Request for Supplemental Information (non-proprietary)

Docket No. 72-1051
Application for site-specific independent spent fuel storage installation (ISFSI) license for the HI-STORE Consolidated Interim Storage (CIS) Facility in Lea County, New Mexico

By letter dated March 30, 2017, as supplemented on April 13, 2017, Holtec International (Holtec) submitted to the U.S. Nuclear Regulatory Commission (NRC) an application for a specific independent spent fuel storage installation (ISFSI) license to construct and operate the HI-STORE Consolidated Interim Storage (CIS) Facility, in Lea County, New Mexico, in accordance with the requirements of Part 72 of Title 10 of the *Code of Federal Regulations* (10 CFR Part 72), "*Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste and Reactor-Related Greater than Class C Waste.*" In addition, 10 CFR Part 51, *"Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions,"* requires the NRC to prepare an Environmental Impact Statement (EIS) for the issuance of a specific license for an ISFSI at a site not occupied by a nuclear power reactor.

The staff has performed an acceptance review of your application and has determined that the application does not provide sufficient technical information to begin a detailed review and supplemental information is needed. The staff's requests for supplemental information (RSIs) and observations are provided below:

License Application (LA):

RSIs:

RSI LA-1: Re-file the March 30, 2017, license application for the HI-STORE CIS facility under oath or affirmation.

The initial submission of the license application for the HI-STORE CIS facility was not submitted under oath or affirmation. NRC regulations require that each application for a specific ISFSI license be executed in an original signed by the applicant under oath or affirmation. Additional guidance on electronic submissions, including those that require oath or affirmation, is provided in Regulatory Issue Summary (RIS) 01-005, "Guidance on Submitting Documents to the NRC by Electronic Information Exchange or on CD-ROM."

This information is necessary to determine compliance with 10 CFR 72.16(b).

Safety Analysis Report (SAR), Chapter 2, "Site Characteristics"

RSIs:

RSI 2-1: Provide a complete copy, including the appendices, with full-resolution figures and diagrams, of the Eddy Lea Energy Alliance's (ELEA) Global Nuclear Energy Partnership (GNEP) Siting Study (Reference 2.1.3 of the HI-STORE SAR).

The resolution of several figures in SAR Chapter 2 is too low; therefore, important details and dimensions are not discernible. The staff notes that the majority of the referenced drawings, figures, and diagrams are excerpted or copied from Reference 2.1.3. A complete copy, with all appendices and full-resolution figures, is also necessary to complete the staff's review of the HI-STORE CIS Environmental Report (see RSI ER-1).

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

RSI 2-2: Describe in detail the extent of mining in the subsurface at the Belco Shallow, Belco Deep facilities (SAR Figure 2.1.13), and Intrepid Mining NM, LLC facilities, as discussed in the 2007 GNEP Siting Study [ref 2.1.3] including any potential effects on the proposed CIS facility (e.g., long-term surface deformation due to subsidence). Also, discuss any effects of nearby oil and gas exploration and production activities on the proposed CIS facility operation (e.g., any effects of injection wells).

Detailed information regarding the mining techniques used to extract potash at the Belco Shallow and Belco Deep facilities, including the extent of excavation(s) at the subsurface, should be provided as these facilities are very close to the site boundary (SAR Figure 2.1.3). Additionally, the 2007 GNEP Siting Study states that potash mining by Intrepid Mining has not progressed as far as the proposed site; however, any progression of mining activities toward the proposed CIS facility site since then should be presented. This should include an assessment of whether these mining excavations may collapse in future and result in surface subsidence that may affect safe operation at the proposed CIS facility, as specified in Section 2.4.2 of NUREG-1567. In addition, detailed information of nearby oil and gas exploration and extraction-related activities and an assessment of potential hazards posed by these should be provided.

This information is necessary to determine compliance with 10 CFR 72.24, 72.90(a) through (d), 72.94, and 72.98.

RSI 2-3: Provide an assessment of the hazards from aircraft flight-related activities at nearby airports and aircraft flights through the nearby airways (e.g., IR180, IR192, V291, and V102) to the proposed CIS facility.

Although there are several airways in the near vicinity of the proposed site, no information has been provided to determine the probability of potential aircraft crashes onto the proposed facility. For example, airway IR180 traverses within 3.2 km [2 mi] of the site. Information of flight activities in nearby airways and airports, including any holding patterns, should be provided and the cumulative hazard for all nearby flight-related activities to the proposed CIS facility should be assessed, as specified in Section 2.2 of Regulatory Guide 3.48. Section 3.5.1.6 of NUREG–0800 provides guidance to assess aircraft crash hazards that may be applicable to the CIS facility. The assessment should consider the full capacity of the facility (SAR Table 1.0.1).

This information is necessary to determine compliance with 10 CFR 72.24(a), 72.90(a) through (d), 72.94, and 72.98.

RSI 2-4: Provide an assessment of potential hazardous cargo that may be transported through roads and railroads near the proposed CIS facility.

There is one major (US 62) and a few rural roads in the vicinity of the proposed CIS facility. The application did not provide an assessment of hazardous cargo that may be transported through these roads. Additionally, although SAR Table 1.0.1 lists a Southwestern Railroad rail terminal approximately 6 km [3.8 mi] away from the site, no discussion or assessment has been provided whether rail traffic may pose a hazard to the operation of the proposed CIS facility. An assessment of materials transported using nearby roads and railroads and their potential effects on safe operation of the CIS facility should be provided, as specified in Section 2.4.2 of NUREG–1567 and Section 2.2 of Regulatory Guide 3.48.

This information is necessary to determine compliance with 10 CFR 72.24(a), 72.90(a) through (d), 72.94, and 72.98.

RSI 2-5: Provide the following information:

a) information that characterizes the location, size, and hydrologic characteristics of all surface hydrologic features, including streams, ephemeral drainage, and playa lakes within and surrounding the site;
b) information that describes hydrological processes that may result in surface runoff and flow into the playa lakes within and surrounding the site;
c) information that identifies the sources of the hydrologic information, the types of data collected, and the methods and frequency of collection, including extreme precipitation events such as probable maximum precipitation of various durations.

The application does not provide sufficient information or descriptions of surface flow into adjacent playa lakes, particularly Laguna Gatuna and Plata, and through hydraulic features, such as ephemeral drainage waterways.

