Items Included in Enclosure 2:

Multi-discipline	RSI NP-1.2
General Description	RSI NP-1.2
Site Characteristics	RSI NP-2.3 *Follow-up response from July 2016 RSI submittal*
SSC and Design Criteria	RSI NP-4.1
	RSI NP-4.2 *Follow-up response from October 2016 RSI submittal*
	RSI NP-4.3 *Follow-up response from August 2016 RSI submittal*
	RSI NP-4.4
Thermal	RSI NP-6.1 *Follow-up response from August 2016 RSI submittal*
	RSI NP-6.2 *Follow-up response from November 2016 RSI submittal*
	RSI NP-6.3 *Follow-up response from August 2016 RSI submittal*
Shielding	RSI NP-7.1 *Follow-up response from November 2016 RSI submittal*
	RSI NP-7.2 *Follow-up response from July 2016 RSI submittal*
Confinement	RSI NP-9.3
	RSI NP-9.8 *Follow-up response from July 2016 RSI submittal*
Materials	RSI NP-10.1 *Follow-up response from August 2016 RSI submittal*
	RSI NP-10.4 *Follow-up response from July 2016 RSI submittal*
Radiation Protection	RSI NP-12.2 *Follow-up response from July 2016 RSI submittal*
	RSI NP-12.6 *Follow-up response from July 2016 RSI submittal*
Waste Confinement and Management	RSI NP-15.1
Accident Analysis	RSI NP-16.1
Environmental Report	RSI NP-18.1 *Follow-up response from July 2016 RSI submittal*

1. Multi-discipline

RSI NP-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. Also, references given in Section D.9.2.1 point to the entire NU HOMS 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.

Response to RSI MD NP-1.2:

WCS is not relying on the post-shipment leak test described in QP-10.02, Revision 1, as its primary means of demonstrating that canister confinement boundaries remain intact after transport to the WCS CISF. Verification that canister confinement boundaries and redundant boundary components remain intact during transport to WCS is based on a structural analysis of each canister/transport cask system under normal transport conditions. The analyses demonstrate that the loads applied during normal transport conditions, as defined in 10 CFR Part 71 and 49 CFR Part 173, Subpart I, are not sufficiently large to adversely affect the integrity of the confinement boundaries or redundant boundary components. This is accomplished by evaluating the confinement boundary of each canister type authorized for storage at the WCS CISF to demonstrate that loads during normal conditions of transport (NCT) do not exceed ASME Boiler and Pressure Vessel Code Subsection NB Article NB-3200 (Level A allowables). This demonstrates that the confinement boundary of the canisters is not adversely impacted during transport to the WCS CISF.

The post-shipment leak test described in QP-10.02, Revision 1, is performed on every loaded transport cask received at WCS and serves as a secondary confirmation that overall confinement is maintained and that there is no detectable leakage from a canister. In response to Parts a and b of the RSI, the leak test is not intended to be a means of verifying confinement for canisters, or to distinguish between the integrity of confinement and redundant boundary components. The intended role of the post-shipment leak test is discussed in the Response to RSI NP-10.1.

Chapter 11 (Confinement), the Appendix Chapter 11s (Confinement) and the Appendix Chapter 7s (Structural) are revised in response to RSI NP-9.3 to include and clearly demonstrate that structural analyses are being used as the primary means of verifying that canisters remain within the conditions evaluated in the safety analyses of their respective certification of compliance (CoC)/license upon receipt at the WCS CISF and, therefore, the canisters meet the conditions for storage at the facility. The revision will include calculation packages and associated input files.

SAR Impact:

No change as a result of this question.

1. General Description

RSI NP-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.

Response to RSI NP-1.2:

In a public meeting on November 22, 2016, WCS and the NRC staff discussed the need to make all references as specific and clear as possible. WCS and the NRC staff also discussed the difficulties in referencing information on storage systems licensed by different vendors that have distinct methods of structuring their respective FSARs.

WCS has already clarified and provided specific references for a number of WCS CISF SAR sections in the RSI responses that WCS submitted to the NRC in July, August, October, and November of 2016. For the examples cited in this RSI:

1. Step 21 in Section D.5.2.1, will be revised in Revision 1 of the WCS CISF SAR to reference Certificate of Compliance No. 9302.

2. General references for the dose rates given in Section D.9.2.1 are now addressed by adding specific references in Section D.9.2.2 (see the Response to RSI NP-12.6 herein). Section D.9.2.2 refers to Table T.5-2 of the Updated Final Safety Analysis Report for the Standardized NUHOMS® Horizontal Modular Storage System for Irradiated Nuclear Fuel for the HSM Model 102, and Table A.5-1 of NUHOMS®-MP197 Transportation Package Safety Analysis Report for the MP197HB.

As another example, the review of the WCS CISF SAR in preparation for Revision 1 will ensure that the SAR discusses the impact that information referenced for individual cask systems has in supporting the overall bases for facility safety parameters. For example, Section 9.4.2 of the WCS CISF SAR, “Dose to Workers,” will be revised to describe the cumulative doses to workers based on the total number and types of canisters being shipped. WCS CISF Appendices A through F will also be revised to reference specific sections of the appropriate FSARs from the different vendors where the doses for handling individual cask systems are discussed.

In providing more specific references, WCS has sought to address the fact that the formats for the FSARs referenced for AREVA and NAC have significant differences in style and organization.

Prior to submitting Revision 1 of the WCS CISF SAR, WCS will conduct a thorough review of information and analyses being incorporated by reference into the CISF SAR. The review will include changes to WCS CISF SAR sections made in response to RSIs, as well as WCS CISF SAR text that was not changed as a direct result of RSI responses. The review will ensure that references point to specific sections in the appendices and FSARs where the information is located. Additionally, the revised WCS CISF SAR will be reviewed to ensure that supporting information incorporated by reference has a clear relationship to the facility safety basis being discussed.

SAR Impact:

No changes as a result of this question.

2. Site Characteristics

RSI NP-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.

Original WCS Response and Impacts:

The response and impacts are included in the submittal letter dated July 20, 2016.

NRC Feedback:

In the NRC public meeting August 22, 2016 NRC stated that more detail was needed than just a statement that the flood will not compromise safety. NRC also stated they need calculations to support the statement that if the berms/ditches fail, the flood won't impact the CISF. WCS assumed a 1" rise but NRC was unsure if that is with the berms/ditches intact or if they failed. Please clarify this and provide the analysis in enough detail to see the assumptions.

Revised Response to RSI NP-2.3:

a. As noted previously, a stormwater collection ditch and berm are to be constructed up-gradient from the WCS CISF storage area. Figure 2-26 (CJI Drawing C-1) show the location of the Collection Ditch and Berm.

b. The ditch and berm are to be constructed as a matter of operational convenience to minimize (not prevent) run-on of stormwater during precipitation events by diverting it around the operational storage area. Figures 2-27 through 2-30 (CJI Drawings C-2, C-3, C-4 and C-5) show plan and profile of the collection ditch and berm.

c. There will be no adverse impact from the features on the design basis and Probably Maximum Flood.

d. WCS has revised WCS CISF SAR Attachment B, CISF Drainage Evaluation and Floodplain Analysis to reflect raising the storage pad elevation by approximately two feet and to perform the flood plain modeling analyses without considering the diversion ditch and berm, which increases the area of runoff contributing to the flood plain evaluation. The net result is that performing the hydrologic modeling without considering the ditch and berm resulted in no change to the flood elevation. By raising the storage pad area by approximately two feet, the storage pad area is completely above the probable maximum flood (PMF) elevation. The Flood Plain Analysis Report has been revised and calculations are included in Appendix E of the Report. The two structures are for operational convenience and will have no impact on safety structures at the proposed site. All safety structures are above the PMF elevation.

The WCS CISF SAR has been revised to reflect that the entire site is above the PMF elevation and is not in a floodplain.

WCS CISF new Figure 2-35, which shows a map of the developed drainage area, has been added to Chapter 2.

Previously submitted in response to RSI P-2.2 drawings 2-26 and 2-33 have been revised to reflect the edge of pad 5 to be raised to 3490 ft elevation to ensure the entire site is above the PMF elevation.

SAR Impact:

WCS CISF SAR Sections 2.4.2, 2.4.2.2, 3.3.1.3, 10.1.2, A.3.3.2, A.12.2.6, B.3.3.2, B.12.2.6, C.3.3.2, C.12.2.6, D.3.3.2, D.12.2.6, E.3.1.1.2, E.3.2.1.2, F.3.1.1.2, and G.3.1.1.2 have been revised as described in the response.

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

WCS CISF SAR Figures 2-26 and 2-33 have been revised as described in the response.

WCS CISF SAR Figure 2-35 has been added as described in the response.

WCS CISF SAR Chapter 2 Attachment B is completely replaced and revised as described in the response.

Changed SAR pages are provided in Enclosure 4 of this submittal.

4. SSC and Design Criteria

RSI NP-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, 8.3.4.4, 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,”
- 8.3.4.4, “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.

Response to RSI NP-4.1:

References to specific sections of the six FSARs applicable to each system, which are listed in Sections 1.6.1.2 and 1.6.2.2 of the WCS CISF SAR, address the following:

- The method of sealing,
- Requirements for redundant sealing,
- Canister maximum leakage rate criterion, and
- Dose rates for normal, off-normal, and accident conditions.

These references address all conditions of storage. Additional text is added to WCS CISF SAR Sections A.3.4.4, B.3.4.4, C.3.4.4, D.3.4.4, E.3.1.2.1, E.3.2.2.1, F.3.1.2.1, and G.3.1.2.1 to point to the bounding evaluations performed for each system to demonstrate that the confinement boundaries for the canisters do not exceed ASME Boiler and Pressure Vessel Code Subsection NB Article NB-3200 (Level A allowables) during NCT to provide reasonable assurance that the confinement boundary is not adversely impacted by transport to the WCS CISF. New NAC SAR references have been added to WCS CISF SAR Sections E.3.3, F.3.2, and G.3.2.

SAR Impact:

WCS CISF SAR Sections A.3.4.4, B.3.4.4, C.3.4.4, D.3.4.4, E.3.1.2.1, E.3.2.2.1, E.3.3, F.3.1.2.1, F.3.2, G.3.1.2.1 and G.3.2 have been revised as described in the response.

