Request for Additional Information
Docket No. 72-1026
SENTRY™ Dry Storage System
Certificate of Compliance No. 1026
Set 2

By letter dated April 30, 2020 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML20121A196), as supplemented on June 5, 2020, October 2, 2020, November 20, 2020, and January 15, 2021 (ADAMS Accession Nos. ML20164A120, ML20276A295, ML20329A083, ML21019A509, and ML21019A509, respectively), Westinghouse Electric Company LLC (Westinghouse or the applicant) submitted to the U.S. Nuclear Regulatory Commission (NRC) an application for the SENTRY™ Dry Storage System (SENTRY DSS or SENTRY), Certificate of Compliance (CoC) No. 1026, pursuant to the requirements of Part 72 of *Title 10 of the Code of Federal Regulations*.

The requested information is listed by chapter number and title in the applicant's safety analysis report (SAR or application). The NRC staff used NUREG-2215, "Standard Review Plan for Spent Fuel Dry Storage Systems at a General License Facility — Final Report," in its review of the application. This request for additional information identifies information needed by the NRC staff (the staff) in connection with its technical review of the SENTRY DSS application.

Chapter 5: Thermal Analysis

5-1. See Enclosure 1.

5-2. See Enclosure 1.

5-3. See Enclosure 1.

5-4. See Enclosure 1.

5-5. See Enclosure 1.

5-6. Provide ".cas", ".dat", and (if applicable) user defined function files for the analyses discussed in the above RAIs and the analyses that were not provided.

The issues discussed in the preceding RAIs point to uncertainties in the existing models. These uncertainties may result in temperatures exceeding allowable values for certain conditions, including those that were not reviewed. For example, Condition 5 and Condition 3 (without ACS in operation during transfer and vacuum drying), in particular, are conditions that did not have ".cas", ".dat", and (if applicable) user defined function files for review. These conditions are transfer cask operating conditions that do not rely on a reservoir of water, and therefore, a correct allowable operation period is important for safe operation of W37 and W21H content. A review of the files, including the updated models, will help to understand the changes and their impact on results.

This information is needed to demonstrate compliance with 10 CFR 72.236(f).

5-7. Provide further information about the model's gaps, interface resistances, and geometric simplifications so that an evaluation of the model's thermal performance can be made.

a. There was limited detailed discussion and analysis associated with the gaps used in the thermal models to justify the statement in SAR Section 5.4.1.3.1.1 that the "thermal resistance of each gap is treated conservatively."

b. See Enclosure 1.

c. Staff notes that although SAR Appendix 5A.3 discussed gap variation, there was no clear connection with the discussion in SAR Section 5.4.1.3.1.1 about the use of "worst tolerances" and interface resistances. For example, there was no clear connection of SAR Table 5.4-9, the 'worst tolerances", and the gap uncertainty analyses in SAR Appendix 5A.3. Finally, there was no clear explanation as to which gap in SAR Table 5.4-9 was incorporated in the thermal model.

d. There was no discussion of the implementation of interface resistances in the model and no calculations of an interface resistance to account for "worst tolerances" (SAR Section 5.4.1.3.1.1).

e. Regarding SAR Section 5.4.1.3.1.1, the evaluations and discussion used to determine that the geometric simplifications did not impact the flow field or heat transfer should be provided so that an assessment can be made.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-8. Provide further discussion about the off-normal and accident scenarios described in SAR Chapter 16 and SAR Chapter 5 (e.g., SAR Section 5.4.1.6 and SAR Section 5.4.1.2.7).

a. SAR Section 5.4.1.2.7 and Section 5.4.1.6 provided a brief discussion about the accident storage conditions. There was limited discussion about the assumptions associated with certain boundary conditions, such as flame velocity and the choice of convection coefficient.

b. There appears to be an inconsistent description of the model used to analyze the fire accident condition. SAR Section 5.4.1.2.7 stated that the fire accident condition was analyzed using a 2D model and a 3D model. If both 2D and 3D models were used, the SAR should be updated to include both results for review.

c. The maximum temperatures of the ITS components reached during off-normal, short-term, and accident transients should be provided so that margins with the allowable temperature could be reviewed. For example, although some component temperatures were provided (e.g., SAR Table 5.4-15), other component temperatures were not provided.