Aerial photos (e.g. Figures 2.1.2, 2.1.3, and 2.1.8 of the HI-STORE SAR) show surface hydrologic features (potentially ephemeral) of drainage on the northeastern side of the site. These features suggest that this drainage connects to nearby playa lakes, including one within the boundary of the site (Laguna Gatuna, Figure 2.1.2). The figure also indicates that man-made impounding occurs before water is drained into the playa. Drainage features on the northwestern side (ephemeral) within the facility boundary is clearly visible in Figures 2.1.6 and 2.1.7, “Topography of the Site and Surrounding Area.” In Section 2.5, “Subsurface Hydrology,” the application states that brine in Laguna Gatuna is around 3,500 feet above mean sea level. The application should provide a more precise description and characterization of these hydrologic features and their respective elevations, which may impact the flood water level and perched groundwater levels under extreme precipitation conditions.

This information is needed to determine compliance with 10 CFR 72.90(a), and 72.92(a) and (b).

RSI 2-6: Provide information regarding the elevations of structure, system, and components (SSCs) important to safety with respect to the site-specific probable maximum flood elevation. Provide site topographical information before and after the SSCs are constructed, with the location and elevation of the SSCs clearly annotated.

Elevations of on-site SSCs relative to the estimated probable maximum flood water level are not adequately described. The application does not provided the site topography before and after construction that is necessary to determine if there are any potential impacts to the site drainage patterns and the general environment, e.g., soil erosion.

This information is needed to determine compliance with 10 CFR 72.90(a), 72.92(a), and 72.122(b).

RSI 2-7: Provide supplemental information and technical basis to justify the conclusion in Section 2.4.2 of the SAR that Laguna Gatuna and Laguna Plata would be able to accept a one-day severe storm total precipitation within the 7.5 inch range with excess free board space. In addition, provide information that compares the 7.5 inch precipitation with regional probable maximum precipitation of various durations.

The application states that, "Both of these drainages [Laguna Gatuna and Laguna Plata] would be able to accept a one day severe storm total within the 7.5 inch range with excess free board space." However, the applicant did not provide information that shows how the 7.5 inch storm precipitation compares with the probable maximum precipitation at the site. Furthermore, the application does not provide technical evidence to show that the two Laguna could support severe storms with excess free board space.

This information is needed to determine compliance with 10 CFR 72.90(b), 72.92(a), and 72.122(b).

RSI 2-8: Provide a site-specific analysis of the probable maximum flood that considers site-specific topographic and hydrologic information. Provide the results of the analysis as probable maximum flow rate, velocity, and surface water elevation. The analysis should contain an estimate of the erosion potential based on these results, and compare the elevation with the base elevations of the HI-STORM UMAX units and other onsite structures, systems, and components. Provide sufficient technical basis to support the claim that the proposed site is flood-dry. If any of the HI-STORM UMAX units are below the calculated surface or subsurface water elevation, identify the design basis flood (DBF) and provide a rationale for this specific design basis.

Section 2.4.1 of the SAR, "Hydrologic Description," states that "the Site can be considered "flood-dry" and therefore it can be concluded that none of the facilities important to safety structures will be affected by the Site's hydrologic features." However, no technical basis was provided to support this statement. The American National Standards Institute/American Nuclear Society (ANSI/ANS) 2.8-1981 Standard defines 'flood dry' when the proposed site is so high above potential sources of flooding that safety to structures important to safety is obvious or can be documented with little analysis. To justify this definition, the application should provide: (1) the flood water elevations, and (2) the elevations of structures and components with respect to the most severe flood water elevations.

Section 2.4.3 of the SAR states that an analysis conducted for the International Isotopes Fluorine Products, Inc.(IIFP) Fluorine Extraction Process & Depleted Uranium De-conversion Plant (FEP/DUP) site, located 23 miles away, shows the flood water level would be approximately 4.8 inches for the HI-STORE CIS site. The application states that, "Holtec determined that the probable maximum flood (PMF) for the CIS Facility Site would be similar to the PMF developed […] for the FEP/DUP site." These statements do not appear to be consistent with the statements in Section 2.4.1 that the site is flood-dry.

This information is needed to determine compliance with 10 CFR 72.90 (b), 72.92(a) and (c), and 72.122(b).

RSI 2-9: Provide the following information:

a) Details of laboratory and/or field characterization of the subsurface materials conducted to develop site design parameters including the acceptable standard used to measure each parameter. Subsurface materials should be characterized using, as a minimum, the following parameters, as described in Section 2.5.6 of NUREG–1567; for example, grain size classification, Atterberg limits, water content, unit weight, soil classification (based on Unified Soil Classification Scheme), shear strength, relative density, shear modulus, Poisson's ratio, bulk modulus, damping and shear modulus degradation with strain, consolidation characteristics, seismic wave velocities, blow count in Standard Penetration Test and/or Cone Penetration Test, porosity, and strength under cyclic loading. Any improvement necessary (e.g., reinforcement piling) of the material(s) used for the foundations should be described in detail and accompanying analyses should demonstrate that the required parameter value(s) can be achievable with adequate margin. Additionally, standard(s) used to measure each parameter should be provided.

   Table 4.3.3 of the SAR shows that the materials placed in different regions (Space A, B, C, and D) of the storage pad meet or exceed the design specifications; however, no information has been provided how the site-specific parameter values have been developed. The number and locations of the samples used, method of sample collection, type(s) of laboratory and field tests conducted, scatter of the results, etc., are not provided. Moreover, no information on the Cask Transfer Facility foundation area was provided in the SAR. This information should be provided, as specified in Section 2.4.6.4 of NUREG–1567 and in Sections 2.6.4.2, 2.6.4.4, and 2.6.4.7 of Regulatory Guide 3.48.

b) Geological profiles that show the relationships of major foundations at the CIS facility to the subsurface strata, including groundwater. Additionally, provide maps and profile drawings showing the extent and dimensions of the excavations and backfill planned at the site including the compaction criteria for the engineered backfill. The criteria should be substantiated with representative laboratory or field test records.

   Table 1.0.1 and Section 2.6.1 of the SAR show that the facility will be constructed by excavating below the grade to a maximum of 7.6 m [25 ft]. However, no information has been provided that identifies the corresponding strata for each important to safety structure. In addition, it is not clear whether the excavation will be partially or fully backfilled with natural or engineered materials. This information should be provided, as specified in Section 2.6.4.3 of Regulatory Guide 3.48 and Section 2.4.6.4 of NUREG–1567.

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

RSI 2-10: Provide a map (or maps) showing the locations of all borings, trenches, seismic lines, piezometers, geologic profiles, and excavations used to characterize the site to develop the design specifications of the storage pads and the Cask Transfer Facility (e.g., Table 4.3.3). Outlines of the important to safety structures at the HI-STORE CIS site should be superimposed on the maps.

No information has been provided regarding the locations for sample collection in addition to other site characterization activities. This information should be provided, as per Section 2.6.4.3 of Regulatory Guide 3.48 and Section 2.4.6.4 of NUREG–1567.

