

Items Included in Enclosure 6:

Multi-discipline	RSI NP-1.1
Site Characteristics	RSI NP-2.1 <i>Follow-up response from July 2016 RSI submittal</i>
SSC and Design Criteria	RSI NP-4.5 <i>Follow-up response from August 2016 RSI submittal</i>
	RSI NP-4.6 <i>Follow-up response from August 2016 RSI submittal</i>
Installation and Structural	RSI NP-5.2 <i>Follow-up response from August 2016 RSI submittal</i>
	RSI NP-5.4
	RSI NP-5.7
Thermal	RSI NP-6.2 <i>Follow-up response from August 2016 RSI submittal</i>
Shielding	RSI NP-7.1
Confinement	RSI P-9-1
	RSI NP-9.7
Radiation Protection	RSI NP-12.3 <i>Follow-up response from July 2016 RSI submittal</i>
	RSI NP-12.4 <i>Follow-up response from July 2016 RSI submittal</i>
	RSI NP-12.5 <i>Follow-up response from July 2016 RSI submittal</i>

1. Multi-discipline

RSI NP-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.

Response to RSI NP-1.1:

The non-copyright references are listed in Enclosure 8. These non-copyright references are each being provided by one of four methods. Those methods are described immediately below. Enclosure 8 indicates the method for each reference.

1. Consolidated versions of certain items (e.g., final safety analysis reports) have been provided to NRC in separate submittals, on the docket to which they apply. Those items are discussed further below.
2. Certain references were in the initial application and Enclosure 8 provides that information.
3. Certain references are provided herein in Enclosure 9 (for non-proprietary references) and Enclosure 10 (for proprietary references). Those items are discussed further below.
4. Certain references are available at URLs provided in Enclosure 8.

Discussion of Separately-Submitted References and Associated WCS CISF SAR Changes

SMUD

Transmittal number DPG 16-198 for Rancho Seco Independent Spent Fuel Storage Installation, Docket No. 72-11, License No. SNM-2510, Submittal of Consolidated Version of the Rancho Seco Independent Spent Fuel Storage Installation Final Safety Analysis Report (FSAR) Revision 4, was submitted to the NRC Document Control Desk on August 11, 2016. On October 12, 2016 under transmittal letter DPG 16-244, SMUD sent drawings NUH-05-4001 Revision 15, NUH-05-4003 Revision 10, NUH-05-4004 Revision 16, and NUH-05-4005 Revision 14 to the NRC.

AREVA

Consolidated versions of the following non-copyright references have been submitted to the NRC Document Control Desk with a formal letter for docketing under the specific docket for each item:

Submitted with AREVA formal letter E-45733 on 07/13/2016:

AREVA TN Document NUH-003, Revision 14, "Updated Final Safety Analysis Report for the Standardized NUHOMS[®] Horizontal Modular Storage System for Irradiated Nuclear Fuel."

Submitted with AREVA formal letter E-45734 on 07/13/2016:

AREVA TN Document, ANUH-01.0150, Revision 6, "Updated Final Safety Analysis Report for the Standardized Advanced NUHOMS[®] Horizontal Modular Storage System for Irradiated Nuclear Fuel," NRC Docket No. 72-1029.

Submitted with AREVA formal letter E-45735 on 07/15/2016:

AREVA TN Document NUH-05-151 Rev. 17, "NUHOMS[®]-MP187 Multi-Purpose Transportation Package Safety Analysis Report"

Submitted with AREVA formal letter E-45736 on 07/20/2016:

AREVA TN Document, NUH09.101 Rev. 17, "NUHOMS[®]-MP197 Transportation Package Safety Analysis Report"