d. There were no references or analyses that justified the W180 vent pressure loss coefficients during operations, including the off-normal partial blockage of air inlet condition (and normal condition) mentioned in SAR Section 16.1.2.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-9. Provide the thermal analyses that show boiling will not occur in the water-filled canister and the water placed in the annulus between the canister and transfer cask, during loading, transfer, and unloading conditions.

a. SAR Section 5.4.2.1.2 stated that "[w]ith the operation of the ACS, boiling of the water in the cavity is not expected to occur by design", but no supporting analysis was provided. In addition, there was no analysis that supported the ACS design specifications of 31.8 gpm at 68°F water temperature were sufficient to meet thermal performance. Likewise, there was no justification for the statement in SAR Section 16.1.4.6 that recirculation of spent fuel pool water at 115°F would meet cooling performance considering that the ACS system is designed for 68°F cooling water.

b. SAR Page 5-3 indicated that heat removal from the canister is performed by conduction through a demineralized water-filled annulus formed between the outer canister and the transfer cask inner shell for low heat load; correspondingly, water flows through the annulus via the ACS for high heat loads. Neither the SAR nor the Technical Specification provided a demarcation as to when relevant heat loads require either a stagnant water condition or an ACS water condition. In addition, thermal analyses that justify the stagnant water conditions (non-ACS operation) would not boil were not provided and, therefore, could not be reviewed.

c. Although SAR Section 16.1.4.5 stated that there were design features to ensure canister water did not boil and SAR Table 5.4-17 and Table 5.4-18 indicated a 212°F water temperature criteria for various conditions, only SAR Figure 5.4-18, Figure 5.4-19, Figure 5.4-26 and Figure 5.4-27 from two operating conditions (out of approximately nine) showed time to boil calculations (i.e., for the condition at high decay heat).

d. Staff notes that the text in SAR Section 11.2.7 and Section 11.3.2.2 that allowed boiling conditions should be updated because it is inconsistent with SAR Section 16.1.4.5 that stated design features would prevent boiling.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-10. Provide the neutron resin and lead temperature for the various operating conditions when the content is placed within the transfer cask.

Although the neutron resin and lead are ITS components, there is hardly any mention of their temperature during the various conditions and operations when the content is placed within the transfer cask. Only Condition 6 in SAR Section 5.4.2.5.3 mentioned the neutron resin temperature reached its allowable temperature, but no other conditions provided the temperature for this ITS component.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-11. Clarify the choice of the time limits associated with Condition 6 recognizing the time limits did not allow for margin with the transfer cask neutron resin reaching its allowable temperature limit.

SAR Section 5.4.2.5.3 listed the time limits to activate the ACS for Condition 6. However, according to SAR Figure 5.4-30 and Figure 5.4-31, these time limits do not include any margin in time to prevent the neutron resin temperature from increasing beyond its allowable temperature, recognizing there is a time delay between activating the ACS and starting the actual cooling of ITS components.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-12. Provide a drying condition thermal analysis associated with vacuum conditions.

SAR Section 5.4.2.1.3 stated there would be 3 torr of helium pressure within the canister during vacuum drying conditions and Technical Specification 3.1.3 stated that helium pressure could be below 3 torr. Recognizing that helium pressure could be below 3 torr during the vacuum drying process for a variety of reasons (e.g., instrument malfunction), a steady-state 3D bounding vacuum condition analysis should be performed to demonstrate the sensitivity of the system (W37 and W21H) to the potential vacuum drying condition.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-13. Clarify in the SAR Thermal chapter the basis of the four hour time limit to both fill the annulus with water and start the ACS and the 10 hour stabilization time limit of maintaining ACS operation. In addition, clarify in the SAR the equivalence of measuring gas temperature with the above-mentioned time limits (as described in SAR Section 11.2.8).

a. Technical Specification Table 5.3-1 noted that the W37 and W21H transfer time limits are 16 hours and 14 hours, respectively. Although the details were not explicitly mentioned in SAR Section 5.4.2.1.5, it appears these time limits were derived from SAR Figure 5.4-24 and SAR Figure 5.4-25. However, the basis for the four hour and 10 hour time limits for the potential subsequent loss of the ACS condition described in the Technical Specification Table 5.3-1 was not provided.

b. Likewise, the reason for a four hour and 10 hour time limit for both the W37 and W21H canister was not provided, recognizing that other time limits in Technical Specification Table 5.3-1 have different time limits for each canister type because of the significantly different decay heats.

c. There appears to be an unverified procedure expressed in the Note at the end of SAR Section 11.2.8, which implies the user can rely on gas temperature monitoring to adopt time limits, although there was no validated equivalence between the time limits determined by thermal analysis and gas temperature measurement.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-14. See Enclosure 1.