Changed SAR pages are provided in Enclosure 4 of this submittal.

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RSI NP-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).

Revised Response to RSI NP-4.2

Storage of GTCC will necessarily be portrayed differently for specific licensees. Storage of GTCC at Rancho Seco was approved in canisters referenced in Appendix A as part of its specific license. GTCC stored in canisters at other reactor sites such as those described in Appendices E, F, and G were approved under 10 CFR Part 30 as part of a 10 CFR Part 50 license. The regulatory requirements for general license and specific license approvals are different, but accomplish safety functions that the NRC requires.

<u>GTCC Waste Characterization</u>

Section 1.2.4 has been updated to clarify that the GTCC waste requested to be stored at the WCS CISF includes only reactor related low-level radioactive waste generated as a result of plant operation and decommissioning where the radionuclide concentration limits of 10 CFR 61.55 are exceeded. This waste may include such components as incore components, core support structures, and small reactor related miscellaneous parts resulting from the reactor vessel internals segmentation/decommissioning processes.

All waste stored within the various GTCC canisters will be in the physical form of activated metals that may have surface contamination. The GTCC canisters will not contain process wastes containing paper, plastics or ion exchange resins that could result in the generation of combustible gases or chemical or galvanic corrosion reactions with the canister. Proposed License Conditions 6-B and 7-B contain language limiting what type and physical form of GTCC waste is allowed for storage at the WCS CISF site.

The characterization of the GTCC waste stored in NAC storage systems at the WCS CISF is described in the associated transportation cask Safety Analysis Report (SAR) for each system. GTCC waste for Phase 1 of the project may come from Maine Yankee (GTCC-Canister-MY), Connecticut Yankee (GTCC-Canister-CY), Yankee Rowe (GTCC-Canister-YR), and Zion (GTCC-Canister-ZN).

Maine Yankee GTCC waste is stored in the NAC-UMS system and the GTCC canister (GTCC-Canister-MY) is authorized for shipment within the NAC-UMS transportation cask, NRC Docket No. 71-9270. The GTCC waste is described in proposed Materials License Conditions 6-B and 7-B, and specific pointers are provided for the isotopic contents of the GTCC canisters to the NAC-UMS transportation cask SAR in the WCS CISF SAR, Section 3.1 and 9.2.1.1. The characterization of the GTCC waste authorized for receipt at the WCS CISF can be found in the NAC-UMS transportation cask SAR, Section 1.3.1.1.2. The maximum quantity of GTCC waste allowed for transport in the GTCC-Canister-MY, and, therefore, the maximum per GTCC-Canister-MY to be received at the WCS CISF, is 20,000 pounds per GTCC-Canister-MY.

Connecticut Yankee and Yankee Rowe GTCC waste is stored in the NAC-MPC system and the GTCC canisters (GTCC-Canister-CY and GTCC-Canister-YR, respectively) is authorized for shipment within the NAC-STC transportation cask, NRC Docket No. 71-9235. The GTCC waste is described in proposed Materials License Conditions 6-B and 7-B, and specific pointers are provided for the isotopic contents of the GTCC canisters to the NAC-STC transportation cask SAR in the WCS CISF SAR, Section 3.1 and 9.2.1.1. The characterization of the GTCC waste authorized for receipt at the WCS CISF for both the GTCC-Canister-CY and GTCC-Canister-YR can be found in the NAC-STC transportation cask SAR, Section 1.2.3.2. The maximum quantity of GTCC waste allowed for transport, and, therefore, the maximum per canister to be received at the WCS CISF, is 18,743 pounds per GTCC-Canister-CY and 12,350 pounds per GTCC-Canister-YR.

Zion GTCC waste is stored in the NAC-MAGNASTOR system in a GTCC-Canister-ZN. The GTCC-Canister-ZN is intended for shipment within the NAC-MAGNATRAN transportation cask, NRC Docket No. 71-9356. The GTCC waste is described in proposed Materials License Conditions 6-B and 7-B, and specific pointers are provided for the isotopic contents of the GTCC canisters to the NAC-MAGNATRAN transportation cask SAR in the WCS CISF SAR, Section 3.1 and 9.2.1.1. The characterization of the GTCC waste authorized for receipt at the WCS CISF can be found in the NAC-MAGNATRAN transportation cask SAR, Section 1.3.2. The maximum quantity of GTCC waste allowed for transport, and, therefore, the maximum per GTCC-Canister-ZN to be received at the WCS CISF, is 55,000 pounds per GTCC-Canister-ZN.

GTCC Waste Canisters and Storage System Descriptions

Descriptions of the containers, including drawings and discussion of features in terms of the functions they perform (e.g., shielding, confinement), were added for the NUHOMS® MP187 System GTCC canister as part of the response the RSI NP 4.5. The drawings for the GTCC canister are included in Section A.4.6 and the descriptions are provided in Section A.4.2 and associated subsections. To provide more clarity related to the structural, thermal, shielding, and containment evaluations incorporated by reference into the WCS CISF SAR, specific pointers are added to the appropriate chapters in Appendix A to the specific sections of the Rancho Seco SAR, which is incorporated by reference into the WCS CISF SAR.

The license drawings for the GTCC-Canister-MY are 790-611 and 790-612, respectively. These license drawings can be found listed in the NAC-UMS transportation cask CoC and are located in the transportation cask SAR, which are now listed for incorporation by reference in WCS CISF SAR Section F.4.3. NAC has generated a WCS CISF site-specific license drawing showing the GTCC-Canister-MY system configuration. The new site-specific license drawing has been provided in the WCS CISF SAR as license drawing 30039-590 and has been added to WCS CISF SAR Section F.4.3.

The license drawings for the GTCC-Canister-CY are 414-887, 414-888, and 414-889. The license drawings for the GTCC-Canister-YR are 455-887 and 455-888. These license drawings can be found listed in the NAC-STC transportation cask CoC and are located in the transportation cask SAR, and are now listed for incorporation by reference into WCS CISF SAR Section E.4.4. NAC has generated WCS CISF site-specific license drawings showing the GTCC-Canister-CY and GTCC-Canister-YR system configurations. The new site-specific license drawings have been provided in the WCS CISF SAR as license drawings 30039-863 and 30039-862 for GTCC-Canister-CY and GTCC-Canister-YR, respectively, and have been added to WCS CISF SAR Section E.4.4.

The NAC-MAGNATRAN transportation cask is currently in the final stages of review and initial approval by the NRC. The license drawings for the GTCC-Canister-ZN are 71160-711, 71160-781, and 71160-785. These license drawings are located in the transportation cask SAR, and are now listed for incorporation by reference into WCS CISF SAR Section G.4.3. NAC has generated a WCS CISF site-specific license drawing showing the GTCC-Canister-ZN system configuration. The new site-specific license drawing is being provided in the WCS CISF SAR as license drawing 30039-591 for GTCC-Canister-ZN and is added in WCS CISF SAR Section G.4.3.

Materials License Conditions 6-B and 7-B have been modified to be consistent with the preceding discussion.

Specific limits for the total quantity of GTCC waste to be stored at the WCS CISF have been added as Materials License Condition 8-B (231.3 MT or 510,000 pounds) and to Sections 3.1 and 3.6.3 of the WCS CISF SAR.

Provision for GTCC waste in the Standardized Advanced NUHOMS® System, Standardized NUHOMS®-61BT System, and Standardized NUHOMS®-61BTH Type 1 System was removed from the WCS CISF application as part of the response to RSI NP-4.5.

WCS CISF SAR Chapter 1 Section 1, Chapter 3 Section 3, 3.1 and Chapter 15 Section 15.1.4 were revised for clarification.

Impact on the Proposed Materials License (from the October 7, 2016 submittal):

Materials License Conditions 6-B, 7-B, and 8-D have been updated as described in the response.

Impact on the WCS SAR (from the October 7, 2016 submittal):

SAR Sections 1.2.4, 3.1, 3.6.3, 3.8, 9.1.2, 9.1.3, 9.2.1.1, A.3.1, A.8, A.8.1, A.11, A.12, B.5, B.7.1, B.8, B.9.2.2, C.5, C.7, C.9.2.2, D.5, E.4, E.4.3, E.4.4, E.8, E.11, E.12, F.4, F.4.2, F.4.3, F.8, F.11, F.12, G.4, G.4.2, and G.4.3 have been revised as described in the response.

SAR Tables 1-1, 3-1, 4-1, 5-1, 7-2, 8-1, 9-4, 11-1, 12-2, and B.9-1 have been revised as described in the response.

SAR Drawings 30039-590, 30039-591, 30039-862, and 30039-863 have been added as described in the response.

Impacts on the WCS SAR (in this submittal):

SAR Sections 1, 3, 3.1, and 15.1.4 have been revised as described in the response.

Changed application/SAR pages are provided in Enclosure 4 of this submittal.

RSI NP-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.

Original WCS Response and Impacts:

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

NRC Feedback:

In the NRC public meeting on September 29, 2016, the NRC stated that descriptions and drawings of the facility needed additional equipment, schematics, and drawings. The requested information included providing more detail for cask transfer systems, loading and offloading equipment, carrying equipment, vertical cask transporter (VCT), wash down area, cranes, distance to the parking lots, distance to state line road, and the receiving area. The requested information also included resolving discrepancies that were noted for the Owner Controlled Area in Figure 1-1 when compared to Figures 1-2 and 1-3, and to resolve similar inconsistencies on Figure 1-2 when compared to Figures 9-1 and 9-2. This could impact dose and detectors.

Revised Response to RSI NP-4.3:

This response includes updated and new figures to provide information on the facility and equipment that will be used for operation of the WCS CISF.

WCS CISF SAR Figure 1-1 “WCS CISF Location” has been updated. Changes to the figure include the following:

- Existing WCS Facilities have been added to the figure for reference (LLRW Facilities, Byproduct Facility, Treatment Storage and Disposal Facility, Concrete Production Facility, Low Specific Activity Pad, and Sedimentation and Evaporation Ponds).
- Texas and New Mexico State Line has been added.
- Texas State Hwy 176 (New Mexico Hwy 234) has been added.
- The CISF Owner Controlled Area Fence and the Protected Area Fences have been labeled.
- Protected Area Isolation Zone has been indicated.
- Protected Area crushed rock surface has been called out.
- Parking area has been made consistent with other figures.
- References to a wash down area have been removed since there will be no wash down area at the WCS CISF.

