Request for Supplemental Information with Observations
Model No. No. CASTOR® geo69 Storage Cask
Docket No. 72-1052

This request for supplemental information (RSI) identifies information needed by the staff in connection with its acceptance review of the application for a certificate of compliance for the Model No. CASTOR® geo69 spent fuel packages, dated June 7, 2021 (Agencywide Documents Access and Management System Accession No. ML21188A178). The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the application using the guidance in NUREG-2215, "Standard Review Plan for Spent Fuel Dry Storage Systems and Facilities."

The requested information is listed by technical discipline of review.

I. REQUESTS FOR SUPPLEMENTAL INFORMATION

A. Structural Evaluation (St)

RSI-St-1 Clarify the storage frame is an important to safety (ITS) system, structure, or component (SSC). If the storage frame is ITS, provide a description and an evaluation of it including anchorage components, the details of the components anchoring the storage frame to the independent spent fuel storage installation (ISFSI) pad (i.e., bolting, embedment, etc.), the mechanism securing the dry storage system (DSS) to the storage pad, and the effects of the storage frame on the DSS. If the frame is not ITS, show that its failure would not impair the ability of an ITS component to perform its function.

Chapter 1, "General Description," of the safety analysis report (SAR), page 1.2-27, notes that the tipping or sliding of the cask during a design basis earthquake is prevented by a storage frame, which is anchored to the storage pad. As discussed in Chapter 1, the effects of the storage frame on the storage system are considered in the thermal evaluation. Section 4.1.1, "Design Features," of the SAR notes that it is assumed that the cask is fixed with a storage frame to the baseplate of the storage hall. However, the structural evaluation of the design basis earthquake in Chapter 3.6, "Accident Conditions of Storage," of the SAR does not consider the effects of the design basis earthquake on the storage frame or a DSS with the storage frame. It is unclear to the staff whether the storage frame is an ITS SSC for structural design, or if the use of a storage frame, as described in the SAR, will affect the structural design and evaluations of the storage system.

This information is needed to determine if the storage frame qualifies as an ITS SSC, following the guidance in NUREG/CR-6407, "Classification of Transportation Packaging and Dry Spent Fuel Storage System Components According to Importance to Safety." If the storage frame is an ITS SSC, or a potential impact on safety would qualify it as an ITS SSC, the applicant should provide the design details and structural evaluations of the storage system with the storage frame in Chapter 3.6

of the SAR. This evaluation should include the assessment of the stability of the DSS against tipping and sliding in the event of a design basis earthquake.

This information is needed to determine compliance with the regulatory requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) 72.236(b) and (l).

RSI-St-2 Provide the following:

a. Analyses for relevant accidents and natural phenomena and their impacts on the casks' performance and safety functions (e.g., shielding and radiation protection) without the assumption of the casks being stored in a storage building structure; or,

b. The characteristics of the storage building structure and a description of how the building eliminates some of the impacts related to accident and natural phenomena events and does not introduce other accidents (e.g., building collapse) that may adversely impact the storage casks' ability to fulfill their safety function, including:

   i. an assessment of the building's safety significance (i.e., ITS or not) including a justification of the safety significance.

   ii. the design bases of the building including the design codes and standards and the methods used for load determination, particularly loads from accident and natural phenomena hazards.

   iii. the design criteria of the building including the design codes and standards and the methods used to determine the structural capacity of the building members and the design safety margin; and

   iv. an analysis or a description of an analysis demonstrating that the building will not affect the storage cask performance under normal, off-normal, and accident conditions, including natural phenomena. The analysis should include the input parameters and methods of evaluation (e.g., the use of structural analysis software or finite element analysis software).

   Section 1.2.2.4, "Operation of the DSS during Long -term Interim Dry Storage," of the SAR notes that the DSS is placed in a storage building in a vertical position. Also, the applicant appears to rely on this assumption to justify not evaluating the impacts of certain accident and natural phenomenon events on the storage casks (e.g., SAR Section 2.2).

Additionally, the application does not include any description of the building and its characteristics. It also does not include any analyses showing that the building with those characteristics will preclude the casks from being impacted by accidents and natural phenomena events beyond those currently identified and evaluated in the SAR and that are typically analyzed for cask systems. Nor does it include an analysis or a description of an analysis that demonstrates that the building itself can withstand accidents and natural phenomena events without collapsing onto the casks or that building collapse will not have an adverse impact on the casks to perform their safety functions (e.g., structure, shielding, thermal, radiation protection) and meet 10 CFR Part 72. The analyses should include evaluation of the natural events listed in SAR Section 2.0.1, "CASTOR® geo69 DSS Principle Design Criteria." The applicant also did not demonstrate that the building does not introduce other accidents that may impact the storage casks.

