4. SSC and Design Criteria

RSI NP-4.7

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

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

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

Original WCS response and Impacts:

The response and impacts are included in the submittal letter dated August 31, 2016. WCS CISF SAR Section 1.2.3 was updated. New Table 1-2 was added to Chapter 1 of the WCS CISF SAR. New Figures (1-7 and 1-8) were added to Chapter 1 of the WCS CISF SAR. WCS CISF SAR Sections 3.2.1 and 4.1.2.5 of the WCS CISF SAR were updated. WCS CISF SAR Section 7.5.3 was added. WCS CISF SAR Table 7.1 was updated.

NRC Feedback:

In the NRC public meeting on September 29, 2016, the NRC requested additional information consistent with NUREG-1567. A second item raised by the staff was the identification of the two commercial cranes being designated as not important to safety (NITS). The NRC believes more analysis on the classification of NITS should be factored in for cranes, concrete floors and building design or classify as ITS.

Revised Response to RSI NP-4.7:

WCS is revising the conceptual design previously presented for the Cask Handling Building (CHB) in response to NRC questions regarding the CHB design.

WCS has reviewed the potential accidents identified in NUREG-1567, Section 15.2.2 and has determined that only the following five accident types could potentially result in the collapse of the building.

- Earthquake (seismic)
- Tornados and missiles generated by natural phenomena
- Fire and explosion
- Accidents at nearby sites

- Flood

The revised CHB is an important to safety (ITS) – Category C steel structure designed in accordance with the 2006 International Building Code (IBC) (or the governing IBC version at the time of construction), to withstand loads associated with a seismic event without collapse, consistent with the requirements of 10 CFR 72.122(b)(2)(ii). The CHB is 140 feet by 130 feet, and approximately 70 feet tall with rail access to facilitate cask unloading operations, canister transfer operations, and miscellaneous maintenance activities. WCS CISF SAR Figures 1-7 and 1-8 have been updated for this response to show the revised building layout. Since the building will be designed according to IBC standards the previously submitted tables 7-26, 7-27 and 7-28 are no longer applicable and therefore have been deleted from the WCS CISF SAR.

To facilitate railcar unloading activities for NUHOMS® systems, the CHB design incorporates two overhead bridge cranes rated at 130 tons each for lifting loaded spent fuel transportation casks from the railcar, removal of impact limiters, and shielding, etc. The NAC systems will utilize the overhead bridge cranes to remove impact limiters and personnel barriers. Transportation casks will be unloaded using the NAC Vertical Cask Transporter (VCT).

The overhead bridge cranes are classified as NITS and are designed in accordance with ANSI B30.2, “Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist).” The overhead crane bridge trucks and trolleys are attached to the CHB structure in a manner that provides adequate assurance that the rails will remain attached to the CHB structure during a seismic event. The IBC seismic event is based on the Maximum Considered Earthquake Ground Motion, which is used to develop the Design Earthquake Ground Motion for which the CHB structure will be proportioned to resist. The building is classified within IBC as Seismic Design Category C. This classification is based on the Design Earthquake Ground Motion and the Occupancy Category of the building. The Occupancy Category of the building has been assigned as IV (Building determined to be an essential facility). The Design spectral response acceleration (short periods) is established at 0.21g and the design spectral response acceleration (1-second period) is established at 0.05g. These accelerations will be used in the analysis and design of the building structure and crane supports.

Seismic clips are provided on the overhead crane bridge trucks and trolley to limit uplift during a seismic event, thereby eliminating the potential for the bridge or trolley to fall onto loaded spent fuel casks inside the CHB.

Lifts performed by the overhead bridge crane are governed by the guidance of NUREG-0612, “Control of Heavy Loads at Nuclear Power Plants: Resolution of Generic Technical Activity A-36,” to minimize the potential for release of radioactive material from a spent fuel cask. NUHOMS® transportation/transfer cask lifts are performed using the overhead bridge crane and the lift height is administratively controlled to ensure the 80-inch design basis drop accidents previously approved by the NRC remain bounding (Reference WCS CISF SAR Tables A.3-1, B.3-1, C.3-1, and D.3-1). The overhead cranes may be used for miscellaneous lifts that do not involve lifting of loads over loaded spent fuel transportation or storage casks inside the CHB.

The CHB is an ITS-C steel structure designed to withstand snow, rain, and wind loads in accordance with the 2006 IBC. Administrative controls will be used to preclude the presence of loaded storage, transportation, or transfer casks inside the CHB during a tornado watch or other inclement weather watches with the potential to lead to winds in excess of those addressed by IBC, thereby eliminating the potential for structural members or the overhead bridge crane from collapsing onto spent fuel transportation or storage cask systems due to these weather events.

WCS CISF-initiated explosions are not considered credible since insufficient explosive materials are present to initiate an event that would result in the destruction of the building. During operations, the amount of flammable liquids that are in the CHB will be administratively controlled to ensure the amount of flammable liquids is maintained below the fire load limits for the respective systems (e.g., 300 gallons of diesel fuel for NUHOMS®). In combination with fuel limitations and a fire suppression system, the fire hazard for the building is adequately mitigated.

Accidents at Nearby Sites: The impact of potential accidents at nearby sites are addressed in WCS CISF SAR Section 12.2.2, which was added in the response to RSI NP-16.1 and modified in this response.

Floods: The CHB finished floor elevation is above the probable maximum flood plain elevation, and therefore flood loads are not applicable as demonstrated in WCS CISF SAR Section 7.5.3.

As part of Revision 1 to the WCS CISF SAR, WCS will provide revisions that will include the following:

- Principal Design Criteria (Chapter 3)

  Information will be provided that describes the design criteria on the CHB and related structures, systems, and components (SSCs). The information will conform to that contained in response to RSIs. The safety significance of the SSCs will be assigned using guidance in NUREG/CR-6407.

- Facility Design (Chapter 4)

  Information will be provided that describes how the facility meets 10 CFR Part 72.122 using information primarily derived from the responses to the RSIs. Revision 1 will also include a summary table, which will provide a cross-walk between the requirements in 10 CFR 72 subpart F and the SAR sections where compliance is demonstrated.

- Operations (Chapter 5)

  A description of facility operations will include more detailed descriptions and diagrams primarily derived from responses to the RSIs.

Application/SAR Impact:

WCS CISF SAR Sections 1.2.3, 3.2.1, 3.3.1.8, 7.5, 7.5.3, 7.5.3.1, 7.5.3.2, 7.5.3.2.1, 7.5.3.2.2, 7.5.3.3, 7.5.3.4, 7.5.3.5, 7.5.3.6, 7.5.3.7, 7.5.3.8, 7.5.3.9, and 12.2.2, Tables 1-2, 7-1, and 7-25, and Figures 1-7 and 1-8 have been revised as described in the response.

WCS CISF SAR Sections 7.5.3.8 and 7.5.3.9 have been added, as described in the response.

WCS CSF SAR Tables 7-26, 7-27, and 7-28 have been deleted.

Changed SAR pages are provided in Enclosure 3 of this submittal.