WCS CISF SAR Figure 1-2 “WCS CISF Site Boundary Layout” also has been updated. Changes to the figure include the following:

- Additional dimensions shown from the Protected Area Boundary to the Owner Controlled Area fence.
- Dimension from the Owner Controlled Area fence to the parking lot and to State Line Road have been added.
- Area of the Owner Controlled Area and the Protected Area are shown.
- Additional Rail Side Track added adjacent to the Cask Handling Building to provide additional rail storage and flexibility shown.
- Receiving Area where rail cars and casks will have their visual inspection performed before entering the Protected Area is shown.
- Protected Area Isolation Zone indicated.
- Protected Area crushed rock surface called out.
- Parking area made consistent with other figures.
- References to a wash down area have been removed since there will be no wash down area at the WCS CISF.

WCS CISF SAR Figure 1-3 “WCS CISF Site Layout” has been updated. The figure name has been changed to “WCS CISF Site Overview.” Changes to the figure include the following:

- Additional dimensions have been added to show the distances from the storage area to the buildings.
- Receiving area has been indicated.
- Crushed rock surfaces have been called out.
- Protected Area Boundary Isolation Zone has been called out.
- References to a wash down area have been removed since there will be no wash down area at the WCS CISF.

WCS CISF SAR Figure 1-6 “WCS CISF Storage Pad Layout” has been updated. Changes to the figure include the following:

- HSM array for Millstone Model 102 has been changed from a 2 x 25 array to a 2 x 24 array.
- HSM array for SMUD Model 80 HSM has been changed from a 2 x 11 array to a 2 x 12 array.

In response to this RSI, additional figures showing operations equipment have been created. The following new equipment figures have been created and added to Chapter 4 of the WCS CISF SAR:

- A new section, Section 4.9, “Supplemental Data Drawings,” has been added to the WCS CISF SAR Chapter 4. In addition, Drawing WCS01-2100, “WCS Lift Beam Assembly,” has been added to this new section. The drawing shows the lift beam assembly used to lift and move the NUHOMS® transportation casks from the rail car to the transfer trailer.
- WCS CISF SAR Figure 4-1, “NUHOMS Transfer System,” is a new figure that has been added. The NUHOMS® transfer system includes a transfer trailer on which the cask alignment system and the cask support skid are mounted. The skid supports a hydraulic ram and a grapple that are used to push the canisters from the transfer cask into the HSM and to retrieve it. A hydraulic power unit drives the ram and grapple. The transfer system includes a wide distribution of the load over many tires. The transfer cask is carried at a height lower than the analyzed drop accident. The transport cask will be unloaded from the rail car and placed on the transfer trailer using an overhead building crane. The crane will not lift the cask above the analyzed drop height. The transfer trailer is pulled and maneuvered with a standard yard truck.
- WCS CISF SAR Figure 4-2, “Exploded View of Transfer Components,” is a new figure that has been added. It shows a view of the component parts of the transfer system.

- WCS CISF SAR Figure 4-3, “Assembled Transfer Trailer,” is a new figure that has been added. It shows an assembled transfer trailer. The support skid uses on-board hydraulics to align the transfer cask with the HSM just prior to inserting the canister into the HSM. The support skid positioning system (SPS) provides axial and transverse alignment. The transfer skid is the steel frame on which the transfer cask rests during transfer operations. Two transfer skids are required; one for the NUHOMS® MP197HB cask and one for the NUHOMS® MP187 cask.

  The SPS guide center module is mounted to the trailer frame and controls the position of the skid (and transfer cask) during alignment with the HSM. The lateral alignment of the transfer cask is accomplished with hydraulic cylinders mounted near the front and rear of the guide module. The axial movement to dock with the HSM opening is accomplished with a longitudinal cylinder. The hydraulic ram system (HRS) is also integrated with the transfer skid and consists of a double-acting three-stage hydraulic cylinder, with a grapple mounted on the end. It is used to push the canister into or pull it from the HSM. A hydraulic power unit separate from the transfer trailer drives the ram and grapple.

- WCS CISF SAR Figure 4-4, “Vertical Cask Transporter,” is a new figure that has been added. The vertical cask transporter is used to unload NAC Transport Casks from the rail car and move vertical concrete casks to the storage pads. Section 7.5.2 of the SAR provides additional Information about the VCT. The canister transfer will occur using the Canister Transfer System (CTS). The CTS is described in WCS CISF SAR Chapter 7 Section 7.5.1.

Associated text changes have been made to Section 4.2.1.1 as part of the addition of the WCS CISF SAR new Section 4.9 and Figures 4-1 through 4-4.

In response to this RSI, the following WCS CISF Chapter 9 changes have been made:

- WCS CISF SAR Figure 9-4 has been deleted. This information is shown in WCS CISF SAR Figure 1-7.
- WCS CISF SAR Figure 9-6, “WCS Shared Laboratory Locations,” is a new figure that has been added. This figure shows the location of two existing WCS Counting Laboratories and their relative location to the WCS CISF.
- WCS CISF SAR Figure 9-7, “Shared Laboratory Facilities,” is a new figure that has been added. This figure shows the building layout of the two existing WCS Counting Laboratories and general equipment in each lab.

The deletion of WCS CISF SAR Figure 9-4 has associated text changes made to WCS CISF Section 9.3.3.1. The addition of WCS CISF SAR Figures 9-6 and 9-7 has associated text changes made to WCS CISF SAR Section 9.5.2 in response to RSI NP-12.2.

Figures demonstrating the operation of the facility have been produced and have either revised figures or have been added as new figures to the WCS CISF SAR appendices. The following operational figures have been revised:

- WCS CISF Figure A.5-1, “NUHOMS®-MP187 System Operations,” has been revised. This process diagram shows the operational steps the FO-, FC- and FF-DSCs and greater than Class C (GTCC) canisters will go through from rail car to storage.

- WCS CISF SAR Figure B.5-1, "Standardized Advanced NUHOMS® System Loading Operations," has been revised. This process diagram shows the operational steps the 24PT1 DSCs will go through from rail car to storage.
- WCS CISF SAR Figure C.5-1, "Standardized NUHOMS®-61BT System Loading Operations," has been revised. This process diagram shows the operational steps the 61BT DSCs will go through from rail car to storage.
- WCS CISF SAR Figure D.5-1, "Standardized NUHOMS®-61BTH Type 1 System Loading Operations," has been revised. This process diagram shows the operational steps the 61BTH Type 1 DSCs will go through from rail car to storage.

The following operational figures have been added as new figures:

- WCS CISF SAR Figure E.5-1 (2 pages), "Canister Transfer Operation," is a new figure that has been added. The diagrams on these two pages show the operational steps the NAC canister will go through from rail car to storage.
- WCS CISF SAR Figure F.5-1 (2 pages), "Canister Transfer Operation," is a new figure that has been added. The diagrams on these two pages show the operational steps the NAC canister will go through from rail car to storage.
- WCS CISF SAR Figure G.5-1 (2 pages), "Canister Transfer Operation," is a new figure that has been added. The diagrams on these two pages show the operational steps the NAC canister will go through from rail car to storage.

The revision or addition of these operational figures has generated associated text revisions in Sections A.5.1.1, B.5.1.1, C.5.1.1, D.5.1.1, E.5, F.5, and G.5.

In addition to the attached figures, WCS will, as part of Revision 1 to the SAR, revise Chapters 3, 4, and 5 to provide additional details about the WCS CISF, including additional details on and/or clarify the following subject matter:

3. Principal design criteria for the facility
    - General operating functions (transportation and storage)
    - Structural and mechanical safety criteria
    - Safety protection systems
    - Classification of structures, systems, and components
    - Decommissioning considerations
    - Summary of design criteria

4. Installation design for buildings and other installed features of the facility
    - Location and layout, principal features, and boundaries
    - Storage structures
    - Auxiliary systems (ventilation, electrical, lighting, communications, etc.)
    - Decontamination systems
    - Shipping casks and associated components
    - Cathodic protection

- Spent fuel handling systems (Canister Handling Building and equipment)

5. Operations Systems
   - Operation description
   - Spent fuel handling systems
   - Other operating systems
   - Operation support systems
   - Control room and control areas
   - Analytical sampling

SAR Impact:

WCS CISF SAR Sections 4.2.1.1, 9.3.3.1, A.5.1.1, B.5.1.1, C.5.1.1, D.5.1.1, E.5, F.5, and G.5, and Figures 1-1 through 1-3, 1-6, A.5-1, B.5-1, C.5-1, and D.5-1 have been revised as described in the response.

WCS CISF SAR Section 4.9, Drawing WCS01-2100 (3 sheets), Figures 4-1 through 4-4, 9-6 and 9-7, E.5-1, F.5-1, and G.5-1 have been added as described in the response.

WCS CISF SAR Figure 9-4 has been deleted as described in the response.

Changed SAR pages are provided in Enclosure 4 of this submittal.

RSI NP-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 61 BTH 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 61 BTH 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).

Response to RSI NP-4.4:

For the NUHOMS® Systems the transportation casks are used to transport NUHOMS® canisters under 10 CFR Part 71 and are reconfigured at the WCS CISF as transfer casks for transfer operations under 10 CFR Part 72. For the NAC Vertical Systems, separate transfer casks are used as part of the Canister Transfer System described in the WCS CISF SAR.

<u>NUHOMS® MP187 cask</u>

The MP187 cask in its transportation configuration is used to transport the FO-, FC- and FF-DSCs; the NUHOMS® System GTCC canisters; and 24PT1 DSCs to the WCS CISF. Once the MP187 cask and its contents arrive at the site, it is reconfigured as a transfer cask for transfer operations at the WCS CISF. These operations are described in Section A.5.1.1 for the FO-, FC- and FF-DSCs and the NUHOMS® System GTCC canisters and Section B.5.1.1 for the 24PT1 DSCs.