5-15. Clarify the FLUENT model type (2D or 3D) when analyzing normal loading Condition 2 and Condition 3.

SAR Table 5.4-17 indicated that Condition 2 and Condition 3 FLUENT models were run as steady-state analyses. Although one could assume that the analyses were based on the 3D models because SAR Section 5.4.2.3 and Appendix 5A.2 both state that 2D axisymmetric models were developed for transient simulations, it was not clear whether 3D or 2D models (for both W37 and W21H content), with their different modeling assumptions and boundary conditions, were analyzed during the Condition 2 and Condition 3 steady-state runs. As noted in the above RAIs, there are validation issues with 2D models.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-16. Justify the much lower PCT of the W21H canister (616°F) compared to the W37 canister (728°F) for Condition 3 reported in SAR Section 5.4.2.5.2.

The W21H canister has a decay heat that is 1.44 times greater than the W37 canister, which generally would indicate a more bounding thermal condition. Recognizing that both canisters have similar PCT values at normal storage conditions according to SAR Table 5.4-10 and Table 5.4-11 and the W21H canister has a PCT that is nearly 50°F higher than the W37 canister during Condition 2 according to SAR Table 5.4-21, there was no explanation for the W21H canister having a PCT that was over 100°F less than the W37 canister for Condition 3.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-17. Provide the thermal analyses that support the temperature and pressure conclusions associated with the damaged fuel assemblies as content.

a. SAR Table 5.4-31 provided pressure information associated with Damaged Fuel Cans (DFC). However, the model's decay heat, the effect of different effective thermal properties, and the boundary conditions for the thermal analyses were not described in the SAR.

b. Clarify in the SAR that the Chapter 5 DFC thermal model and analyses (e.g., reported in SAR Table 5.4-10) considered the unique thermal properties and shape of the DFC in the thermal model.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-18. Provide the boundary conditions and further discussion that supports the 512°F helium temperature used for the pressure calculations.

SAR Section 5.4.3.3 indicated that the pressure calculations were based on temperatures from the thermal analyses. However, the details associated with the thermal model (e.g., decay heat, boundary conditions) were not mentioned and, therefore, the bounding nature of the pressure calculations could not be determined, including for short term operations (e.g., transfer). In addition, staff notes that, although only one canister helium backpressure was discussed in the SAR Thermal chapter, there may be different backpressures and boundary conditions in order to achieve a bounding thermal analysis (i.e., underpredict helium backpressure in order to underpredict the thermosiphon cooling effect) and a bounding pressure analysis (i.e., overpredict helium backpressure).

This information is needed to determine compliance with 10 CFR 72.236(f).

5-19. See Enclosure 1.

5-20. See Enclosure 1.

5-21. See Enclosure 1.

5-22. See Enclosure 1.

5-23. See Enclosure 1.

5-24. See Enclosure 1.

5-25. Demonstrate that the W21H canister fins will retain thermal performance for the certification period after undergoing handling conditions and being exposed to environmental conditions that can deform and foul the canister's fins.

It was not demonstrated that the fin design (per dimensions in drawing 1AM9.21L2) is sufficient to withstand handling operations (e.g., inadvertent bumping during loading and unloading into the cask) without undergoing fin deformations that could impair thermal performance. Likewise, there was no analysis in the 2D and 3D models to show the impact of a partial loss of fin area due to handling operations. Finally, there was no analysis in the 2D and 3D models that addressed the "cleanliness" of the fin and its corresponding thermal performance throughout its use, such as after being submerged in the pool, within the transfer cask exposed to the ACS water, and the potential fouling of the fins within the ventilated W180 storage cask (e.g., fouling factor due to dirt accumulation).

This information is needed to determine compliance with 10 CFR 72.236(f).

5-26. See Enclosure 1.