WCS CISF SAR Changes Associated with the Submittal of the AREVA References

WCS CISF SAR Appendix A.7 cites Reference A.7-5 in multiple sections. Reference A.7-5 is Revision 4A to the Standardized NUHOMS[®] UFSAR. Note that Appendix B to the "Rancho Seco Independent Spent Fuel Storage Installation Safety Analysis Report," NRC Docket No. 72-11, Revision 4 contains the applicable pages from the Standardized NUHOMS[®] UFSAR Revision 4A, as listed on the Rancho Seco SAR Appendix B list of pages. As mentioned above, the Rancho Seco consolidated SAR was docketed in response to this RSI. The Rancho Seco SAR contains these applicable Standardized NUHOMS[®] UFSAR Revision 4A pages in Appendix B. Therefore, WCS CISF SAR Section A.7.1 has been revised to explain this, and the description of Reference [A.7-5] in WCS CISF SAR Section A.7.8 is changed to be "Appendix B to "Rancho Seco Independent Spent Fuel Storage Installation Safety Analysis Report," NRC Docket No. 72-11, Revision 4." Other associated changes are made for clarity in WCS CISF SAR Sections A.7.2 and A.7.4.

WCS CISF SAR Section A.7.1 discusses revisions to the Standardized NUHOMS[®] UFSAR involving the HSM Model 80. Both Reference A.7-8 (Standardized NUHOMS[®] UFSAR, Revision 6) and Reference A.7-3 (Standardized NUHOMS[®] UFSAR, Revision 14) are cited. Because the applicable UFSAR section (Section 1.3.1.2) is unchanged between Revision 6 and Revision 14 in the areas pertinent to this HSM Model 80 change, and because UFSAR Revision 6 is only cited in this one area of the WCS CISF SAR, reference to UFSAR Revision 6 is deleted and UFSAR Revision 6 is deleted from the Section A.7.8 reference list.

NAC

NAC has provided the NRC with a consolidated version of the latest Final Safety Analysis Report (FSAR) revisions for the NAC-MPC, NAC-UMS, and NAC-MAGNASTOR storage systems via NAC letters ED20160066, ED20160065, and ED20160064, respectively. In addition, NAC has provided the NRC with a consolidated version of the latest Safety Analysis Report (SAR) for the NAC-UMS transportation cask via NAC letter ED20160079. These were submitted to the NRC on August 3, 2016.

The SAR for the NAC-STC transportation cask was previously provided to the NRC and is located under ADAMS accession numbers ML11152A179, ML16021A330, ML16021A319, ML16021A354, and ML16021A347.

The SAR to the NAC-MAGNATRAN transportation cask has yet to be consolidated as it is still under initial NRC review and approval. The initial approval of this transportation cask is expected soon, shortly after which NAC intends to have consolidated the initial SAR and will provide the NRC with Revision 0.

Discussion of References Provided in Enclosure 9 and Enclosure 10

Enclosures 9 and 10 provide pdfs of certain of the references listed in Enclosure 8. The pdfs in Enclosure 9 are non-proprietary (i.e., public). The pdfs in Enclosure 10 are entirely proprietary.

Other WCS CISF SAR Changes Associated with this RSI

While compiling the requested information for this RSI, it was determined there were several typographical errors throughout WCS CISF SAR Chapter 7, Section 7.7. Specifically References 7-21 through 7-25 used NAC International Report number 630075-R-01, Revision 1. This should have been 630075-R-06, Revision 3. Reference 7-26 and Reference 7-41 are now Revision 1. References 7-15 and 7-17 were duplicate entries and as a result, Reference 7-15 has been deleted.

During the review and approval process of NAC Calculation NAC004-CALC-04, Attachment 4 was removed. Consequently, WCS CISF SAR Section 7.7 has been revised to delete Reference 7-59, which was the reference to Attachment 4 and was unnecessarily added. WCS CISF SAR Section 7.6.3.2 has been revised by deleting the last bullet under the subheading titled "Finite Element Model Inputs," which had made reference to Reference 7-59.

Application/SAR Impact:

WCS CISF SAR Sections 7.6.3.2, 7.7, A.7.1, A.7.2, A.7.4, and A.7.8 have been revised as described in the response.

Changed application/SAR pages are provided in Enclosure 5 of this submittal.

2. Site Characteristics

RSI NP-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.