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

RSI 2-11: Provide the following information:

1. An assessment of potential for liquefaction of the subgrade based on site-specific material characteristics and in situ measurements.

   Subsurface strata under the storage pads and below the Cask Transfer Facility may be prone to liquefaction during a seismic event. Excessive lateral spreading from the liquefaction event may cause extensive damage to the important to safety structures, systems, and components. This information should be included, as per Section 2.6.4.8 of Regulatory Guide 3.48 and Section 2.4.6.4 of NUREG–1567.

2. An assessment demonstrating that the subgrade of the storage pads (specifically material in Space D and Space C and below Space C of Figure 4.3.1) and the foundation of the Cask Transfer Facility have sufficient bearing capacity to withstand both static and dynamic loads.

   The subgrades below the important to safety structures at the CIS facility should be able to withstand the bearing pressure from the structures above. Based on site-specific material properties, assessments should be made to show that the soil, backfill, or any engineered materials placed have sufficient bearing capacities to withstand the loads without failure. This assessment should be included, as specified in Section 2.4.6.4 of NUREG–1567 and Sections 2.6.4.10, 2.6.4.9, and 2.6.4.11 of Regulatory Guide 3.48.

3. Assessments of potential settlements of the foundations of the storage pads and the Cask Transfer Facility to demonstrate that the important to safety structures at the CIS facility would not sustain excessive settlement from both static and dynamic loads. The assessment should also consider the differential settlements due to spatial variations of material characteristics. The estimated settlements should be compared with the allowable settlement based on the design assumptions of the proposed facility.

   Section 4.3.2.1 of SAR states that long-term settlement of the HI-STORE facility storage pads has been computed; however, no information has been provided on long-term settlement of the Cask Transfer Facility. Moreover, it is not clear whether the estimated

settlement also includes contribution from any dynamic load. Storage pads and the Cask Transfer Facility foundations may suffer excessive settlement post construction and during a seismic event. In addition, due to variation of the properties of the subgrade materials, settlement may not be spatially uniform. Excessive differential settlement may cause damage to the over-lying structures. This information should be included, as specified in Section 2.4.6.4 of NUREG–1567 and Section 2.6.4.9 and 2.6.4.10 of Regulatory Guide 3.48.

4. An assessment of the lateral pressure to be experienced by the Cask Transfer Facility from in-situ adjacent materials during a seismic event.

   The Cask Transfer Facility is a below-grade structure (SAR Section 5.3.3.1). The exterior structural walls of the facility will experience earth pressure induced by a seismic event, which needs to be evaluated. Additionally, during excitation, separation of structural wall and soil interface is possible. The assessment should discuss why the estimated values are conservative. This assessment should be included as specified in Section 2.4.6.4 of NUREG–1567 and Sections 2.6.4.9 and 2.6.4.10 of Regulatory Guide 3.48.

5. An assessment demonstrating that the proposed storage pad design at the CIS facility would not fail due to sliding under dynamic loading.

   Sliding may occur during a seismic event at the interface between Space A and Space C or along a critical failure surface within the material in Space C (Figure 4.3.1). The assessment should establish that the shear resistance provided would be able to prevent sliding of the pads.

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

Observations:

Obs 2-1: Provide a legible scale for Figures 1.0.1, 2.1.3, and 2.1.6.

Several figures throughout the SAR (e.g., Figs. 2.1.3 and 2.1.6; Fig. 1.0.1) lack a scale, and in other cases the scale is not legible.

This information is necessary to determine compliance with 10 CFR 72.24(a).

Obs 2-2: Provide maps and aerial photographs of the site with radial coverage extending to a minimum of 8 km [5 mi] from the site.

Although aerial photographs of the site were provided in SAR Figures 2.1.2 and 2.1.3, they do not have radial coverage extending to a minimum of 8-km [5-mi] from the site, as recommended in Section 2.4.1.1 in NUREG–1567. In addition, no map of the same region has been provided clearly showing adjacent buildings, roads, railroads, transmission lines, wetlands, and surface water bodies, as specified in Section 2.4.1.1 of NUREG-1567.

This information is needed to determine compliance with 10 CFR 72.24(a), 72.90(a)–(c), 72.92, 72.94, 72.98, and 72.100.

Obs 2-3: Provide details of current transient population and future projected population (both resident and transient) distributions within 8 km [5 mi] of the site.

Although the current population data within an 8-km [5-mi] radius from the site have been presented in a sector map (SAR Figure 2.1.10), no information has been presented on projected population in the same region. In addition, there is no information regarding current and future transient population within this region. This information is necessary to determine the potential for radiological and environmental impacts on the region with due consideration of the characteristics of the population, as specified in Section 2.4.1.3 of NUREG–1567 and in Section 2.1.3 of Regulatory Guide 3.48.

This information is needed to determine compliance with 10 CFR 72.24(a), 72.90(e), 72.98, and 72.100.

Obs 2-4: Provide detailed information regarding nearby pipelines (e.g., size, pressure, material conveyed, depth of burial, construction details, location(s) of nearest shut-off valves, age) including distances(s) to important to safety structures and systems and an assessment of the hazards from potential rupture of these pipelines at the proposed CIS facility.

There are several pipelines carrying natural gas and hazardous liquids near the site. SAR Section 2.1.2 identifies existing underground natural gas pipelines along the North-South axis to the East of the site. Based on SAR Figure 2.1.13, these pipelines are very close to Route 55 [Area 13 Boundary in SAR Figure 2.1.4(b)], which is approximately 333 m [1,000 ft] from the edge of the storage pad. However, SAR Section 2.2 states that the closest natural gas pipeline is approximately 3.2 km [2 mi] from the site. The applicant should reconcile the discrepancy between these two sections of the SAR.

Details of these pipelines should be provided, as specified in Section 2.4.2 of NUREG–1567 and Section 2.2 of Regulatory Guide 3.48. Additionally, technical basis for why an underground pipeline would not be a hazard to the proposed CIS facility operations, as stated in SAR Section 2.1.2, should be provided. Although rare, underground pipelines have ruptured and posed hazard to the surrounding areas.

In addition, there is an oil recovery facility with tanks within the site boundary. Details of this facility and an assessment of potential hazards from this facility to the CIS facility operations should be provided, as per Section 2.4.2 of NUREG–1567 and Section 2.2 of Regulatory Guide 3.48.

This information is necessary to determine compliance with 10 CFR 72.24(a), 72.90(a)–(d), 72.94, 72.98, and 72.122.

Obs 2-5: Provide dimensions of the storage pads including pad-to-pad distances. Additionally, provide dimensions of the placement of the storage casks in a pad including different subgrade spaces.