5-27. Provide the thermal analyses that consider the movement of the contents within the storage cask from the time the canister is placed within the storage cask within the fuel building to the time the storage cask is placed on the ISFSI pad.

a. The loading and transfer operation in SAR Section 1 discussed the process of a loaded canister within the transfer cask inside of the fuel building as well as the process of a loaded canister within the storage cask as it moves from the fuel building to the ISFSI pad. The SAR Thermal chapter only discussed the process associated with the loaded canister within the transfer cask. There was no discussion in the SAR of analyses that demonstrated there would be adequate heat transfer during the process of transporting the loaded canister within the storage cask from the fuel building (at 115°F) to the ISFSI pad.

b. In addition, the Technical Specifications only referred to the transfer of the canister within the transfer cask and did not provide any time limits or conditions associated with the transfer of the canister within the STORAGE CASK (part of which can occur at 115°F) as it is being transported to the ISFSI pad.

c. SAR Section 11.2.9.5 stated that air pallets must be removed prior to installation of the inlet vent screens. There was no discussion in the SAR Thermal chapter as to whether the storage model represented the actual conditions within the transfer building and during transport to the ISFSI pad (e.g., blockage of vents, including due to air pallet placement).

This information is needed to determine compliance with 10 CFR 72.236(f).

5-28. Provide further discussion about the thermal model during the transfer process (mentioned in SAR Section 5.4.2.1.5) that demonstrates the transfer cask thermal performance.

The transfer process is a critical operation because the canister is confined within a cask without the cooling feature of the ACS. Although SAR Section 12.1.2.6 stated that the "transfer cask thermal performance is demonstrated through analysis", there was very little discussion in the SAR about the transfer operation boundary conditions and the transfer operation thermal model, including the W110 transfer cask and W180 storage cask during its movement. For example, although system temperatures may rise if the ACS is not operable (e.g., annulus water is not available) when the canister is placed within the transfer cask, the temperature of ITS components, such as shielding materials (i.e., lead and epoxy-resin), was not discussed.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-29. See Enclosure 1.

5-30. See Enclosure 1.

5-31. Clarify that the entire confinement boundary will be leak tested to ensure dose and release requirements as well as to ensure thermal performance.

SAR Section 12.1.3.6.1 stated that leakage rate tests are performed to ensure adequate helium supply within the canister and SAR Section 1 (page 1-1) stated that the canisters are "leaktight". Likewise, SAR Section 9.1.2.1 stated that helium leak rate tests, which are to be in accordance with ANSI N14.5 (2014), would be performed to ensure dose and release requirements. However, SAR Table 9.1-2 and SAR Table 12.1-3 indicated that only certain welds of the W37 and W21H confinement boundary would be helium leak tested. In addition, Technical Specification Limiting Conditions for Operation (LCO) 3.1.4 and B3.1.4 "Canister Leak Rate" did not address the confinement boundary, but only referred to the drain and vent cover leak rate test.

This information is needed to determine compliance with 10 CFR 72.236 (d), (f), (j).

5-32. Clarify in the Technical Specification that the maximum allowable temperature during transfer is 115°F, which is the maximum temperature analyzed.

SAR Section 5.3.1 (page 5-30) stated that loading operations are performed inside a plant's fuel building. SAR Section 5.4.2.3.1 stated that the transfer operation that occurs within the plant's fuel building and then to the outside storage pad is based on an ambient temperature of 115°F. Technical Specification 4.3 stated that the minimum temperature for transfer operations is 0°F and stated that the maximum temperature within the fuel building during transfer operations "should" be 115°F. Considering that the transfer thermal analyses in Chapter 5 were based on a 115°F ambient temperature, the Technical Specification should indicate that the maximum allowable temperature inside the fuel building and the ambient during transfer is 115°F.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-33. Clarify in the SAR thermal chapter and Technical Specification that the normal condition thermal analyses for storage were based on an 80°F ambient temperature (not an average yearly temperature); in addition, the Technical Specification should be based on a bounding temperature that reflects a normal condition expected to routinely occur (i.e., maximum normal temperature during summer seasonal).