Original WCS Response and Impacts:

New Figures 2-19, 2-20, and 2-25 were mentioned by reference in the SAR pages that changed as part of the response for the non-proprietary submittal from July 20, 2016, but they were not included as part of the changed pages.

NRC Feedback:

In the NRC Public Meeting on August 22, 2016, it was indicated that Figures 2-19, 2-20, and 2-25 were not included in the submittal.

Revised Response to RSI NP-2.1:

Figures 2-19, 2-20, and 2-25 have been added in response to this question.

Application/SAR Impact:

WCS CISF SAR Figures 2-19, 2-20, and 2-25 have been added as described in the response.

Changed application/SAR pages are provided in Enclosure 5 of this submittal.

4. SSC and Design Criteria

RSI NP-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 61 BTH 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 61 BTH 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 2.24(b), (c), and (e).

Original WCS Response and Impacts:

The response and impacts were included in the submittal letter dated August 31, 2016.

NRC Feedback:

In the NRC public meeting September 29, 2016, NRC stated that Rancho Seco Volume 4 is missing from NRC records.

Revised Response to RSI NP-4.5:

On October 12, 2016, under transmittal letter DPG 16-244, SMUD sent Drawings NUH-05-4001 Revision 15, NUH-05-4003 Revision 10, NUH-05-4004 Revision 16, and NUH-05-4005 Revision 14 to the NRC.

Application/SAR Impact:

No change as a result of this question.

RSI NP-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.

Original WCS Response and Impacts:

The response and impacts were included in the submittal letter dated August 31, 2016.

NRC Feedback:

In the NRC public meeting September 29, 2016, NRC stated that Rancho Seco Volume 4 is missing from NRC records.

Revised Response to RSI NP-4.6:

On October 12, 2016, under transmittal letter DPG 16-244, SMUD sent Drawings NUH-05-4001 Revision 15, NUH-05-4003 Revision 10, NUH-05-4004 Revision 16, and NUH-05-4005 Revision 14 to the NRC.

Application/SAR Impact:

No change as a result of this question.

5. Installation and Structural

RSI NP-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.

Original WCS Response and Impacts:

Response and impacts are included in the submittal letter dated August 31, 2016. WCS CISF SAR Tables A.3-1, B.3-1, C.3-1, and D.3-1 in Appendices A through D were updated. WCS SAR Section 7.2 was revised.

NRC Feedback:

In the NRC Public Meeting on September 29, 2016, the NRC requested the same table for NAC as that included for the NUHOMS[®] System.

Revised Response to RSI NP-5.2:

The tables requested were provided in response to RSI NP-10.3, submitted in WCS letter dated August 31, 2016. The tables numbers are E.3-1, F.3-1 and G.3-1 and have been added to WCS CISF SAR Appendices E, F, and G, respectively. These previously submitted tables have been formatted in the SAR as Rev. 1 Interim pages and are included with the changed SAR pages in this submittal as "information only."

Application/SAR Impact:

As discussed in the response, previously-submitted Tables E.3-1, F.3-1 and G.3-1 have been formatted in the SAR as Rev. 1 Interim pages and are included with the changed SAR pages in this submittal as "information only."

RSI NP-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).

Response to RSI NP-5.4:

WCS revised Sections 7.6.1, 7.6.2 and 7.6.3 of the WCS CISF SAR to focus only on the design details and bases for the Storage Pads for the VCCs. WCS revised and added WCS CISF SAR Sections 7.6.4 and 7.6.5, respectively, to provide the design details and bases for the storage pads for the NUHOMS[®] HSMs. Section 7.6.4 summarizes the SSI evaluation for the NUHOMS[®] Systems NITS pad and Section 7.6.5 summarizes the pad design for the NUHOMS[®] NITS storage pad. In addition to the pad design, WCS has made additional changes to WCS CISF SAR Appendices A, B, C and D to qualify the SSI evaluation for the NUHOMS[®] System components for the g loads resulting from the NUHOMS[®] Systems NITS pad presented in Section 7.6.4. In addition, some editorial changes were made throughout these sections to correct spelling errors etc.