The design criteria for the MP187 cask are incorporated by reference with specific pointers to the reference document and high level descriptions provided in WCS CISF SAR Sections A.3.1.4 and A.3.4.2 (for transfer of the FO-, FC- and FF-DSCs and the NUHOMS® System GTCC canisters) and Sections B.3.1.4 and B.3.4.2 (for transfer of the 24PT1 DSCs). All of this information is summarized in Table A.3-1 (for transfer of the FO-, FC- and FF-DSCs and the NUHOMS® System GTCC canisters) and Table B.3-1 (for transfer of the 24PT1 DSCs), which include a tabulation of the principle design criteria for the MP187 cask along with specific pointers to where the design criteria for the cask are documented, whether by incorporation by reference, or as evaluated within the WCS CISF SAR. (The tables were modified to include the pointers as part of the Response to RSI NP-5.2, which was sent as part of the August 31, 2016 submittal.)

Design drawings, including materials and dimension specifications, are incorporated by reference with specific pointers to the applicable drawings in the reference documents in WCS CISF SAR Section A.4.6. Section A.4.6 and the MP187 cask drawings are referenced, as appropriate, throughout Appendices A and B for the cask. Section A.4.6 and the drawings pointers were added as part of the Response to RSI NP-4.5 (sent as part of the August 31,2016 submittal), which requested drawings and descriptions of the shielding design for the overpacks, storage modules and canisters being proposed for use at the WCS CISF.

Dose rate analyses for the MP187 cask with its contents (FO-, FC- and FF-DSCs and the NUHOMS® System GTCC canisters) are incorporated by reference with pointers to the reference document in Section A.9. The occupational dose evaluations for placing a canister into storage or taking it out of storage for offsite transport are provided in WCS CISF SAR Section A.9.2 (the addition for taking the canister out of storage for offsite transport was added as part of the Response to RSI NP-12.6, which was sent as part of the July 20, 2016 submittal). Similarly the occupational dose evaluations for placing a 24PT1 DSC into storage or taking it out of storage for offsite transport are provided in WCS CISF SAR Section B.9.2. Section A.9.2.2 has been updated to incorporate these dose rates by reference with specific pointers to the appropriate tables and figures in the reference documents for the MP187 cask containing FO-, FC- and FF-DSCs and the NUHOMS® System GTCC canister. Section B.9.2.2 has been updated to incorporate these dose rates by reference with specific pointers to the appropriate tables and figures in the reference documents for the MP187 cask containing a 24PT1 DSC.

Each subsection of Chapters A.12 and B.12 for both off-normal and accident conditions incorporate by reference the applicable evaluations for the MP187 cask and its contents using specific pointers to the reference documents for each evaluation.

NUHOMS® MP197HB cask

Unlike the MP187 cask, the MP197HB cask was not previously licensed for transfer operations under 10 CFR Part 72; therefore, the WCS CISF SAR provides the required evaluations for the MP197HB cask to qualify it for transfer operations for both the 61BT and 61BTH Type 1 DSCs. In general, a bounding evaluation is performed for both the 61BT and 61BTH Type 1 DSCs such that the evaluation, which is included in Appendix C and Appendix D points to Appendix C for the actual evaluation details.

The MP197HB cask in its transportation configuration is used to transport 61BT and 61BTH Type 1 DSCs to the WCS CISF. Once the MP197HB cask and its contents arrive at the site, it is reconfigured as a transfer cask for transfer operations at the WCS CISF. These operations are described in Section C.5.1.1 for the 61BT DSCs and Section D.5.1.1 for the 61BTH Type 1 DSCs.

The design criteria for the MP197HB cask are incorporated by reference with specific pointers to the reference document and high level descriptions provided in WCS CISF SAR Sections C.3.1.4 and C.3.4.2 (for transfer of the 61BT DSCs) and Sections D.3.1.4 and D.3.4.2 (for transfer of the 61BTH Type 1 DSCs). In addition, for the site-specific natural phenomena listed in Section C.3.3 (and subsections), pointers are provided to the locations in Chapter C.7 for the structural evaluations of the MP197HB cask. All of this information is summarized in Table C.3-1 (for transfer of the 61BT DSCs) and Table D.3-1 (for transfer of the 61BTH Type 1 DSCs), which include a tabulation of the principle design criteria for the MP197HB cask along with specific pointers to where the design criteria for the cask are documented, whether by incorporation by reference, or as evaluated within the WCS CISF SAR. (The tables were modified to include the pointers as part of the Response to RSI NP-5.2, which was sent as part of the August 31, 2016 submittal.)

Design drawings, including materials and dimension specifications, are incorporated by reference with specific pointers to the applicable drawings in the reference documents in WCS CISF SAR Section C.4.6. Section C.4.6 and the MP197HB cask drawings are referenced, as appropriate, throughout Appendices C and D for the cask. Section C.4.6 and the drawings pointers were added as part of the Response to RSI NP-4.5 (sent as part of the August 31, 2016 submittal), which, as noted before, requested drawings and descriptions of the shielding design for the overpacks, storage modules and canisters being proposed for use at the WCS CISF.

Dose rate analyses for the MP197HB cask with its contents (61BT and 61BTH Type 1 DSCs) are documented as part of the occupational dose evaluations for placing a canister into storage, or taking it out of storage for offsite transport, are provided in WCS CISF SAR Sections C.9.2 and D.9.2 (the addition for taking the canister out of storage for offsite transport was added as part of the Response to RSI NP-12.6, which was sent as part of the July 30, 2016 submittal). As discussed in Section C.9.2 and Table C.9-1, the surface dose rates for the MP197HB cask with the 61BT DSC in the transportation configuration are bounded by those presented in the MP197HB transport SAR (loaded with a 69BTH DSC) and in the transfer configuration bounded by the OS200 cask containing a 69BTH DSC as documented in the Standardized NUHOMS® FSAR. Section C.9.2.2 has been updated to incorporate these dose rates by reference with specific pointers to the appropriate tables and figures in the reference documents. Similarly, as discussed in Section D.9.2 and Table D.9-1, the surface dose rates for the MP197HB cask with the 61BTH Type 1 DSC in the transportation configuration are also bounded by those presented in the MP197HB transport SAR (loaded with a 69BTH DSC) and in the transfer configuration bounded by the OS200 cask containing a 69BTH DSC, as documented in the Standardized NUHOMS® FSAR. Section D.9.2.2 has been updated to incorporate these dose rates, by reference, with specific pointers to the appropriate tables and figures in the reference documents for the MP197HB cask containing a 61BTH Type 1 DSC.

Each subsection of chapters C.12 and D.12 for both off-normal and accident conditions point to the applicable evaluations for the MP197HB cask and its contents using specific pointers to the applicable sections in C.7 and D.7 for each evaluation.

NAC-MPC Storage System

The NAC-MPC transfer cask is used for the vertical transfer of the NAC-MPC System canisters between the transport cask and the storage overpack or the storage overpack back to the transport cask. The transfer cask is a component of the Canister Transfer System housed in the Cask Handling Building. The Canister Transfer System is described in Sections 1.3.1.2, 4.1.2.4 and 7.5.1 of the WCS CISF SAR.

The design criteria for the NAC-MPC cask are incorporated by reference with specific pointers to the reference document and high level descriptions provided in WCS CISF SAR Sections E.4.1.3, E.4.1.4.3, E.7.1.1 and E.7.1.6 (for transfer of Yankee-MPC, or CY-MPC) and Sections E.4.2.3, E.4.2.4.3, E.7.2.1 and E.7.2.6 (for transfer of MPC-LACBWR). Additionally, the GTCC waste canisters, GTCC-Canister-YR and GTCC-Canister-CY, are transferred using the NAC-MPC transfer cask. The design criteria for the GTCC waste canisters are described in the NAC-STC SAR, Section 2.1. This information is summarized in Table E.3-1, which includes a tabulation of the principle design criteria for the NAC-MPC cask along with specific pointers to where the design criteria for the cask are documented, whether by incorporation by reference, or as evaluated within the WCS CISF SAR. Table E.3-1 was added, with the pointers, as part of the Response to RSI NP-10.3, which was sent as part of the August 31, 2016 submittal, and provided as information only in the revised response to RSI NP-5.2, which was sent as part of the November 16, 2016 submittal.

Design drawings, including materials and dimension specifications, are incorporated by reference with specific pointers to the applicable drawings in the reference documents in WCS CISF SAR Section E.4.4. Section E.4.4 and the NAC-MPC cask drawings are referenced, as appropriate, throughout Appendix E for the cask. Section E.4.4 and the drawings pointers were added as part of the Response to RSI NP-4.2 (sent as part of the October 7, 2016 submittal), which requested a characterization of the GTCC waste proposed for storage at the WCS CISF, and RSI NP-4.5 (sent as part of the August 31, 2016 submittal), which requested drawings and descriptions of the shielding design for the overpacks, storage modules, and canisters proposed for use at the WCS CISF.

Dose rate analyses for the NAC-MPC cask with Yankee-MPC, CY-MPC, or MPC-LACBWR are incorporated by reference with pointers to the reference document in Section E.9.1. The occupational dose evaluations for placing a canister into storage or taking it out of storage for offsite transport are provided in WCS CISF SAR Table E.9-1. The addition for taking the canister out of storage for offsite transport has been added as part of the Response to RSI NP-12.6. Additionally, the GTCC waste canisters, GTCC-Canister-YR and GTCC-Canister-CY, are transferred using the NAC-MPC transfer cask. Dose rate analyses for the GTCC waste canisters are described in the NAC-STC SAR, Section 5.1.2.2 for GTCC-Canister-YR and Section 5.1.2.3 for GTCC-Canister-CY. The occupational dose limits for the GTCC waste canisters are bounded by the design basis directly loaded fuel evaluations, which is described in NAC-STC SAR, Section 5.0. Therefore the information presented in WCS CISF SAR Table E.9-1 bounds the occupational dose rates for GTCC waste canisters.

The off-normal and accident conditions, discussed in Chapter E.12.1 (for Yankee-MPC, CY-MPC) and E.12.2 (for MPC-LACBWR), incorporate by reference the applicable evaluations for the NAC-UMS transfer cask and its contents using specific pointers to the reference documents for each evaluation.