Figure 4.3.1 and Table 4.3.3 specifies different subgrade spaces of the storage pad, namely, Space A, B, C, and D; however, dimensions of these subgrade spaces and cask placement

configuration are not provided. This information is necessary to assess whether the design of the storage pads in the CIS facility would be able to fulfill the safety functions.

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

Safety Analysis Report (SAR), Chapter 3, "Operations at the CIS Facility"

RSIs:

RSI 3-1: Provide additional descriptions of the estimated completion times and expected doses from cask loading, unloading, and normal operations, and revise the facility's radiation protection plan to demonstrate the adequate implementation of the ALARA principle. In addition, revise relevant parts of Chapter 10 and Chapter 11 of the SAR to ensure consistency, as necessary.

Section 3.0 of the SAR states that: "[t]he information presented in this chapter along with the technical basis of the system design described in the canister's FSAR in its host 10 CFR Part 72 docket will be used to develop detailed operating procedures. In preparing the site-specific procedures, the conditions of the license and technical specifications, equipment-specific operating instructions, as well as the information in this chapter will be utilized to ensure that the short-term operations shall be carried out with utmost safety and ALARA." The SAR further states that: "[t]he following generic criteria shall be used to determine whether the site-specific operating procedures developed pursuant to the guidance in this chapter are acceptable for use […]." The staff cannot assess the adequacy of the radiation protection program for the HI-STORE CIS design without additional descriptions of the estimated completion times for each operation, and the estimated dose from these operations.

This information is necessary to determine compliance with 10 CFR 72.104, 72.126(a)(6), and 72.126(d).

RSI 3-2: Provide an accident recovery operation plan that demonstrates the adequate implementation of the defense in-depth measures for the safe operation of the ISFSI with respect to radiation protection.

Section 3.0 of the SAR states that: "it is shown that the loading operations are characterized by a number of defense-in-depth measures intended to preclude a handling accident or ALARA transgression." To support this statement, the SAR lists several measures to demonstrate that the facility operations are conducted using procedures that provide defense in-depth. However, these examples do not include handling accidents. Accidents other than those listed could occur and may need additional time to correct. Doses received during recovery operations from all credible off-normal and accident conditions must be included to demonstrate compliance with 10 CFR 72.106.

This information is necessary to determine compliance with 10 CFR 72.24(e) and 72.106.

Observations:

Obs 3-1: Provide additional justification, either through supplemental evaluations, incorporation by reference, or through revised operational procedures, to demonstrate that the proposed receipt inspection procedures and acceptance criteria for the CIS facility, as described in the HI-STORE SAR, provide adequate confirmation of the aged canisters' structural and confinement integrity for continued storage at the CIS facility. The justification should clearly discuss how the confinement analyses and the materials considerations analyses in Chapter 9 and 17, were used to derive the proposed canister receipt inspection procedures and acceptance criteria.

The justification should also discuss whether the safety analyses in Chapter 9 and 17 adequately support the application of the same receipt procedures and criteria for canisters of any age, type, or storage term prior to receipt at the HI-STORE CIS facility.

The safety analyses for confinement and structural integrity referenced in the HI-STORE SAR (from the HI-STORM UMAX and HI-STORM FW FSARs) rely on the canister remaining within the CoC/license conditions during the licensed storage period. Specifically, Section 9.2.1 of the HI-STORE SAR states that, "[c]onfinement safety of the canisters in this docket is therefore demonstrated by reference to confinement determination reached in the HI-STORE UMAX FSAR." These safety analyses include canister loading, transfer operations from the spent fuel pool to the ISFSI pad, and storage operations. However, these safety analysis do not evaluate transport operations from their initial storage facility to the HI-STORE CISF. The application does not discuss if and how the proposed canister receipt inspection procedures and acceptance criteria are used to complement the confinement safety analyses and ensure that all canister operations prior to receipt at the CIS facility are evaluated for confinement integrity.

This information is needed to determine compliance with 10 CFR 72.122(f), 72.128(a)(1) and (a)(3).

Safety Analysis Report (SAR), Chapter 5, "Installation and Structural Evaluation"

RSIs:

RSI 5-1: Provide the design features applicable to the lifting devices, the cask transfer building crane and the vertical cask transporter structures, systems, and components necessary to render cask drops non-credible events in the proposed Technical Specifications in Chapter 16 of the SAR.

Section 15.3.14, "Cask Drop," of the HI-STORE SAR states that cask drops are not credible and cites Sections 4.5.1, 4.5.2, and 4.5.3 of the SAR, which apply to the design of lifting devices, the cask transfer building cane, and the vertical cask transporter, respectively, as the basis for this conclusion. The design features applicable to these structures, systems and components necessary to render cask drops non-credible events have not been captured in the proposed Technical Specifications in Chapter 16 of the SAR. The requirements of 10 CFR 72.44(c) specify that each license include technical specifications with requirements in the following categories:

1. Functional and operating limits and monitoring instruments and limiting control settings.
2. Limiting conditions.
3. Surveillance requirements.
4. Design features.
5. Administrative Controls.

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

RSI 5-2: Provide information describing how redundant drop protection features are incorporated into the canister lowering operation.

Section 4.5.3 of the SAR, "Vertical Cask Transporter," describes the design criteria applicable to the VCT. Item ii of Section 4.5.3.3 states: "*Prevention of a cask or canister drop is afforded by design conformance with NUREG-0612 [1.2.7] and ANSI N14.6 [1.2.4] combined with the use of automatic redundant drop protection features along with hydraulic check valves and enhanced safety margins.*"

Figure 3.1.1 of the SAR, "Cask Handling Summary Illustrations," includes diagrams depicting canister lowering operations. The staff did not find information in the SAR describing how redundant drop protection features are incorporated into the canister lowering operation. The application should explain in detail how the canister lowering operation protects against a canister drop.

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

Safety Analysis Report (SAR), Chapter 6, "Thermal Evaluation"

RSIs:

RSI 6-1: Provide allowable temperatures for the storage system components listed in Chapter 6 of the HI-STORE SAR so that an evaluation of the structures, systems, and components important to safety (SSCs ITS) can be performed.

Tables 6.4.3, 6.4.5, 6.4.6, 6.5.2, 6.5.3, and 6.5.4 of the HI-STORE SAR list the temperatures of components during normal, off-normal, and accident conditions. However, corresponding allowable temperatures were not provided. Likewise, the incorporation by reference, as described in HI-STORE CIS SAR Table 4.0.1, did not clearly describe the locations for the allowable temperatures for all of the components and conditions mentioned in Tables 6.4.3, 6.4.5, 6.4.6, 6.5.2, 6.5.3, and 6.5.4 (e.g., HI-TRAC inner/outer shell, HI-STAR 190 Holtite, HI-STAR 190 enclosure shell).

