and MAGNASTOR systems (Docket Nos. 72-1015 and 72-1031). For instance, MAGNASTOR, TS Section 5.4b states, “ISFSI pad parameters (i.e., thickness, concrete strength, soil modulus, reinforcement, etc.) are consistent with the FSAR analyses.” Thus, the MAGNASTOR language permits storage pad parameters to be reevaluated in accordance with the 10 CFR 72.48 change process. As such, it is unclear how the CISF pad design parameters can be used effectively through the incorporated by reference process.

This information is needed to determine compliance with 10 CFR 72.26 and 10 CFR 72.122(b)

18. Environmental Report

RSIs

18.1 In Section 1.1 of the ER, WCS states that it “is requesting authorization to store up to 5,000 MTU in Phase 1, but has analyzed the environmental impacts of storing up to 40,000 MTU at the CISF.” WCS further states that “[t]he CISF would be constructed in eight phases over 20 years” (ER section 2.22), “with one phase being completed approximately every 2.5 years.” (ER section 4.1). Each phase would be “sized to hold approximately 5,000 MTU for a total facility capacity of 40,000 MTU when all eight phases are complete” (ER section 2.22.2).

These statements imply that environmental impacts from construction and operation of the phases could be occurring at the same time over the course of the proposed 20-year construction period for the CISF. Additionally, Figure 2.26 of the ER shows the proposed layout of the 8 phases and how completed phases would be in close proximity to phases under construction.

It is not clear from the impact analysis in the ER whether WCS has addressed the integrated effects of construction and operation on the affected environment of all the eight phases or how the construction activities of future phases might impact the operation of the pads in operation.

WCS's environmental analysis should address the integrated impacts to all resource areas of the affected environment from construction and operation of the eight phases over the anticipated CISF construction period (e.g., 20 years).

This information is needed to determine compliance with 10 CFR 51.45(b)(1)

18.2 WCS discusses transportation in Sections 3.2 and 4.2 of the ER. In Section 3.2, WCS identifies (1) the connected environmental impacts of transporting the SNF from the shutdown decommissioned reactors; (2) the roads around the WCS CISF and rail lines to be used for SNF transportation near the WCS CISF; and (3) the proposed rail spur to the WCS CISF. In Section 4.2, WCS evaluates the transportation impacts from construction and operation, to scenic views, air quality, water quality, and noise, the radiological and non-radiological impacts of transporting SNF, and more. In neither section does WCS identify the existing levels of transportation on the local roads or rails to which the proposed action would affect, nor the existing levels of transportation associated with ongoing activities at the WCS CISF that are related to waste disposal and storage.

This information is needed to allow NRC staff compliance with 10 CFR 51.70(b).

Observations

18.1 Recent ecology surveys are not provided.

Section 3.5.16 of the ER identifies the ecology surveys performed at the WCS CISF. These surveys were performed in 1997, 2003, 2004, and 2007, 2008. The ER does not provide evidence of more recent surveys. WCS should provide ecological surveys and results that show the present conditions, vegetation, and wildlife observed in the region around the WCS CISF.

This information is needed to determine compliance with 10 CFR 51.45(b)(1)

18.2 Listing of required federal, state, and local permits is not provided.

The ER does not contain a listing of the federal, state, and local permits needed by WCS for the construction and operation of the proposed CISF. Pursuant to 10 CFR 51.45, licensees and applicants are required to provide a listing of each permit, license or approval needed to construct and operate the proposed facility, the relevant agency that issues the permit, the current status of WCS' application for the permit, license, or approval, and the current status of the agency's review for the permit. The NRC uses this information in its environmental review to help in identifying federal, state, and local agencies to reach out to and to obtain relevant information for its environmental review. WCS should compile this listing and provide it to NRC with the request for supplemental information.

This information is needed to determine compliance with 10 CFR 51.45(d).

18.3 References to the SAR and the license application

The ER references the SAR and license application. Please ensure that references in the ER to the SAR and license application consistently identify the specific sections in those documents to understand the basis and applicability for those references with respect to the ER.

This information is needed to allow NRC staff compliance with 10 CFR 51.70(b).

18.4 Public availability of environmental-related information.

The information the NRC uses to conduct and inform its environmental reviews, which will include information in the ER, must be publicly available, as appropriate. Therefore, please ensure that the information included in response to these requests for supplemental information, as well as any information in the ER and documents referenced in the ER, can be made publicly available. Also please ensure that the information in the SAR and license application which is referenced in the ER can be made publicly available.

This information is needed to allow NRC staff compliance with 10 CFR 51.70(b) and 10 CFR 51.73.