NAC-UMS Storage System

The NAC-UMS transfer cask is used for the vertical transfer of the NAC-UMS System canisters between the transport cask and the storage overpack or the storage overpack back to the transport cask. The transfer cask is a component of the Canister Transfer System housed in the Cask Handling Building. The Canister Transfer System is described in Sections 1.3.1.2, 4.1.2.4 and 7.5.1 of the WCS CISF SAR.

The design criteria for the NAC-UMS cask are incorporated by reference with specific pointers to the reference document and high level descriptions provided in WCS CISF SAR Sections F.4.1.3, F.4.1.4.1, F.4.1.4.3 and F.7.1.6 (for transfer of TSCs). Additionally, GTCC waste canisters and GTCC-Canister-MY are transferred using the NAC-UMS transfer cask. The design criteria for the GTCC waste canisters are described in the NAC-UMS Transportation SAR, Section 2.1. This information is summarized in Table F.3-1, which includes a tabulation of the principle design criteria for the NAC-UMS cask along with specific pointers to where the design criteria for the cask are documented, whether by incorporation by reference, or as evaluated within the WCS CISF SAR. Table F.3-1 was added, with the pointers, as part of the Response to RSI NP-10.3 (sent as part of the August 31, 2016 submittal) and provided as information only in the revised response to RSI NP-5.2 (sent as part of the November 16, 2016 submittal), as described in the NAC-UMS SAR. The NAC-UMS transfer cask can be provided in either a Standard or Advanced configuration. The standard transfer cask may be used to lift canisters weighing up to 88,000 pounds, while the advanced transfer cask incorporates a trunnion support plate allowing it to lift canisters weighing up to 98,000 pounds. The transfer cask configurations are designed to handle one of three classes of PWR fuel assemblies. In addition, a Transfer Cask Extension may be used to extend the operational height, when using the standard transfer cask.

Design drawings, including materials and dimension specifications, are incorporated by reference with specific pointers to the applicable drawings in the reference documents in WCS CISF SAR Section F.4.3. Section F.4.3 and the NAC-UMS cask drawings are referenced, as appropriate, throughout Appendix F for the cask. Section F.4.3 and the drawings pointers were added as part of the Response to RSI NP-4.2 (sent as part of the October 7, 2016 submittal), which requested a characterization of the GTCC waste proposed for storage at the WCS CISF, and RSI NP-4.5, which requested drawings and descriptions of the shielding design for the overpacks, storage modules, and canisters proposed for use at the WCS CISF.

Dose rate analyses for the NAC-UMS cask with its contents (for transfer of TSCs) are incorporated by reference with pointers to the reference document in Section F.9.1. The occupational dose evaluations for placing a canister into storage or taking it out of storage for offsite transport are provided in WCS CISF SAR Table F.9-1. The addition for taking the canister out of storage for offsite transport was added as part of the Response to RSI NP-12.6, which was sent as part of the July 20, 2016 submittal. Additionally, GTCC waste canisters and GTCC-Canister-MY are transferred using the NAC-UMS transfer cask. Dose rate analyses for the GTCC waste canisters are described in the NAC-UMS Transportation SAR, Section 5.5.1.2 for GTCC-Canister-MY. The occupational dose limits for the GTCC waste canisters are bounded by the design basis spent fuel, which is described in NAC-UMS Transport SAR, Section 5.0. Therefore, the information presented in WCS CISF SAR Table F.9-1 bounds the occupational dose rates for GTCC waste canisters.

The off-normal and accident conditions, discussed in Section F.12.1 incorporate by reference the applicable evaluations for the NAC-UMS transfer cask and its contents using specific pointers to the reference documents for each evaluation.

NAC-MAGNASTOR Storage System

The NAC-MAGNASTOR transfer cask is used for the vertical transfer of the NAC-MAGNASTOR System canister between the transport cask and the storage overpack or the storage overpack back to the transport cask. The transfer cask is a component of the Canister Transfer System housed in the Cask Handling Building. The Canister Transfer System is described in Sections 1.3.1.2, 4.1.2.4 and 7.5.1 of the WCS CISF SAR.

The design criteria for the NAC-MAGNASTOR cask are incorporated by reference with specific pointers to the reference document and high level descriptions provided in WCS CISF SAR Sections G.4.1.4, G.7.1.1 and G.7.1.6 (for the transfer of TSCs). Transfer casks are designed with either carbon steel shells (MTC1) or stainless steel shells (MTC2). Additionally, GTCC waste canisters, GTCC-Canister-ZN, are transferred using the NAC- MAGNASTOR transfer cask. The design criteria for the GTCC waste canisters are described in the NAC-MAGNATRAN SAR, Section 2.1.2. This information is summarized in Table G.3-1, which includes a tabulation of the principle design criteria for the NAC-MAGNASTOR cask along with specific pointers to where the design criteria for the cask are documented, whether by incorporation by reference, or as evaluated within the WCS CISF SAR. Table G.3-1 was added, with the pointers, in response to RSI NP-10.3 (sent as part of the August 31, 2016 submittal) and provided as information only in the revised response to RSI NP-5.2 (sent as part of the November 16, 2016 submittal).

Design drawings, including materials and dimension specifications, are incorporated by reference with specific pointers to the applicable drawings in the reference documents in WCS CISF SAR Section G.4.3. Section G.4.3 and the NAC-MAGNASTOR cask drawings are referenced, as appropriate, throughout Appendix G for the cask. Section G.4.3 and the drawings pointers were added as part of the Response to RSI NP-4.2 (sent as part of the October 7, 2016 submittal), which requested a characterization of the GTCC waste proposed for storage at the WCS CISF, and RSI NP-4.5 (sent as part of the August 31, 2016 submittal), which requested drawings and descriptions of the shielding design for the overpacks, storage modules, and canisters proposed for use at the WCS CISF.

Dose rate analyses for the NAC-MAGNASTOR cask with its contents are incorporated by reference with pointers to the reference document in Section G.9.1.1. The occupational dose evaluations for placing a canister into storage or taking it out of storage for offsite transport are provided in WCS CISF SAR Table G.9-1. The addition for taking the canister out of storage for offsite transport has been added as part of the Response to RSI NP-12.6. Additionally, GTCC waste canisters, GTCC-Canister-ZN, are transferred using the NAC-MAGNASTOR transfer cask. Dose rate analyses for the GTCC waste are described in the NAC-MAGNATRAN SAR, Section 5.8.11 for GTCC-Canister-ZN. The occupational dose limits for the GTCC waste canisters are bounded by the design basis directly loaded fuel evaluations, which are described in NAC-MAGNATRAN SAR, Section 5.8.11. Therefore the information presented in WCS CISF SAR Table G.9-1 bounds the occupational dose rates for GTCC waste canisters.

The off-normal and accident conditions, discussed in Chapter G.12.1 incorporate by reference the applicable evaluations for the NAC-MAGNASTOR transfer cask and its contents using specific pointers to the reference documents for each evaluation.

SAR Impact:

WCS CISF SAR Sections A.9.2.2, B.9.2.2, C.9.2.2 and D.9.2.2 have been revised as described in the response.

Changed SAR pages are provided in Enclosure 4 of this submittal.

6. Thermal

RSI NP-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 NU HOMS, 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.

Original WCS response and Impacts:

The response and impacts are included in the submittal letter dated August 31, 2016. WCS CISF SAR Table 1-2, Section 2.3.2.1, and the WCS CISF SAR Appendices were updated to incorporate additional temperature values. WCS CISF SAR Section 8.4 was revised to address potential effects of cask spacing, wind speed and elevation. WCS CISF SAR Table 8-2 was added to compare the temperature values for the WCS site with the normal, off-normal, and accident temperature for the cask systems.

NRC Feedback:

During the NRC public teleconference on September 29, 2016, the NRC staff stated for the responses to RSI NP-6.1 and RSI NP-6.3 that normal and ambient temperatures were not clear and are close to bounding for some of the systems. Temperatures at the boundary may be different than in the middle of the array as the array will provide some heat. WCS needs to clarify the responses and how they are presented in the application.

Revised Response to RSI NP-6.1:

The NRC feedback and the revised WCS response are the same as is shown in the Response to RSI NP-6.3 herein.

SAR Impact:

No change as a result of this question.

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 the 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.

Second WCS response and Impacts:

The second response and impacts are included in the submittal letter dated November 16, 2016, and provided justification for use of an accident scenario using the blockage of air inlets and outlets to analyze adiabatic heat up consistent with the guidance given to NRC reviewers in NUREG 1567.

Response to RSI NP-6.2:

Section 12.2.3 has been added to the WCS CISF SAR to include additional justification to that provided in the second response to this RSI.

WCS CISF SAR Chapter 12 Section 12.2 has been revised to cite new Section 12.2.3.

WCS CISF SAR Chapter 12 Section 12.3 has been revised to add reference to NUREG-1567 and NUREG-1536.

SAR Impact:

WCS CISF SAR Sections 12.2 and 12.3 has been revised as described in the response.

WCS CISF SAR Section 12.2.3 has been added as described in the response.

Changed SAR pages are provided in Enclosure 4 of this submittal.

RSI NP-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.

Original WCS response and Impacts:

The response and impacts are included in the submittal letter dated August 31, 2016. WCS CISF SAR Table 1-2, Section 2.3.2.1, and the WCS CISF SAR Appendices were updated to incorporate additional temperature values. WCS CISF SAR Section 8.4 was revised to address potential effects of cask spacing, wind speed and elevation. WCS CISF SAR Table 8-2 was added to compare the temperature values for the WCS site with the normal, off-normal, and accident temperature for the cask systems.

NRC Feedback:

During the NRC public teleconference on September 29, 2016, the NRC staff stated for the responses to RSI NP-6.1 and RSI NP-6.3 that normal and ambient temperatures are not clear and are close to bounding for some of the systems. Temperatures at the boundary may be different than in the middle of the array since the array will provide some heat. WCS needs to clarify the responses and how they are presented in the application.

Additional Response to RSI NP-6.3:

Section 2.3.3.1 has been revised to provide additional detail on how normal, off normal and extreme temperature were derived for the WCS CISF site. The derived temperatures are based on measurements taken in Andrews, TX from 1962 - 2010 and in Midland, TX from 2000-2015. The normal, off-normal and extreme temperatures listed in Table 1-2 that are applicable to the WCS CISF are derived to provide the temperatures in the form required to support the differing methods of evaluation employed by the vendors systems.