This information is needed to determine compliance with 10 CFR 72.122(h) and 72.128(a)(4).

RSI 6-2: Provide a thermal analysis that considers the effect on inlet air temperature at the proposed site conditions (e.g., array spacing pitch, hot ambient temperature) to the UMAX storage system due to air mass transfer (i.e., mixing of air) between the array of HI-STORE UMAX inlet and outlet vents.

According to Table 1.0.1 of the HI-STORE CIS SAR, the application is for an array of 500 UMAX systems, which are based on nearly co-located inlet and outlet vents. However, a thermal analysis of array effects (rather than a single system) that quantifies relevant boundary conditions (e.g., inlet vent air temperature, radiant energy view factors) for subsequent thermal analyses of the UMAX systems was not provided for review.

This information is needed to determine compliance with 10 CFR 72.122(h) and 72.128(a)(4).

RSI 6-3: Provide a discussion in the HI-STORE SAR that evaluates the likelihood and consequences of rangeland fires on the proposed HI-STORE CIS site.

Chapter 2 of the HI-STORE SAR notes the occurrences of thunderstorms in the vicinity of the storage facility. Likewise, the chapter discusses the presence of vegetation (e.g., seasonal grasses between sporadic shrubs and forbs, Section 2.1.2). Recognizing that lightning often occurs during a thunderstorm and vegetation can be a fuel source, the accident analysis chapter should discuss the consequences of rangeland fires on the storage facility and any preventative measures that may already be incorporated in the facility design. Areas of discussion should include dimensions of fire breaks surrounding the pads and buildings (i.e., dimensions of crushed rock and gravel area) relative to the dimensions a fire can jump and measures to keep controlled area boundary free of vegetation. [Staff notes that other fires are discussed in Sections 15.3.1 (onsite initiated) and 15.3.17 (offsite initiated), and thermal evaluation is presented in Section 6.5.]

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

RSI 6-4: Provide the HI-STORE CIS Facility's Fire Protection Program document.

Page 10-10 of the HI-STORE SAR mentions the “Fire Protection Program” (in addition, page 3-8, 6-40, 10-23, and 15-10 mention “Fire Protection”), but the document was not provided for the staff’s review.

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

Observations:

Obs 6-1: Provide thermal analyses that include ambient temperatures for the thermal model’s boundary conditions that represent the average maximum temperature for the high temperature seasonal period (e.g., June, July, and August) and that reflect the effect of surrounding air temperatures from air outlet vents.

According to the FLUENT model provided for the HI-STORE SAR, the inlet boundary temperature for the normal conditions model was 16.67 deg C [62 deg F]. This temperature does not consider that during three months of the year, the average monthly maximum temperature ranges from 92.57 deg F to 93.62 deg F, as reported in Table 2.3.1 of the HI-STORE SAR. In addition, the model does not consider the potential effects on the temperature of air entering the UMAX system from the array of UMAX storage modules proposed for the HI-STORE facility.

This information is needed to determine compliance with 10 CFR 72.122(h) and 72.128(a)(4).

Safety Analysis Report (SAR), Chapter 9, "Confinement Evaluation"

Observations:

Obs 9-1: Incorporate Chapter 7, "Confinement Evaluation" of the HI-STORM FW FSAR by reference into the HI-STORE SAR.

Table 9.0.1, "Material Incorporated by Reference in this Chapter," of the HI-STORE SAR states, "the HI-STORM UMAX FSAR includes references to the HI-STORM FW FSAR, since both share the same canister models. However, since the HI-STORM UMAX FSAR includes relevant excerpts from the HI-STORM FW FSAR, no part of the HI-STORM FW FSAR needs to be incorporated by reference into the HI-STORE SAR in this chapter." The details of the canister confinement design and requirements for normal, off-normal, and hypothetical accident conditions are provided in the HI-STORM FW FSAR for the canister models, while only the evaluation is provided in the HI-STORM UMAX FSAR. Also, Chapter 7 of the HI-STORM FW FSAR describes the confinement design characteristics, structures, systems, and components (SSCs) important to safety, and confinement design basis for the two types of canisters proposed for approval in HI-STORE SAR.

This information is needed to determine compliance with 10 CFR 72.18 and 72.24(c)(3).

Obs 9-2: Include specific references to the type of canisters for which confinement evaluations were made in Chapter 9, "Confinement Evaluation" of the HI-STORE SAR.

Section 9.0 of the HI-STORE SAR references, "canisters that are certified for storage in the HI-STORM UMAX docket (Docket #72-1040)." The specific canisters proposed for approval should be clearly identified within Chapter 9, "Confinement Evaluation," of the HI-STORE SAR, and be consistent with those identified in the facility's Technical Specifications.

This information is needed to determine compliance with 10 CFR 72.18 and 72.24(c)(3).

Obs 9-3: Provide a clear and specific reference to a figure(s), or provide the figure(s) in Chapter 9 of the HI-STORE SAR that shows the confinement boundary and redundant closure for each canister, in addition to the portions of the boundaries that are accessible and not accessible to the receipt inspection leakage rate testing.

The application does not contain nor makes reference to a figure or diagram that shows the confinement boundary and redundant closure for each canister. These figures should also show the portions of the confinement boundary and redundant closure that are accessible and not accessible to the receipt inspection leakage rate testing.

This information is needed to determine compliance with 10 CFR 72.18 and 72.24(c)(3).

Obs 9-4: Provide additional descriptions in Chapter 3, "Operations at the HI-STORE CIS Facility," and Chapter 10, "Conduct of Operations Evaluation," of the HI-STORE SAR that discuss the appropriate means to cover the opened vent/drain port of the transportation package, in addition to a description of the means to collect any radioactive material.

Subsection 9.2.2, "Operational Activities," of the HI-STORE SAR describes that one of the vent/drain ports of the transportation cask is opened to allow access to the small free volume

between the canister and the cask. Subsection 9.2.2 of the HI-STORE SAR also states, “For this activity the port is covered by appropriate means […]” and if the volume contains any radioactive material, “appropriately collected.” The appropriate means to cover the port cover, in addition to a description of the means to collect any radioactive material (e.g. sampling equipment, test method, test period, instrument sensitivity, qualification of sampling procedure that is written by qualified personnel, etc.) should be described in greater detail in Chapters 3 and 10 of the HI-STORE SAR to ensure no release of radioactive material and accurate sampling results.

This information is needed to determine compliance with 10 CFR 72.24(e), 72.44(c)(ii), and 72.128(a)(1).