Application/SAR Impact:

WCS CISF SAR Sections 7.6.1, 7.6.2, 7.6.3, 7.6.3.2, 7.6.4, 7.7, A.3.3.3, A.7.5, A.7.5.1, A.7.5.2, A.7.8, A.12.2.3, B.3.3.3, B.7.5, B.7.8.5, B.7.8.6, B.7.8.9, B.12.2.3, C.3.3.3, C.7.3, C.7.3.2, C.7.3.3, C.7.5.3, C.7.6.3, C.7.7.1, C.7.7.4.6, C.7.7.4.6.1, C.7.7.4.9, C.7.8, C.12.2.3, D.3.3.3, D.7.3, D.7.3.1, D.7.3.1.1, D.7.3.1.2, D.7.3.1.3, D.7.3.1.4, D.7.3.1.5.1, D.7.3.1.5.2, D.7.3.1.6, D.7.3.3, D.7.5.3, D.7.6, D.7.8 and D.12.2.3 have been revised as described in the response.

WCS CISF SAR Sections 7.6.4, 7.6.4.1, 7.6.4.2, 7.6.4.3, 7.6.4.4, 7.6.4.4.1, 7.6.4.4.2, 7.6.4.4.3, 7.6.4.4.4, 7.6.5, 7.6.5.1, 7.6.5.2, 7.6.5.3, 7.6.5.4, and 7.6.5.5 have been added as described in the response.

WCS CISF SAR Sections C.7.3.3.1, C.7.3.3.2, C.7.7.4.5.3, C.7.7.4.6.2, D.7.3.3.1 and D.7.3.3.2 have been deleted as described in the response.

WCS CISF SAR Tables 7-29 to 7-40, A.7-1, and A.7-2 have been added as described in the response.

WCS CISF SAR Tables A.3-1, C.3-1, C.7-1, D.3-1, D.7-1 and D.7-2 have been revised as described in the response.

WCS CISF SAR Table D.7-3 has been deleted as described in the response.

SAR Figures 7-31, B.7-2, D.7-2, D.7-3 and D.7-4 have been revised as described in the response.

SAR Figures 7-33 to 7-53, A.7-2 to A.7-6, C.7-26 to C.7-33 and D.7-5 to D.7-9 have been added as described in the response.

Changed application/SAR pages are provided in Enclosure 5 of this submittal.

RSI NP-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).

Response to RSI NP-5.7:

Design calculation AREVATN001-CALC-001, "ISFSI Pad Design for WCS at Andrews, Texas" Revision 1 is provided in Enclosure 11 for the NUHOMS[®] pad design. This calculation is for the pad design described in WCS CISF SAR Section 7.6.5 (as revised by the response to RSI NP-5.4).

Soil structure interaction calculation AREVATN001-CALC-002, "Soil Structure Interaction Analysis of TN Independent Spent Fuel Storage Installation (ISFSI) Concrete Pad at Andrews, TX," Revision 0 is provided in Enclosure 12 for the SSI evaluation provided in WCS CISF SAR Section 7.6.4 (as revised by the response to RSI NP-5.4). This calculation determines the seismic motion response spectra for the actual bounding NUHOMS[®] HSM storage pad design.

Application/SAR Impact:

No change as a result of this question.

6. Thermal

RSI NP-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.

Original WCS response and Impacts:

The response and impacts are included in submittal letter dated August 31, 2016 discussing the accident analyses that were completed for the six storage systems. WCS CISF SAR Chapter 12, Section 12.2 was updated.

NRC Feedback:

In the NRC public teleconference on September 29, 2016, NRC provided feedback that WCS needs to justify why the thermal analyses done for near adiabatic conditions for the six WCS storage cask approvals using NUREG-1536 are acceptable in lieu of the adiabatic heatup analysis noted in NUREG 1567.