SAR Section 5.4.1.2.1 stated that 80°F as the average ambient temperature is characteristic and reasonably bounding for all reactor sites. Likewise, Technical Specification 4.3.1 stated that the ambient temperature considered for normal conditions for storage is based on an 80°F average yearly temperature. As written in the SAR and Technical Specification, a site may incorrectly conclude that the Sentry system has been analyzed to meet allowable values (e.g., component temperatures, pressures) for locations that have an 80°F average yearly temperature, which can have normal condition temperatures greater than 80°F during the year (i.e., summer seasonal period). In fact, however, the SAR's thermal analyses have only demonstrated that allowable values were met for a normal condition ambient temperature of 80°F. A correct interpretation of the SAR's Sentry thermal analyses is important so as to ensure components meet allowable values.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-34. Clarify in the Technical Specification that the ACS with its redundant components (e.g., chiller, pump) is designated as ITS and that the ACS 31.7 gpm water flow rate (at 68°F) are performance parameters.

SAR Section 1.2.1.5.3, Section 5.4.2.1 and the Technical Specification 5.3.6 describe the importance of the ACS system for loading, transfer, and unloading operations in order to maintain the content and system components below allowable temperatures. Both SAR Section 1.2.1.5.3 and Section 5.4.2.1 note that the system will have redundant chiller and pump with volumetric flow rate of 31.7 gpm at 68°F water temperature.

However, the Technical Specification did not designate the ACS as ITS nor did it specify the ACS performance requirements.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-35. Provide the thermal analyses that justify the Cask Monitoring frequencies specified in the Technical Specification and the duct inspection frequency in SAR Table 5.5-1.

Results in SAR Table 5.4-16 showed that temperatures above ITS component allowable temperatures can be reached as soon as 11 hours for certain vent blockages. However, SAR Table 5.5-1 indicated W180 storage cask duct inspection frequency of 36 hours and 82 hours. The vent inspection frequency should reflect that the amount of blockage (e.g., 25%, 50%, 100%) that can occur at any given time is not known, *a priori*. For all Technical Specification LCOs, staff notes that the appropriate choice of Technical Specification surveillance frequencies and completion times (and the ITS component temperatures that determine the completion times) needed to place the storage system into compliance should ensure that LCO and surveillance frequency applicability bases (e.g., SR 3.0.2) do not incorrectly extend completion times in a manner such that the system is not at normal function, recognizing that components do not immediately cool down (i.e., thermal inertia effects).

This information is needed to determine compliance with 10 CFR 72.236(f).

5-36. Update the application to include hydrogen monitoring within the Technical Specification.

Although SAR Chapter 11 mentioned the need to monitor hydrogen concentration during lid welding, the Technical Specifications should describe a hydrogen monitoring program, recognizing the importance of the program for safe operations.

This information is needed to determine compliance with 10 CFR 72.236(h).

5-37. Clarify the bases for the Completion times and Frequency associated with the Technical Specification's Limited Conditions of Operation (LCO) 3.1.2, LCO 3.1.3, LCO 3.1.4, LCO 3.1.5, LCO 3.3.1.

The bases and analyses for some of the Completion times and Frequency did not appear to be located in the SAR (e.g., LCO 3.1.2). Likewise, the Completion Times and Frequency for the LCOs (e.g., LCO 3.1.3, LCO 3.1.5, LCO 3.3.1) were different from the time periods analyzed in the SAR Thermal Chapter, including SAR Table 5.5-1. It is noted that Completion Times and Frequency values should include margin, recognizing that some of the times listed in SAR Table 5.5-1 do not consider the additional heat up that arises during mitigation operations.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-38. Define the OPERABLE status associated with the STORAGE CASK heat removal system in the Technical Specification LCO conditions (e.g., Technical Specification LCO 3.3.1). The LCO conditions and their surveillance frequency should reflect the need for maintaining a normal operating condition of the storage system.

a. Technical Specification LCO 3.3.1 noted that the completion time for restoring the STORAGE CASK to OPERABLE status was 6 hours. However, a defined description of OPERABLE status was not included.

b. In addition, the average temperature of the outlet vent air (i.e., the “specified limit”) that defines the system as being in an OPERABLE status was not specified.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-39. Provide the thermal analyses that demonstrate the minimum decay heat that does not require the ACS and does not require completion time limits (i.e., steady-state analyses), per Technical Specification Table 5.3-1.

Note (a) in Technical Specification Table 5.3-1 did not provide the maximum decay heat that does not require completion time limits associated with loading, unloading, and transfer operations. Likewise, Note (b) in Technical Specification Table 5.3-1 did not provide the maximum decay heat that does not require the ACS; staff notes that canisters with certain decay heats lower than the design basis heat load would require the ACS in order to limit ITS component temperatures below allowable values.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-40. Provide further details for the Storage Cask Monitoring Program discussed in Technical Specification 5.3.9 and Basis B.3.3.1.