The balance of the WCS CISF SAR was updated to be consistent with the updated data provided in Table 1-2.

Normal Ambient Temperatures

WCS CISF SAR Table 8-2 presents a summary of the maximum temperatures for normal conditions at the WCS site and those used in the thermal evaluation of NUHOMS® systems. Table 8-2 shows that the maximum normal ambient temperature of 81.5°F at the WCS CISF is significantly lower than the normal ambient temperatures listed for the different NUHOMS® systems. Additionally, as noted in response to RSI NP-6.3, the thermal evaluation in WCS CISF SAR Appendices A.8, C.8 and D.8 are based on the maximum ambient temperatures listed in Table 8-2 without any averaging. For the thermal evaluation in Appendix B.8, a 24-hour daily average ambient temperature of 97°F corresponding to a daily maximum ambient temperature of 104°F is utilized in the analyses.

Table RSI NP-6.3-1 summarizes the margins in the normal ambient temperature at the WCS CISF compared to the design basis temperature used for the various NUHOMS® systems.

RSI NP-6.3-1
Ambient Temperature Margins for NUHOMS® Systems

	Normal Ambient Temperature (°F)		
	WCS CISF	**Design Basis**	**Margin to Ambient at WCS CISF (°F)**
Appendix A.8	81.5	101	19.5
Appendix B.8	81.5	97(1)	15.5
Appendix C.8	81.5	100	18.5
Appendix D.8	81.5	100	18.5

Note 1: A 24-hour daily average ambient temperature of 97°F corresponding to a daily maximum ambient temperature of 104°F is utilized in the analyses.

In any instance, the maximum normal ambient temperatures utilized in the thermal evaluation of the NUHOMS® systems have significant margin to the normal ambient temperature of 81.5°F for the WCS CISF as seen from the table.

Temperature in the Array

WCS CISF SAR Figure 1-6 presents the layout of the various storage modules at the WCS site. As shown in the layout, the NUHOMS® systems are located in a back-to-back array with significant open area in the front of the HSMs. Furthermore, due to the large stack height of the HSMs, the inlet and outlet vents are separated by a large distance. Due to the large separation in the HSM between the inlet and outlet vents, there is no potential for the hot air exiting the module to intermix with the colder air at the inlets.

In addition, since the HSMs are located side-by-side (and also back-to-back), the worst case for the maximum temperatures occurs when DSCs with the maximum decay heat load are stored in adjacent HSMs. To evaluate this worst case, adiabatic boundary conditions are applied over the outer surfaces of the HSM side and back walls (to bound for back-to-back and single-row HSM arrays). Therefore, there is no impact on the length of the array.

Based on this and the large margins to the normal ambient temperatures considered in the thermal evaluation, the thermal evaluations presented in the respective UFSARs for the various NUHOMS® systems remain bounding.

SAR Impact:

WCS CISF SAR Sections 2.3.3.1, 3.3.2.1, 12.1, A.7.6, A.7.6.1, A.7.6.2, A.8.3.1, B.7.6, B.7.6.1, B.8.4.1, C.8.4.1, C.8.5.2, D.8.4.1, D.8.5.2, E.8.1.2, E.8.1.3, F.8.1.2, F.8.1.3, G.8.1.2 and G.8.1.3 have been revised as described in the response.

WCS CISF SAR Tables 1-2, 8-2, A.3-1, B.3-1, C.3-1, D.3-1, E.3-1, F.3-1, and G.3-1 have been revised as described in the response.

WCS CISF SAR Table 2-13 has been added as described in the response.

Changed SAR pages are provided in Enclosure 4 of this submittal.

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.

Revised 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, Tables 9-5 and 9-6 have been revised to remove reference to Phases 2 – 8. The figure shows 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.

WCS CISF SAR Section 9.4.1, Table 9-6 and Figure 9-1 were revised for clarification.

Application/SAR Impact (from the November 16, 2016 submittal):

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.

Impacts on SAR (in this submittal)

WCS CISF SAR Sections 9.4.1, Table 9-6 and Figure 9-1 have been revised as described in the response.

Changed SAR pages are provided in Enclosure 4 of this submittal.

RSI NP-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.

Original WCS response and Impacts:

The response and impacts are included in the submittal letter dated July 20, 2016. Calculation Packages and computer files were provided.

NRC Feedback:

In the NRC public meeting on August 22, 2016 the NRC staff stated that if any changes are made when addressing RSI NP-7.1, then WCS will need to revisit RSI NP-7.2 and provide any necessary updates to the calculation packages.

Revised Response to RSI NP-7.2:

The shielding calculations provided to the NRC in response to RSI NP-7.2 were not changed in order to support the revised response to RSI NP-7.1 and no new calculations were performed. Therefore, no updated calculation packages need to be submitted to the NRC at this time for RSI NP-7.2.

SAR Impact:

No change as a result of this question.

9. Confinement

RSI NP-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®-61 BT System," and
- D.11, "CONFINEMENT EVALUATION Standardized NUHOMS®-61 BTH Type 1 System."

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

Response to RSI NP-9.3:

Chapter 11 and the Chapter 11 appendices have been revised in response to this RSI to address the impact of normal condition of transport (NCT) on the canister confinement boundaries. The Chapter 11 appendices point to the Chapter 7 appendices (structural) where sections were added where the bounding evaluations are documented for each system to demonstrate that the confinement boundaries for the canisters do not exceed ASME Boiler and Pressure Vessel Subsection NB Article NB-3200 (Level A allowables) during NCT. This provides reasonable assurance that the confinement boundary is not adversely impacted by transport to the WCS CISF and combined with the confinement boundary structural and confinement evaluations for storage conditions that are already included in the WCS CISF SAR remain valid even after transport to the WCS CISF.

Finally, as part of the response to RSI NP-4.1, Sections A.3.4.4, B.3.4.4, C.3.4.4, D.4.4.4, E.3.1.2.1, E.3.2.2.1, F.3.1.2.1 and G.3.1.2.1 were updated to provide reference to the specific sections of the FSARs applicable to each system for the protection of stored material from degradation under all conditions of storage and NCT evaluations included in this RSI response.

SAR Impact:

WCS CISF SAR Sections 11, 11.3, 11.5, A.7, A.7.1, A.7.8, A.7.9, A.11.1, B.7, B.7.1, B.7.7, B.11.1, C.7, C.7.1, C.11.1, D.7, D.7.1, D.11.1, E.7.1, E.7.2, E.7.3, E.11.1.1, E.11.2.1, F.7.1, F.7.2, F.11.1.1, G.7.1, G.7.2 and G.11.1.1 have been revised as described in the response.

WCS CISF SAR Sections A.7.7, A.7.7.1, A.7.7.1.1, A.7.7.1.2, A.7.7.1.3, A.7.7.1.4, A.7.7.1.5, A.7.7.1.5.1, A.7.7.1.5.1.1, A.7.7.1.5.1.2, A.7.7.1.5.2, A.7.7.1.5.3, A.7.7.1.5.4, A.7.7.1.6, A.7.7.2, A.7.7.2.1, A.7.7.2.2, A.7.7.2.3, A.7.7.2.4, A.7.7.2.5, A.7.7.2.5.1, A.7.7.2.5.1.1, A.7.7.2.5.1.2, A.7.7.2.5.2, A.7.7.2.5.3, A.7.7.2.5.4, A.7.7.2.6, B.7.9, C.7.8, D.7.8, E.7.1.11, E.7.2.11, F.7.1.11, and G.7.1.9 have been added as described in the response.

WCS CISF SAR Tables A.7-3 through A.7-13 have been added as described in the response.

WCS CISF SAR Figures A.7-7 through A.7-12 have been added as described in the response.

Changed SAR pages are provided in Enclosure 4 of this submittal.

RSI NP-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 72.106.72.106.

Original WCS response and Impacts:

The response and impacts are included in the submittal letter dated July 20, 2016. The MP187 cask can be configured as either a transfer cask for transfer operations in accordance with 10 CFR Part 72 or a transportation cask in accordance with 10 CFR Part 71.

Under the requested license for the WCS CISF, once the MP187 cask is received at the CISF site following transport, the cask will be reconfigured for transfer operations for which the canisters rather than the cask provide confinement.

NRC Feedback:

In the NRC public meeting on August 22, 2016 the NRC requested that WCS provide details that show the FO-, FC-, and FF- DSCs provide confinement after being transported to the WCS CISF.

Revised Response to RSI NP-9.8:

The MP187 cask can be configured as either a transfer cask for transfer operations in accordance with 10 CFR Part 72 or a transportation cask in accordance with 10 CFR Part 71.

Under the requested license for the WCS CISF, once the MP187 cask is received at the CISF site following transport, the cask will be reconfigured for transfer operations for which the canisters rather than the cask provide confinement.

In response to RSI NP-9.3, WCS has added evaluations for the confinement boundary of each canister type authorized for storage at the WCS CISF, including those authorized in the NUHOMS® -MP187 transport cask, to demonstrate that loads during normal conditions of transport do not exceed ASME Boiler and Pressure Vessel Code Subsection NB Article NB-3200 (Level A allowables). This is to ensure that the confinement boundary of the canisters is not adversely impacted during transport to the WCS CISF. The WCS CISF SAR Chapter A.11 has also been updated as part of the Response to RSI NP-9.3 to include these Normal Conditions of Transport evaluations of the confinement boundary as part of the licensing basis, and to reference the sections in the WCS CISF SAR where these evaluations are documented. Therefore, the WCS CISF SAR now includes evaluations for the conditions that the canister confinement boundary will experience during transportation.

SAR Impact:

No change as a result of this question.

10. Materials

RSI NP-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).

Original WCS Response and Impacts:

The response and impacts are included in the submittal letter dated August 31, 2016. WCS revised section 1.3.1.5 and added a new section to chapter 3 of the WCS CISF SAR.

NRC Feedback:

In the NRC public teleconference on September 29, 2016, NRC requested additional details regarding any, if needed, off-normal recovery.