Obs 9-5: Revise the application to include the specific subsection(s) for the following chapters of the HI-STORE SAR:

a. In Section 9.1, “Acceptance Criteria,” of the HI-STORE SAR, include the specific subsections of Chapter 4, “Design Criteria for the HI-STORE CIS Structures, Systems, and Components,” that address the confinement acceptance criteria.
b. In Subsection 9.2.2, “Operational Activities,” of the HI-STORE SAR, include the specific subsection(s) of Chapter 10, “Conduct of Operations Evaluation,” that details the receipt inspection test, including instrumentation and acceptance criteria.
c. In Subsection 9.5.1, “Confinement Casks or Systems,“ of the HI-STORE SAR, include the specific subsections of Chapter 18, “Aging Management Program,” of the HI-STORE SAR that address any potential degradation beyond the initial licensing period.

The specific subsections(s) described above were not detailed in the specific sections HI-STORE SAR, also described above. Regarding item b. above, there are two occurrences of the use of, “Chapter 10,” in Subsection 9.2.2 of the HI-STORE SAR.

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

Obs 9-6: Describe the receipt inspection leakage rate testing of each canister to the leaktight acceptance criteria in accordance with ANSI N14.5-2014, “American National Standard for Radioactive Materials – Leakage Tests on Packages for Shipment,” in Section 9.6, “Summary,” of the HI-STORE SAR.

While Section 9.6 of the HI-STORE SAR states the confinement of all radioactive materials is provided by seal-welded canisters, loaded and closed under their original certification, it should also summarize that as part of the receipt inspection each canister is leak tested to the leaktight criteria in accordance with ANSI N14.5-2014 because the leakage rate testing, in part, demonstrates confinement integrity. Chapter 19 of the HI-STORE SAR references ANSI N14.5-2014, Paragraph 10.3.3.1, “Receipt and Inspection of Transportation Cask and Canister,” which describes leakage rate testing of each canister, and Section 16.6 of Chapter 16, “Technical Specifications,” which describes leakage rate testing to the ANSI N14.5-2014 leaktight criteria.

This information is needed to determine compliance with 10 CFR 72.24(g), 10 CFR 72.44(c)(3)(ii), and 72.128(a)(1).

Obs 9-7: Provide additional details in Paragraph 10.3.3.1, “Receipt and Inspection of Transportation Cask and Canister,” of the HI-STORE SAR to describe the leakage rate testing.

In addition, the leakage rate testing should be described and referenced in the Technical Specifications. Details that should be included in Paragraph 10.3.3.1 may include:

- Leakage rate acceptance criterion and sensitivity for each canister (see American National Standards Institute (ANSI) N14.5-2014),
- The type of leakage rate test performed from ANSI N14.5 (e.g., reference the specific section from ANSI N14.5, Appendix A, "Leakage Test Methods and Procedures"),
- A description of the leakage rate testing procedures including instrumentation (e.g. a helium mass spectrometer) used,
- A statement that the leakage rate testing written procedures are developed and approved by personnel certified by the American Society of Nondestructive Testing (ASNT) as a Level III examiner for leakage testing,
- The expected amount of time and any time limit to complete the leakage rate testing of each canister,
- A description of how it is ensured the helium in the HI-STAR annulus space is adequately flushed with nitrogen,
- A description of actions that will be taken if a leakage rate test does not meet the acceptance criterion.

Leakage rate testing should be completely described, and referenced in the Technical Specifications, and tied to Chapter 10, "Conduct of Operations Evaluation," of the HI-STORE SAR to, in part, demonstrate confinement integrity.

This information is needed to determine compliance with 10 CFR 72.24(g), 72.44(c)(3)(ii), and 72.128(a)(1).

Obs 9-8: Clarify or correct the following sentences in the HI-STORE SAR:

a. In Table 9.0.1, "Material Incorporated by Reference in this Chapter," of the HI-STORE SAR, "Further, the HI-STORM UMAX storage <u>system used for storage if the canisters</u> are principally the same as that in the HI-STORM UMAX FSAR."
b. In Section 9.1, "ACCEPTANCE CRITERIA," of the HI-STORE SAR, "The acceptance criteria for confinement evaluations <u>for are</u> presented in Chapter 4 of this SAR."
c. In Table 9.2.1, "Storage Systems," of the HI-STORE SAR, "All normal, off-normal and accident conditions relevant to confinement integrity for which the canister is certified in the HI-STORM UMAX docket are equal <u>to less</u> severe at the HI-STORE facility."
d. In Subsection 9.2.2, "Operational Activities," of the HI-STORE SAR, change "its" to "it is."
e. In Section 14.3, "LIQUID WASTE TREATMENT AND RETENTION," of the HI-STORE SAR, "Therefore leakage of radioactive material from the canisters <u>is or</u> non-credible."

These portions of the HI-STORE SAR above should be revised to ensure the meaning is clear.

This information is needed to determine compliance with 10 CFR 72.11(a).

Safety Analysis Report (SAR), Chapter 10, "Conduct of Operations Evaluation"

Observations:

Obs 10-1: Provide specific staffing requirements and explicitly define responsibilities for personnel, such as Radiation Safety Officer, that are responsible for radiation safety at the HI-STORE CIS Facility.

Table 10.1.1 of the SAR provides a staffing plan for the operation of the HI-STORE CIS. However, this table does not include a requirements for designating Radiation Safety Officer(s) and their responsibilities. Regulatory Guide (RG) 8.2, "Administrative Practices in Radiation Survey and Monitoring," describes methods that NRC staff considers acceptable for complying with regulations regarding radiation safety and protection, as prescribed in 10 CFR 20.2011, 20.1502, 20.2102, and 20.2103. The regulatory position for complying with these regulations includes establishing a Radiation Safety Officer (RSO). RG 8.2 further specifies the required training and qualification for the RSO. The applicant should provide specific staffing requirements and explicitly defined responsibilities for personnel, such as the RSO, who are responsible for radiation safety.

This information is necessary to determine compliance with 10 CFR 20.2011, 20.1502, 20.2102, and 20.2103.

Safety Analysis Report (SAR), Chapter 11, "Radiation Protection Evaluation"

RSIs:

RSI 11-1: Provide a Radiation Protection Program for the HI-STORE CIS facility that satisfies the requirements of 10 CFR Part 20.

NRC regulations in 10 CFR 20.1101(a) state that: "[e]ach licensee shall develop, document, and implement a radiation protection program commensurate with the scope and extent of licensed activities and sufficient to ensure compliance with the provisions of this part." However, the HI-STORE SAR does not include a description of the program that implements the Part 20 requirements for the HI-STORE CIS site. The SAR does not provide detailed specifications for organizational responsibilities, requirements for radiation survey equipment, nor does it identify qualifications for the personnel responsible for radiation protection. Further, the SAR does not include specific requirements for operator training and qualification, Radiation Work Permit administration, and dose monitoring and record management. Although the applicant discusses in various parts of the SAR its intention to follow as low as is reasonably achievable (ALARA) principles in operating the proposed HI-STORE CIS for storage of commercial spent nuclear fuel and the associated greater than Class C (GTCC) wastes in sealed metal spent fuel canisters for a period of 40 years, these statements do not constitute a Radiation Protection Program as required by the regulations.