Revised Response to RSI NP-6.2:

The accident described in Chapter 12.2 of the application that considers adiabatic heat up is the Blockage of Air Inlets/Outlets. An accident scenario using the blockage of air inlets and outlets to analyze adiabatic heat up is consistent with the guidance given to NRC reviewers in NUREG 1567.

For example, NUREG-1567, Section 6.5.1, "Decay Heat Removal Systems" describes "full blockage of ventilation passages" as a required thermal analysis for determining the performance of cask heat removal systems. Likewise, Section 15.5.2.8 of NUREG-1567, "Adiabatic Heatup," states that "the reviewer should verify that the configuration of the SSCs has been defined, (i.e., all inlets and outlets blocked (for casks) and cooling systems or pumps inoperable (for pools)."

In addressing accidents that involve adiabatic heatup, WCS considered the following guidance in NUREGs-1567 and 1536:

- a. Section 5.4.1.1 of NUREG -1567 – "For a site-specific ISFSI, the application may involve use of a cask certified under 10 CFR 72, Subpart L, including the SAR for the certified cask system by reference. Additional information relating to the cask should also be provided, including the applicant's evaluations that establish that site parameter limits are within the bounds of those established as limiting conditions as set forth in the Certificate of Compliance."

- b. Section 6.5.1.2 of NUREG -1567 – “The reviewer should evaluate the thermal performance of the cask in accordance with Chapter 4 of NUREG-1536.” (Section 4.5.4.5 of NUREG-1536 addresses adiabatic heatup.)
- c. Section 6.5.1.1 of NUREG -1567 – “The reviewer should verify that technical specifications relating to heat removal capability have been included in the technical specification chapter of the SAR.”

Each of the storage systems to be used at the WCS CISF have been analyzed under near-adiabatic conditions to determine technical specifications (TS) relating to heat removal capability. These analyses have been reviewed and approved by the NRC either as part of a Certification or Specific License.

The specific analyses done for the storage cask systems are referenced in Chapter 12. As shown in Chapter 2 of the WCS CISF SAR, there are no credible accident scenarios at the WCS CISF site that would result in a full adiabatic condition for the storage systems (i.e., entombment of the storage overpacks from volcanic or seismic activity, landslides, etc.).

In addition, the TS for the six storages cask systems are based on heat loads that are higher than the heat loads requested for storage at WCS CISF. The TS proposed for the WCS CISF are derived from TS that NRC has previously approved for these cask systems.

Finally, Section 15.5.2.8 of NUREG-1567, Adiabatic Heatup, provides instructions to reviewers (as opposed to applicants) on how to develop TS for surveillance frequencies based on a simple bounding calculation. We believe that the development of TS by NRC using Section 15.5.2.8 would be redundant in this instance because NRC has already reviewed and approved TS for the six cask systems that are based on more detailed and realistic analyses of scenarios involving vent blockage and near-adiabatic heatup conditions, consistent with the guidance in NUREG-1567 cited in paragraph b above.

Application/SAR Impact:

No change as a result of this question.

7. Shielding

RSI NP-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.

Response to RSI NP-7.1:

The Chapter 9 dose rate and dose analyses include only the CISF facilities for which the license is being sought (phase 1 as described in the ER). Figure 9-1 is being revised to clarify this as part of the response to RSI NP-15.1, which will be included in the December 9, 2016 submittal. The figure will show the same facility shown in the WCS CISF SAR Chapter 1 figures.

In response to RSI NP-4.3, which provided additional drawings for the facility and facility SSCs relied on for facility operations, WCS CISF SAR Chapter 9, Sections 9.4.1 and 9.4.1.1 were revised to add clarifying text. In response to this RSI the text is further revised to remove any mention of the anticipated additional seven phases of the project discussed in the ER.

Because Figure 9-3 is no longer necessary, Figure 9-3 and references to the figure have been deleted from Chapter 9. Figure 1-6, which was added as part of the response to RSI NP-4.3, provides the storage area layout information formerly contained in Figure 9-3. The response to RSI NP-4.3 is being revised and is scheduled to be included in the December 9, 2016 submittal.