Revised Response to RSI NP-10.1:

As discussed during the public meeting on November 22, 2016, WCS is deleting Chapter 1 Section 1.3.1.5 and Chapter 3 Section 3.3.7.1 of the WCS CISF SAR. WCS is replacing the previous Response to RSI NP-10.1 with the following information:

- Initial confinement is demonstrated as a condition of loading a canister with either spent nuclear fuel (SNF) or GTCC into the storage configuration prior to shipment to WCS;
- Confinement is confirmed after shipment to WCS by showing that loads during NCT do not exceed Class A Service Levels in ASME Boiler and Pressure Vessel Code; and
- Post shipment leak test of accessible portions of confinement boundary will be performed as a prudent measure.

Most importantly, confinement is provided by a welded canister shell and redundant closures. Fuel cladding integrity is ensured by maintaining the storage cladding temperatures below levels that are known to cause degradation of the cladding.

The SNF is stored in an inert helium atmosphere to prevent degradation of the cladding, specifically of cladding rupture due to oxidation and its resulting volumetric expansion of the SNF.

Normal transportation stresses are below ASME Boiler and Pressure Vessel Code Service Levels A, B, C, and D. Canister confinement boundaries (shell and closure) are designed and fabricated to the maximum practicable extent as a Class I component in accordance with the rules of the ASME Boiler and Pressure Vessel Code, Section III, Subsection NB, Article NB-3200.

Each canister design includes a set of approved Code Alternatives that vary somewhat between the various canister designs. Confinement boundaries and code alternatives are incorporated by reference into the WCS CISF SAR.

Normal conditions of transport are defined in 10 CFR Part 71 and 49 CFR Part 173. NCT include vibration and a one-foot drop, which are bounding conditions for the WCS analyses. Loads from NCT must not exceed ASME Boiler and Pressure Vessel Code Service Level A to verify confinement remains intact.

All of the transportation casks, except the NUHOMS®-MP187 Cask, that would be authorized to transport canisters to the WCS CISF (See Table 1-1 of WCS CISF SAR for the list), include evaluations of the canister shells (Part 72 Confinement Boundary) that demonstrate that the maximum stresses during NCT remain below Level A allowable conditions. These evaluations are incorporated by reference from the Part 71 SARs into the WCS CISF SAR.

For the canisters to be transported to the WCS CISF in the NUHOMS®-MP187 Cask, FO-, FC-, FF-DSCs and the 24PT1 DSC, evaluations (calculations) are added to the WCS CISF SAR.

Section A.2.6.15.2 of the MP197HB Revision 17 SAR for NCT, demonstrates that both 61BT and 61BTH Type 1 DSCs maintain structural integrity (including at the weldments) of confinement boundary components. The basis for allowable stresses is ASME Subsection Article NB-3200 for NCT (Level A) loads. Section A.2.13.7 MP197HB DSC, (Shell Assembly) Structural Evaluation, summarizes the calculations performed to qualify the canister shells.

New analyses for canisters transported via the NUHOMS®-MP187 cask are included in Sections A.7 and B.7 of the WCS CISF SAR, which were added in response to RSI NP-9.3. Finite Element Models (FEMs) are used for analyzing the DSCs with enveloping dimensions and loads. One model is for the FO-DSC and 24PTH1 DSC, and one model is for the FC- and FO-DSCs. The DSC shell assembly is analyzed for the postulated load conditions using three-dimensional (3-D) 180° half-symmetric FEMs.

Finally, prior to acceptance at the site, WCS will undertake prudent measures to ensure that the confinement analysis calculations remain representative of the canister configurations. A post-transportation evacuated volume helium leak test on each transportation cask received will be performed to demonstrate that the accessible portions of the canister confinement boundary remain intact following shipment. Those measures will include the following parameters:

- Helium leak testing shall comply with ANSI N 14.5 – 1997.
- Varian Vacuum Products, Model VSMR151, VSMD30 Mass Spectrometer Leak Detector (MSLD), or equal, having a sensitivity of at least $1x10^{-9}$ atm cm^3/sec He.

- Leak Standard: Shall be calibrated permeation type leak through fused glass or quartz. The standard shall have a helium leakage rate in the range of $1x10^{-7}$ to $1x10^{-10}$ atm cm^3/sec He.
- The composition of the helium gas shall be certified.
- The Helium Leak Rate Test is acceptable when the corrected actual leakage rate is equal to or less than $1x10^{-7}$ atm cm^3/sec He.

SAR Impact:

WCS CISF SAR Sections 1.3.1.5 and 3.3.7.1 have been deleted as described in the response.

Changed SAR pages are provided in Enclosure 4 of this submittal.

RSI NP-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)

Original WCS Response and Impacts:

The response and impacts are included in the submittal letter dated July 20, 2016. WCS CISF SAR Section 4.1.2.11 was revised.

NRC Feedback:

In the NRC public meeting on August 22, 2016, the NRC staff stated that it was looking for more detail about specific location in the cask handling building (e.g., an “X” on the floor – see NUREG 1567 Section 3.4.2 and Regulatory Guide 3.48 Section 5.2), special handling techniques (see NUREG 1567 Section 3.4.2 and Regulatory Guide 3.48 Section 5.2), instrument and control systems (see NUREG 1567 Sections 3.4.3 and 3.4.4 and Regulatory Guide 3.48 Sections 5.3 and 5.4), effluent monitoring (see NUREG 1567 Section 9.4.3.2), and operating controls (see NUREG 1567 Sections 3.4.3 and 3.4.4 and Regulatory Guides 5.3 and 5.4). The NRC staff would also like to see a technical specification for the off-normal holding area and time for storage in order to ensure the area does not become too crowded (see NUREG 1567 Section 1.4 and Regulatory Guide 3.48 Sections 1.2 and 1.4.1.1). The NRC staff also mentioned radiological controls (see NUREG 1567 Sections 7.4.2, 7.4.3, and 7.4.4).

Revised Response to RSI NP-10.4:

WCS has concluded that the title for Section 4.1.2.11, “Off-Normal Holding Area,” is confusing. Therefore, WCS has changed the title of Section 4.1.2.11 to better clarify the type of temporary ad hoc areas to be established to respond to issues identified during transportation cask receipt inspections (e.g., excessive surface contamination, elevated dose rates, visible cask damage, etc.). The transportation casks have been analyzed for all normal conditions and hypothetical accident conditions that demonstrate containment is maintained. Therefore, a technical specification for the off normal holding area addressing storage room and time of storage is not needed, because these issues will be addressed expeditiously.

Special Handling Techniques (NUREG 1567 Section 3.4.2 and Regulatory Guide 3.48 Section 5.2) are not applicable, because no special handling techniques or equipment are required.

Similarly, Instrument and Control Systems (NUREG 1567 Section 3.4.3 and 3.4.4 and Regulatory Guide 3.48 Section 5.3 and 5.4) are not required.

Effluent Monitoring (NUREG 1567 Section 9.4.3.2) is not required, because there are no credible events that could result in releases of radioactive products from inside the canister to any effluents or result in unacceptable increases in direct radiation. Fuel is shipped in canisters that are welded shut and will not be opened in the building. There will be no bathrooms or other sewer or water connections to the building. Effluent monitoring is not applicable in the CHB.

Additional Radiation Controls (NUREG 1567 Section 7.4.2, 7.4.3, and 7.4.4) are not required, because the fuel canisters will be shielded during transfer operations by transport, transfer, or storage casks at all times. Radiation controls in the CHB are shown in WCS CISF SAR Figure 1-7. These include dosimeters, alarming radiation monitors, and air monitors. In addition to these measures, radiation postings will be provided and radiation surveys will be performed on a regular basis.

SAR Impact:

WCS CISF SAR Section 4.1.2.11 has been updated as described in the response.

Changed SAR pages are provided in Enclosure 4 of this submittal.

12. Radiation Protection

RSI NP-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.

Original WCS response and Impacts:

The response and impacts are included in the submittal letter dated July 20, 2016. WCS CISF SAR Section 9.5.2 was updated.

NRC Feedback:

In the NRC public meeting on August 22, 2016, the NRC stated that they were looking for more description for the other rooms and buildings, specifically the shared calibration area. The WCS CISF SAR called out the calibration area in the response, but WCS needs to describe what it is.

Additional Response to RSI NP-12.2:

The shared facilities include the existing Treatment Storage Disposal Facility (TSDF) Counting Laboratory and the existing LLRW Counting Laboratory. The TSDF Counting Laboratory is a 430-square-foot room within a 4,200-square-foot building. The building houses Lab Storage, Dressing Rooms, Decontamination Room, Offices, and Admin areas for the WCS TSDF. The LLRW Counting Laboratory is a 700-square-foot room within a 1,400-square-foot laboratory building for the Agreement State licensed WCS Federal and Compact LLRW facilities. The laboratory calibration activities are performed for the Gross Alpha/Beta counters and the Liquid Scintillation counters, which are calibrated with NIST traceable calibration sources. Daily response check activities for all hand held dose rate instruments are performed at the TSDF Counting Lab and daily response checks for contamination meters are performed at both the TSDF counting lab and the LLRW counting lab. Both daily activities are performed with NIST traceable check sources.

WCS CISF SAR Figure 9-6 has been added as part of the December 2016 response to RSI NP-4.3 to show the locations of the two shared calibration areas at the existing WCS site.

WCS CISF SAR Figure 9-7 has been added as part of the December 2016 response to RSI NP-4.3 to show a building layout of the two counting labs including general equipment for each facility.

WCS CISF SAR Section 9.5.2 has been further revised to cite these two new figures.

SAR Impact:

WCS CISF SAR Section 9.5.2 has been revised as described in the response.

Changed SAR pages are provided in Enclosure 4 of this submittal.

RSI NP-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.

Original WCS response and Impacts:

The response and impacts are included in the submittal letter dated July 20, 2016.

NRC Feedback:

In the NRC public meeting on August 22, 2016 the NRC staff stated that the evaluation of doses for AREVA systems (bounded by existing analyses) was responsive to the RSI, but the evaluation of doses for NAC systems needs more clarification.

Additional Response to RSI NP-12.6:

Estimated occupational exposures for receipt and handling of all NAC systems to be stored at the WCS CISF have been added to WCS CISF SAR Appendices E.9, F.9, and G.9. WCS CISF SAR Sections E.9, F.9, and G.9 have been updated, and Tables E.9-1, F.9-1, and G.9-1 have been added in Appendices E.9, F.9, and G.9, respectively, to provide the evaluations of the occupational dose to receive, transfer and place the NAC canisters into storage and to retrieve the canisters and ship them off site.