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

Observations:

Obs 11-1: Provide a description of the radiation protection design features that account for the site-specific design and operational features of the HI-STORE CIS.

In Table 11.0.1, Item 2, the applicant states that, "[t]he HI-STORM UMAX radiation protection design features are the same as described in the HI-STORM UMAX FSAR and therefore the conclusions established therein that the radiation protection features ensure that the occupational dose as well as off-site dose from the ISFSI will be ALARA, remain unchanged in this SAR." However, the applicant does not provide a discussion or demonstration of how the generic radiation protection design features from the HI-STORM UMAX FSAR remain applicable to the site-specific design and operation characteristics of the HI-STORE CIS facility. The applicant should discuss how the radiation protection features of the HI-STORM UMAX FSAR considers for the site-specific dose rates in the areas that workers are expected to occupy and the duration of each operation.

This information is necessary to determine compliance with 10 CFR 72.24(e), 72.104, 72.126(a)(6), 72.126(d), and 10 CFR 20.1201, 20.1206, 20.1301, 20.1302, and 20.1406.

Obs 11-2: Provide estimated annual doses to occupational workers from the operation of the HI-STORE CIS.

In Table 11.0.1, the SAR lists *Estimated On-Site Cumulative Dose Assessment – Excavation Activities and accident site boundary dose limits* and *Estimated Exposures for Surveillance and Maintenance,* which provided estimates of the dose received for these operations. In addition,

the applicant references the dose estimates from the HI-STORM UMAX VVM ISFSI system design as the estimated dose for the HI-STORE CIS operations. However, the SAR does not evaluate or justify in sufficient detail how the dose estimates from the generic HI-STORM UMAX FSAR adequately consider the site-specific design features and operations for the HI-STORE CIS. The application should provide estimates or evaluations of the estimated dose that account for site-specific design features and operations at the HI-STORE CIS facility.

This information is necessary to determine compliance with 10 CFR 20.1101, 20.1301, 20.1302, 20.1501(a), and 10 CFR 72.24(e), 72.104, and 72.126(d).

Safety Analysis Report (SAR), Chapter 17, "Material Considerations"

RSIs:

RSI 17-1: Supplement Chapter 17 of the SAR, "Materials Evaluation," to include the evaluation of the structures, systems, and components (SSCs) unique to the HI-STORE CIS (i.e., those SCCs not associated with the referenced UMAX and FW systems).

Chapter 17 of the HI-STORE SAR provides a detailed discussion of the ventilated vertical module (VVM) and multi-purpose canister (MPC) materials, and references the HI-STORM FW and UMAX safety analysis reports for specific materials information. However, discussion of site-specific important-to-safety components unique to the HI-STORE facility (e.g., transfer cask, lift yokes, components in the cask transfer building) is either limited or not present. To allow the staff to evaluate the materials of these SSCs, provide details of mechanical properties of all materials used, exposure environments, degradation modes, welding specifications, presence of bolting, coatings, chemical/galvanic reactions, and examination and testing.

This information is necessary to demonstrate compliance with 10 CFR 72.24(d).

RSI 17-2: Provide an evaluation of materials aging degradation for the transport cask lift yoke, lift beam, and tilt frame.

Chapter 18 of the SAR and the Holtec aging assessment document (HI-2167378) describe the activities that address aging of important-to-safety SSCs. Table 18.1.1 lists important to safety (ITS) SCCs and identifies these as requiring aging management. However, the aging evaluations do not include components associated with handling of the transport cask. SAR Chapter 5 and the drawings identify the transport cask lift yoke, lift beam, and tilt frame as ITS.

This information is necessary to demonstrate compliance with 10 CFR 72.120(d) and 72.122(b)(1).

RSI 17-3: Provide details on the maintenance programs for SSCs other than the VVM for Chapter 10, "Conduct of Operations Evaluation" of the HI-STORE SAR.

Section 3.1.4.7 of the SAR states that periodic maintenance is required on the overhead crane, service cranes, transfer equipment, HI-TRAC CS transfer cask, and transportation casks. This section refers to SAR Chapter 10 for full details. However, Chapter 10 includes full details of maintenance activities only for the VVM (SAR Table 10.3.2). The SAR should fully describe any maintenance programs for all ITS SSCs. The staff notes that, in some cases the SAR lists a maintenance task (e.g., visual inspection of HI-TRAC cavity), but the purpose of the inspection, what parameters will be inspected, and the acceptance criteria are not provided.

The staff also notes that the SAR sometimes leaves details of maintenance and inspection activities to be determined on a site-specific basis. All such site-specific determinations should be provided for the HI-STORE site. For example, SAR Table 10.3.2, "Maintenance Activities for the HI-STORM UMAX VVM," states "[…] frequencies for additional in-service inspections are determined on a site-specific basis." Also, SAR Section 17.11 states that "…the storage cask or canister should be evaluated by the licensee on a site-specific basis to determine the frequency for such inspections […]"

This information is necessary to demonstrate compliance with 10 CFR 72.120(d) and 72.122(b)(1).

Observations:

Obs 17-1: The canister aging management program (AMP) does not describe either (1) the extent of coverage for the stress corrosion cracking (SCC) inspection/monitoring activities or (2) a technical basis for the adequacy of these activities.

The canister AMP includes visual inspections of the canisters, but it does not define a minimum coverage area (or weld length) for this inspection. The AMP also includes coupon testing for stress corrosion cracking, but it does not define the number of VVMs that will include coupons or how the VVMs will be selected for this monitoring. These details are needed to allow the staff to evaluate the effectiveness of these activities. In addition, the SAR should provide a technical basis that considers site halide measurements, environmental conditions, available estimates on crack growth rates, and operating experience to demonstrate that the frequency, number, and extent (coverage) of inspections or monitoring will be capable of identifying SCC prior to a loss of function.

This information is required to demonstrate compliance with 10 CFR 72.120(d) and 72.122(b)(1).

Obs 17-3: The HI-STORE CIS SAR does not discuss whether the fatigue evaluations originally required by the design code for the UMAX and FW systems remain valid for the proposed 40-year storage term.