Application/SAR Impact:

WCS CISF SAR Sections 9.4.1 and 9.4.1.1, and Tables 9-5 and 9-6 have been revised as described in the response.

WCS CISF SAR Figure 9-3 has been deleted as described in the response.

Changed application/SAR pages are provided in Enclosure 5 of this submittal.

Proprietary Information on Pages 16 and 17
Withheld Pursuant to 10 CFR 2.390

RSI NP-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.

Response to RSI NP-9.7:

There are 21 fuel canisters (2 FO-, 18 FC- and 1 FF-DSCs) loaded under SNM-2510 as documented in the Rancho Seco ISFSI FSAR. The maximum number of fuel assemblies loaded in any one canister is 24. The design basis radioactive inventory for the confinement evaluation included in the Rancho Seco ISFSI FSAR was determined based on the fuel assemblies described in Section 7.2.1 of Volume I of the Rancho Seco ISFSI FSAR (See also Calculation 2069-0507, Revision 0, included in Volume IV of the Rancho Seco ISFSI FSAR). The confinement evaluation documented in the Rancho Seco ISFSI FSAR took into account fewer nuclides in the nuclide inventory than is expected under current standards. Therefore, WCS performed a new confinement evaluation documented in Chapter A.11 of the WCS CISF SAR to include all of the isotopes required to meet current standards. The radioactive inventory was determined using the same design basis fuel assemblies that were demonstrated to be bounding in the Rancho Seco ISFSI FSAR, except that updated methods were used to calculate the radionuclide inventories. The bounding assembly burnup and initial enrichment combinations used for the original analysis remain bounding for the radionuclide inventories regardless of the updated methods used to generate the source term. Therefore, assuming that all 21 canisters containing fuel under the SNM-2510 license are loaded with 24 fuel assemblies, each with the maximum radionuclide inventory for each assembly, the results bound the 21 canisters that are loaded.

With respect to the GTCC canister stored under SNM-2510, the radionuclide inventory for that canister is provided in Table 7-1 of Appendix C of the Rancho Seco ISFSI FSAR. Section 8.2.2 of Appendix C of the Rancho Seco ISFSI FSAR concludes that "[t]he doses from the single GTCC waste canister are far less than the doses from the fuel canisters[.]" referring to the confinement evaluation performed for the GTCC canister. Therefore, the licensing basis under SNM-2510 only includes dose contributions from the confinement evaluations for the 21 fuel canisters assumed to be loaded with 24 design basis fuel assemblies each. This same conclusion can be drawn for the WCS CISF site, because the radionuclide inventory used in the updated confinement evaluation for the fuel canisters results in higher dose contributions compared to the original analysis for the fuel. The methods used to determine the radionuclide inventory for the GTCC canister do not require updating since the GTCC waste source terms are

compliant with current standards for calculating the source terms for confinement evaluations. Therefore, the contribution from a GTCC canister for a confinement evaluation is even lower as compared to the doses from the fuel canisters. Chapter A.11 has been revised to provide the pertinent portions of the above discussion to demonstrate that the source terms from 24 design basis spent nuclear fuel assemblies per canister, and 21 canisters are bounding for all fuel and GTCC waste in FO-, FC-, and FF- DSCs and the GTCC Waste canister. Please note that the response to RSI NP-9.2 included a WCS CISF SAR markup to demonstrate that the GTCC waste canister is bounded by the fuel canister analysis.

Application/SAR Impact:

WCS CISF SAR Sections A.11.2 and A.11.3.2 have been revised as described in the response.

Changed application/SAR pages are provided in Enclosure 5 of this submittal.

12. Radiation Protection

RSI NP-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 versus 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.

Original WCS Response and Impacts:

Response and impacts are included in the submittal letter dated July 20, 2016. WCS CISF SAR Chapter 9, Section 9.3.3.1 was revised and references were made to WCS CISF SAR Appendix A, Tables A.9-2 and A.9-3.