The Storage Cask Monitoring Program did not specify the number and location of the outlet air vents and thermocouples used to obtain the “… average temperature of the outlet vent air” (per LCO 3.3.1). In addition, the Technical Specification’s Storage Cask Monitoring Program did not indicate that the temperature monitoring equipment was ITS and did not provide the acceptance criteria for the thermocouple-based monitoring program (e.g., changes in the difference of the averaged outlet vent air and ISFSI ambient temperature).

This information is needed to determine compliance with 10 CFR 72.236(f).

5-41. Clarify what heat transfer characteristics would be recorded as part of Technical Specification Administrative Controls 5.4 Special Requirements for First System in Place.

Technical Specification Administrative Controls 5.4 and SAR Section 12.3 indicate that measurements will be recorded for “first systems” so as to “measure its heat removal and to establish baseline data.” The heat transfer characteristics to be recorded were vague (e.g., “temperature measurements”). For example, there was no discussion whether the “temperature measurements” were for the air outlet vents and the number of vents. Staff notes that information used to determine cask “heat removal” would also generally include inlet vent air temperature (or a relevant local ambient temperature) and air flow through the inlet vents.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-42. Clarify in the bases for Technical Specification SR 3.1.4.1 that the leak tests performed comply with ANSI N14.5 (2014) as discussed in the SAR, rather than an indeterminate equivalent.

SAR Section 1.2.1.2, Section 1.2.1.3, SAR Table 3.0-1, and the SAR Confinement chapter, which discussed the measures to demonstrate confinement performance, clearly described that leak testing was in accordance with ANSI N14.5, rather than some indeterminate reference, and therefore, ANSI N14.5 (2014) should be reflected in the Technical Specification.

This information is needed to determine compliance with 10 CFR 72.26 and 72.236 (d), (f), (j).

5-43. Clarify the measures that can be taken to “cool the STORAGE CASK” if the Required Actions associated with Technical Specification LCO 3.3.1 cannot be completed within time limits.

Technical Specification Basis B 3.3.1 indicates that a site can “cool the STORAGE CASK”, but does not describe the measures, nor were the measures discussed in the SAR.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-44. Clarify in the Technical Specification and SAR Section 11.3.1.4, SAR Section 11.3.1.5 and SAR Section 11.3.2, the relevant time periods associated with the ACS operation during the unloading operation.

SAR Section 5.4.2.1.6 indicated both a time period in which the ACS does not have to be operated during the unloading condition and a different time period equivalent to the calculation for Condition 5. The differences in these time periods and when each should be applied were not clearly presented in the SAR Section 11 (neither the operation step or the Notes) or the Technical Specification Table 5.3-1.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-45. Clarify in the SAR the acceptance criteria and use of various temperature measurements (transfer cask, canister water temperature, air temperature) specified throughout the Operations described in SAR Chapter 11.

Throughout SAR Chapter 11, operational notes state that temperature measurements can be used for operation and for adopting time limits. For example, SAR Section 11.2, Section 11.2.9.2, Section 11.3.1.4, and Section 11.3.2.1 indicated that the transfer cask temperature can be monitored, but acceptance criteria (e.g., thermocouple placement, allowable temperature value) and the use of the temperature measurement regarding Technical Specification requirements were not provided. SAR Section 11.2 indicated canister water temperature can be monitored to adopt time limits, but no acceptance criteria or equivalence with time limits was discussed. SAR Section 11.2.8 indicated canister gas temperature can be monitored to adopt time limits but no acceptance criteria or equivalence with time limits was discussed. Finally, the use and verification of periodic transfer cask temperature measurements (per Step 8 of SAR Section 11.2.9.2) was not discussed.

This information is needed to determine compliance with 10 CFR 72.236(f).

5-46. Clarify the use of monitoring air temperature for appropriate storage cask concrete conditions.

SAR Section 11.2.9.5 step 9 stated that storage cask concrete temperature is measured using the outlet vent temperature in accordance with Technical Specification LCO 3.3.1. There was no discussion in the SAR Thermal chapter or the Technical Specification about the need to monitor concrete using air temperature measurements nor the equivalence between concrete temperature and air temperature.

This information is needed to determine compliance with 10 CFR 72.236(f).