SAR Impact:

WCS CISF SAR Sections E.9, E.9.1.1, E.9.1.2, E.9.2.1, F.9.1.3, and G.9 have been revised as described in the response.

WCS CISF SAR Tables E.9-1, F.9-1, and G.9-1 have been added as described in the response.

Changed SAR pages are provided in Enclosure 4 of this submittal.

15. Waste Confinement and Management

RSI NP-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).

Response to RSI NP-15.1:

a. WCS reviewed both Application Table 4-1, and specifically the entry for 72.128 (b) where the following is noted:

72.128 (b)	Waste Treatment	There are no radioactive waste streams requiring waste treatment (Section 1.3.1.4).

WCS also reviewed Chapter 1, Section 1.3.1.4 of the WCS CISF SAR, along with Chapter 6 of the WCS CISF SAR and found no inconsistencies between those sections.

While the WCS CISF SAR does, in fact, discuss the generation and storage of some quantities of solid radioactive wastes (specifically in the SAR Chapter 6), License Application Table 4-1 focuses on the fact that “treatment” is not required for the radioactive waste streams that have been identified.

In conclusion, WCS feels that both the license application and WCS CISF SAR content as they exist are not inconsistent. No SAR changes are identified for item a of this RSI response.

b. Releases from the Rancho Seco canisters are not credible because there are a series of barriers to ensure confinement and no credible leak paths through the confinement boundary.

The spent fuel assemblies (SFAs) are confined by a canister shell and by multiple barriers at each end of the canister. In general, the fuel cladding is the first barrier for confinement of radioactive materials. The fuel cladding is protected by maintaining the cladding temperatures during transport and storage below those levels which may cause degradation of the cladding. In addition, the SFAs are stored in an inert atmosphere to prevent degradation of the fuel, specifically cladding rupture due to oxidation and its resulting volumetric expansion of the fuel. Thus, a helium atmosphere for the canisters is incorporated in the design to protect the fuel cladding integrity by inhibiting the ingress of oxygen into the canister cavity.

Helium is known to leak through valves, mechanical seals, and escape through very small passages because of its small atomic diameter and because it is an inert element and exists in a monatomic species. Negligible leakage rates can be achieved with careful design of canister closures. Helium will not, to any practical extent, diffuse through stainless steel. For this reason the canisters have been designed as a redundant weld-sealed containment pressure vessel with no mechanical or electrical penetrations.

The canisters themselves have a series of barriers to ensure the confinement of radioactive materials. The cylindrical shells are fabricated from rolled ASME stainless steel plate, which is joined with multi-pass full penetration 100% radiographed welds. The direction of rolling ensures that any inclusions or laminations are parallel to the shell thickness and therefore cannot form a leak path through the shell. In addition, the top and bottom end closure welds and all port cover plates, etc. are multiple-layer welds. This effectively eliminates a pinhole leak which might occur in a single layer weld, since the chance of pinholes being in alignment on successive weld layers is not credible. Furthermore, the canister cover plates are sealed by separate, redundant closure welds. All the canister pressure boundary welds are inspected according to the appropriate articles of the ASME Boiler and Pressure Vessel Code, Section III, Division 1, Subsection NB except as noted in each canister's NRC accepted code alternatives. These criteria ensure that the weld filler metal is as sound as the parent metal of the pressure vessel.

Therefore, there is no credible leak path through the confinement boundary of a canister. In addition, all canisters except the FO-, FC- and FF-DSCs and the GTCC waste canister for the NUHOMS®-MP187 System, are leak tested to ANSI N14.5 leak tight criteria. For the NUHOMS®-MP187 System canisters, during fabrication and closure operations the confinement boundary were leak tested to $1x10^{-5}$ std cm^3/sec in accordance with ANSI N14.5.

Even though a non-mechanistic release rate of $1x10^{-5}$ std cm^3/sec in A.11.3 was used to satisfy the regulatory requirement for confinement, WCS feels there is no inconsistency in the WCS position because radioactive effluent releases are not credible.

c. WCS CISF SAR Figure 9-2 has been modified to remove the "wash down pad" as part of the Response to RSI NP 4.3. WCS CISF Section 4.2.1 describes decontamination efforts involving the removal of surface contamination on empty casks using dry large area swipes, and is consistent with the position of WCS CISF SAR Chapter 6 that no liquid radioactive effluents or wastes will be generated.

WCS SAR Impacts:

No change as a result of this question.

16. Accident Analysis

RSI NP-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.

Response to RSI NP-16.1:

WCS has reviewed potential accidents at nearby sites to determine if any could potentially impact canisters at the WCS CISF. WCS has concluded that there are no potential accidents at nearby facilities that could contribute to the potential for significant explosions or other accidents located within five miles of the CISF facility. The potential accidents from nearby sites fall within the design criteria listed in Table 1-2 for casks and storage systems used at the WCS CISF. A brief description of nearby sites follows:

URENCO:

The neighboring facility to the west of WCS is a uranium enrichment facility. The process used at this facility is a physical rather than a chemical process, and no significant chemical reactions are initiated. Potential accident sequences and consequences are discussed in greater detail in the Integrated Safety Analysis (ISA) Summary Section 3.7 for the URENCO facility (Louisiana Energy Services, “Integrated Safety Analysis Summary,” Revision 4, 2005). Process Hazards identified by URENCO, which include radioactivity and toxicity of UF_6 release, were found to be intermediate and high consequence. The only accident sequence types from URENCO that can potentially results in intermediate or high consequences for workers at the WCS CISF are loss of confinement events (i.e., caused by process upsets, human error, natural phenomena, fires, and external events). Figure 3.7-1 of the ISA for URENCO shows corresponding doses as a function of distance from the criticality site, and since the WCS CISF is over 2,000 meters from the URENCO facility, the results indicate that the consequences of a postulated criticality event upon members of the public at or beyond the site boundary would be considerably below the threshold for an intermediate consequence event, as defined by 10 CFR 70.61. WCS and URENCO have procedures in place to notify each other in the event of an accidental release.

Texas State Highway 176:

Regulatory Guide 1.91 provides guidance for calculating safe distances from transportation routes, based on overpressures at the WCS facility created by postulated explosions from transportation accidents. The Regulatory Guide indicates that overpressures, which do not exceed 1 psi at the storage site, would not cause significant damage and states that "under these conditions, a detailed review of the transport of explosives on these transportation routes would not be required." The design basis explosion (Regulatory Guide 1.91) would produce an overpressure of 1 psi at a maximum distance of roughly 1660 feet. Highway 176 is approximately 8,000 feet from the southernmost edge of the storage pad. Using the methodology of Regulatory Guide 1.91, the highway is located much further from the CISF than the distances required to exceed a 1 psi overpressure.

WCS Existing Facilities:

Immediately south of the proposed WCS CISF are the currently operating WCS facilities. Potential accidents at these facilities are primarily based on combustible material storage. WCS has several diesel, gasoline, and propane storage tanks used to fuel operations equipment, and emergency generators. There are approximately 15,600 gallons of diesel fuel stored in 11 different tanks. The closest storage tank is over 3,200 feet from the WCS CISF. There is one 5,000 gallon gasoline tank located over 4,700 feet from the WCS CISF. There are two main propane tanks with a combined volume of 3,600 gallons that are over 3,200 feet from the WCS CISF. Potential explosions from these tanks are bounded by the WCS CISF Blast Analysis (Safeguards Information).

Permian Basin Materials LLC:

The neighboring facility to the northwest of the WCS CISF is a quarry and concrete batching facility. The quarry periodically uses blasting techniques for quarrying materials. The quarry out-sources blasting activities to a third party and no explosives are stored onsite. The quarry is located beyond 1,660 feet from the proposed CISF, so an accidental explosion would not produce overpressures over 1 psi at the CISF site.

Oil Industry Pipe Lines:

Oil industry pipelines exist near the WCS CISF. Based on a probabilistic analysis performed by the neighboring URENCO facility, the hazards due to thermal radiation, missile generation, and plant contamination by gas and/or explosion were shown to have an annual probability less than 1.0E-5 and thus, by definition, meet the definition of 'highly unlikely' (see Section 3.2.2.4 of the URENCO ISA).

Section 12.2.2 "Offsite Accident Analysis" has been added to the WCS CISF SAR.

In addition to accidents at nearby sites, WCS addresses the potential for building structural failure onto SSCs inside the WCS CISF Cask Handling Building during operations by designating the Cask Handling Building as ITS to ensure operations within the building are protected from potential building structural collapse. The WCS Response to RSI NP-4.7 addresses the building design criteria.

SAR Impact:

Section 12.2.2 and 12.3 has been added to WCS CISF SAR as described in the response.

Changed SAR pages are provided in Enclosure 4 of this submittal.

18. Environmental Report

RSI NP-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)

Original WCS Response and Impacts:

The original response and impacts are included in the submittal letter dated July 20, 2016.

NRC Feedback:

In the NRC public meeting on August 22, 2016, the NRC requested more information about the potential impact of construction on operations and of operations on construction as WCS builds future phases. This is focused more on the pad itself. The July 20, 2016 response discusses some construction impacts and radiation doses, but the NRC staff needs more detail about any integration between operations and construction. WCS evaluated cumulative impacts, but NRC also wants to see integrated impacts.

Additional Response to RSI NP-18.1:

WCS has further evaluated integrated environmental impacts during the construction and operation of different phases of the CISF. WCS has prepared a new Environmental Report Section 4.14, "Integrated Environmental Impacts," to replace the Section 4.14 that was provided as part of the original Response to RSI NP-18.1 in the submittal letter dated July 20, 2016. This section has been revised to provide additional evaluation of the integrated environmental impacts and to reflect further understanding of the staff's needs with respect to integrated impacts and further review of the environmental impacts for the project.

ER Impact:

WCS CISF Environmental Report Section 4.14 has been revised as described in the response.

WCS CISF Environmental Report Table 4.14-1 has been added as described in the response.

Changed Environmental Report pages are provided in Enclosure 4 of this submittal.