NRC Feedback:

In the NRC public meeting on August 22, 2016, NRC stated that WCS only addressed the Cask Handling Building in our response, but should address any other areas where ALARA applies.

Revised Response to RSI NP-12.3:

WCS will update Chapter 9, *Radiation Protection*, to address the ALARA requirements and guidance contained in NRC Regulatory Guides 3.48, 8.8 and 8.10, Chapter 11 of NUREG 1567 and the requirements in 10 CFR Part 20. The update will be submitted in Revision 1 of the WCS application following the submittal of all RSI responses.

The added narrative will address, but will not be limited to, the following:

- Policy Considerations
- Training of personnel, including passing along management's commitment to ALARA at the WCS CISF
- Protection of personnel (including ALARA considerations for radiation and non-radiation workers)
- Protection of the public

- Design features, such as location and layout of the Receiving Area, Cask Handling Building (CHB), Storage Area, Security and Administration Building and other site features to keep occupational workers and the public separated from the radiation sources to the extent possible
- Operating procedures
- Maintenance practices: i.e., maintenance activities in CHB performed when there are no transfer operations taking place in the CHB
- Point-by-point how Regulatory Position 2 a - i of Regulatory Guide 8.8 are incorporated into the design
- Point-by-point how Regulatory Position 4 of Regulatory Guide 8.8 is met by the WCS radiation protection program
- Operational Considerations (Regulatory Guide 8.10).

Application/SAR Impact:

No change as a result of this question.

RSI NP-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.

Original WCS Response and Impacts:

The response and impacts are included in submittal letter dated July 20, 2016. WCS CISF SAR Chapter 9, Section 9.4.3 was added to support the response.

NRC Feedback:

In the NRC public meeting on August 22, 2016, the NRC staff raised questions related to radiation and non-radiation workers: "Identify all facilities that would have radiation workers? How would you classify construction workers? What about other WCS employees who are not Radiation Workers that could go on the site?"

Additional Response to RSI NP-12.4:

All WCS radiation workers fall under a single radiation protection program that covers the following facilities: CISF, Federal Waste Facility, Compact Waste Facility, Byproduct Facility, Treatment Storage and Disposal Facility, Rail Pedestal Unloading Building, and Low Specific Activity Pad.

In order to maintain radiation doses within ALARA constraints, unrestricted access to the CISF radiologically controlled areas (RCAs) within the Protected Area Boundary (PA, see Figure 1-2) will only be allowed for radiation workers. Non-radiation workers (including WCS employees who are not radiation workers) will only have limited access within an RCA and be escorted by a radiation worker (using a 1-to-5 radiation worker to non-radiation worker ratio).

Construction workers will be considered non-radiation workers and the radiation dose limits in 10 CFR 20 Subpart D will apply to them. Should all of Phase 1 construction not be completed upon the receipt of the first canister for storage, then construction areas will be established outside RCAs to maintain dose rates to construction workers below 2 mrem/hr. Laydown and material and equipment storage areas will be located in consideration of area dose rates to maintain worker doses ALARA.

RCAs located within the WCS CISF will be established around ongoing cask handling in the CHB and transfer operations along the transport haul route, and for loaded storage overpacks in the storage area.

Application/SAR Impact:

WCS CISF SAR Section 9.4.2 has been revised as described in the response.

Changed application/SAR pages are provided in Enclosure 5 of this submittal.

RSI NP-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.

Original WCS Response and Impacts:

The response and impacts are included in submittal letter dated July 20, 2016. WCS CISF SAR Chapter 9, Section 9.1.1 was revised.

NRC Feedback:

In the NRC public meeting on August 22, 2016, the NRC staff raised questions related to radiation and non-radiation workers: Identify all facilities that would have radiation workers? How would you classify construction workers? What about other WCS employees who are not radiation workers that could go on the site?

Additional Response to RSI NP-12.5:

See the additional response to RSI NP-12.3 and RSI NP-12.4 contained in this submittal.

Application/SAR Impact:

No change as a result of this question.