The American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) includes requirements to evaluate the potential for fatigue (or whether such an evaluation is necessary). For example, ASME Code Section III, Division 1, NB-3222.4 considers the effects of both mechanical and thermal cycling on the MPC confinement boundary. The HI-STORE SAR should clearly state whether the ASME Code-required fatigue evaluations that were originally performed for the UMAX and FW designs (certified for 20 years) remain valid for 40 years of storage.

This information is necessary to demonstrate compliance with 10 CFR 72.24(d) and 72.122(b)(1).

HI-STORE CIS Environmental Report (ER)

RSIs:

RSI ER-1 (General): Provide a schedule of all proposed construction phases.

ER Section 1.3, "The Proposed Action," states that the proposed action is a request for a license to construct and operate a CIS facility in Lea County and that Phase I would be associated with construction of a facility to store up to 5,000 MTUs. The ER also discusses that: "[p]hases 2 - 20 would occur over approximately 20 years" and store up to 100,000 MTUs at full capacity. Although the application provides a break-out discussion of Phases 2 -20, it is not clear if the construction phases will occur sequentially or if several phases will be constructed simultaneously. Therefore, the impacts from Phases 2-20 are not defined as bounding based on the expected construction schedule for the additional phases.

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

RSI ER-2 (General): Provide publically available replacement pages for pages 38 and 39 of the ER.

Pages 38 and 39 of the ER contain information that is defined as sensitive. Information in the ER should be publicly available, unless it meets the criteria for withholding under 10 CFR 2.390.

This information is needed to determine compliance with 10 CFR 51.120.

RSI ER-3 (Transportation): Provide a map of the proposed site that includes the proposed access road and railroad spur and also provide a discussion of environmental impacts due to their construction.

ER Section 3.9, "Affected Environment – Transportation," and Section 4.9, "Environmental Impacts – Transportation," discuss the proposed transportation at and near the proposed site. Section 4.9.1, "Construction," mentions that Phase 1 would require a new access road from U.S. Highway 62/180 and a new railroad spur from the existing Carlsbad railroad spur that ends 3.8 miles west of the site. Figure 2.2.1, "Areal View of CIS Facility" does not appear to display the proposed access road or railroad spur. Additionally, Section 4.9.1 does not specify the impacts of construction of the new access road and railroad spur, but points to other sections within Chapter 4, "Environmental Impacts," for impacts. The individual resource impact sections do not specify the environmental impacts of the access road or railroad spur construction.

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

RSI ER-4 (Meteorology): Provide monthly and annual wind roses and wind direction persistence summaries for all heights at which data is applicable.

ER Section 3.6, "Affected Environment – Climatology, Meteorology, Air Quality and Noise," and Section 4.6, "Environmental Impacts - Climatology, Meteorology, Air Quality and Noise," discuss the meteorology and air quality. Table 3.6.2, "Lea County Regional Airport Station All Wind Data," provides wind speed and direction data but a measurement height is not specified. Figure 3.6.2, "Lea County Regional Airport Station All Wind Rose," provides wind rose data compiled from 1948-2014, but not annual data.

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

RSI ER-5 (Meteorology): Provide description of meteorological dispersion characteristics and topography of the site and its surrounding area.

ER Section 3.6.2, "Lea County Regional Airport Station All Wind Rose," describes the air quality of the region but does not discuss dispersion. Average mixing height is provided in Table 3.6.3, "Average Morning and Average Afternoon Mixing Heights," but stability class for the site vicinity is not provided in the ER. The topographic information for the site in the SAR or the ER is not adequate for dispersion analysis.

This information is needed to assess radiological impacts and non-radiological impacts from the proposed action and to determine compliance with 10 CFR 51.45(b)(1).

RSI ER-6 (Ecological Resources): Provide specific information identifying the area investigated during the 2016 ecological survey.

In ER Section 3.4, "Affected Environment – Ecology," and Section 4.4, "Environmental Impacts-Ecology," the description of ecological resources relies on information from an ecological study conducted in 2007 for the Eddy-Lea Energy Alliance (ELEA 2007) Global Nuclear Energy Project (see Observation ER-1, below). It is not clear if the in-field ecological survey completed in 2016 was performed for the entire project area. Section 3.4 of the ER states that the study in Appendix B only focuses on areas proposed for Phase 1 facilities, the rail spur, and the site access road.

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

RSI ER-7 (Public and Occupational Health): Provide additional information describing the radiological characteristics for the site and its surroundings.

ER Section 3.12, "Recent Ecological Survey," does not provide an in-depth description of the radiological environment. It does not provide a description of major sources and levels of background radiation exposure, including natural and man-made sources; current sources and levels of exposure to radioactive materials; major sources and levels of chemical exposure, if any; or any applicable historical exposures to radioactive materials.

This information is needed to assess radiological impacts and to determine compliance with 10 CFR 51.45(b)(1).

RSI ER-8 (Waste Management): Provide a description of the waste sources, types, quantities, storage location (if any), composition of solid, liquid, hazardous, radioactive, and mixed wastes expected for each phase of construction.

ER Section 3.11, "Affected Environment – Waste Management," and Section 4.11, "Environmental Impacts – Waste Management," of the ER do not provide description of the waste sources, types, quantities, storage location (if any), composition of solid, liquid, hazardous, radioactive, and mixed wastes expected for each phase.

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

RSI ER-9 (Alternative Siting Process): Provide a discussion regarding the environmental impacts of the alternatives. Provide the referenced Appendices in ELEA 2007 (including the siting criteria, see RSI 2-1) or provide a location where this information is publicly available.

In ER Chapter 2.3, "Site Selection Process," the site selection process references ELEA 2007 Appendix 2C. This appendix is not readily available and the details of the impacts from alternate sites are not discussed in detail in the application.

This information is needed to determine compliance with 10 CFR 51.45(b)(3) and 51.70.

Observations:

Obs ER-1 (General): Provide information for each resource area confirming that the data conclusions in the 2007 ELEA reference is still valid or update the information for the period between 2007 and 2017.

In ER Chapter 3, "Affected Environment," several of the resource sections rely on data from the ELEA 2007 reference. The ER does not provide verification that the data from this reference, which supports the characterization of the current conditions, is up to date and still applicable. For some resource areas, characteristics may have changed or additional information may be available since the ELEA 2007 reference was completed.

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

Obs ER-2 (General): Provide a site map that includes topography and site features.

There is no overall site map showing topography and site features.

This information is needed for all resource areas and to determine compliance with 10 CFR 51.45(b).

Obs ER-3 (Mitigation): Provide a description of mitigation activities that effects the environmental impacts for each resource area.

Mitigation activities should be clearly stated in ER Chapter 6, "Mitigation Measures." The mitigation activities that are committed to by the applicant and are being accounted for in the impacts should be clearly defined and separated from those mitigation activities that are voluntary.

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