Therefore, it is not clear that the SAR includes analyses (e.g., structural, shielding, thermal, radiation protection analyses) that address all the relevant, or appropriate, accidents and natural phenomena. Therefore, additional analyses are needed in the appropriate SAR chapters, including Chapter 12, to address relevant events and their impacts. The analyses should encompass how storage operations are to be conducted, either with a building or without a building. Even in the case of storage with a building, some operations occur outside that building (e.g., movement of the transfer cask or storage cask to the building) and the analyses should also address events for these operations.

If the applicant takes credit for the building containing the casks, the building and its design specifications will also become part of the storage system. Therefore, the building description and applicable specifications will be included in the certificate of compliance for the CASTOR® geo69 storage cask system.

This information is needed to determine compliance with the regulatory requirements in 10 CFR 72.236(b), (c), (d), (f), (g), and (l).

B. Thermal Evaluation (Th)

RSI-Th-1 Provide details of the thermal analyses for other possible storage conditions to demonstrate that the CASTOR® geo69 storage system will adequately transfer heat and keep ITS SSCs within allowable temperatures and pressures at short-term, off-normal, and accident conditions. Update the thermal chapter of the SAR to describe the new analyses provided.

Sections 4.5 and 4.6 of the SAR analyzed a 10% fuel rod rupture (off-normal condition) and a fire accident thermal analysis during storage. Other relevant short-term, off-normal, and accident conditions that should be analyzed in the SAR thermal chapter include the following:

a. the unloading condition,

b. blockage of storage hall ventilation openings (note that measures to prevent blockage were not described in Section 4.5.2 of the SAR),

c. fire while the canister is within the transfer cask (e.g., lead temperature, effect on transfer cask water chamber),

d. burial under debris,

e. tip-over (e.g., thermal effects due to horizontal cask orientation), and

f. effect(s) of a collapsed storage hall that encloses the CASTOR® storage system (e.g., thermal considerations).

This information is needed to determine compliance with the regulatory requirement in 10 CFR 72.236(f).

RSI-Th-2 Provide the thermal analyses that demonstrate the effect of failed fuel rods at the maximum design decay heat value.

Section 4.8 of the SAR provides the CASTOR® geo69 system thermal and pressure analyses at a reduced decay heat after 20 years of dry storage. However, demonstration of system performance should be based on the system's maximum decay heat requested in the application to ensure safe design and operation of the storage system.

This information is needed to determine compliance with the regulatory requirement in 10 CFR 72.236(f).

RSI-Th-3 Provide the thermal analysis information described in Section 4.4.1.1 of the SAR that was used for thermal model validation.

Section 4.4.1.1 of the SAR notes that validations of steady-state and transient thermal analyses of spent fuel transport and storage systems were performed, including comparisons between calculated and experimental results. This information will be used by the staff in understanding the application's numerical models.

This information is needed to determine compliance with the regulatory requirement in 10 CFR 72.236(f).

RSI-Th-4P[1] Provide the calculations and results for determining the effective axial and radial properties of thermal conductivity, density, and heat capacity.

[Information Withheld Pursuant 10 CFR 2.390.]

This information is needed to determine compliance with the regulatory requirement in 10 CFR 72.236(f).

C. Materials Evaluation

RSI-Ma-1 Provide the fuel basket material qualification documentation and acceptance testing criteria that demonstrates that the material will meet the required mechanical properties, thermal properties, and neutron attenuation performance.

The SAR does not provide qualification test data that demonstrates that the basket material can meet its structural, thermal, and neutron attenuation performance functions. As a result, the staff requests the following information:

a. mechanical property test data at the material's service temperatures (e.g., yield strength, tensile strength, elongation, fracture performance, and creep),

b. thermal property data (e.g., thermal conductivity, density, specific heat),

c. neutron attenuation performance at the acceptance criteria for B_4C and ^{10}B content, and

d. environmental qualification data demonstrating resistance to degradation in the service environment, considering potential effects of porosity.

In addition, the SAR does not fully describe how the manufactured lots of material will be characterized to ensure that property requirements are achieved. As a result, the staff also requests details of acceptance tests or other activities that are used to demonstrate the following:

a. verification of uniformity of boron content, and

b. verification that the material is free of defects or porosity that could affect mechanical and corrosion performance.

[1] Questions containing or referencing proprietary information are identified with the letter "P." Note that some questions may not contain proprietary information, but the responses to the questions may contain proprietary information.

Sections 8.5.7 and 12.5.2.5 of NUREG-2215, provide guidance on the staff's review of neutron absorber materials, which includes reference (with some exceptions) to ASTM International C1671-15, "Standard Practice for Qualification and Acceptance of Boron Based Metallic Neutron Absorber Materials for Nuclear Criticality Control for Dry Cask Storage Systems and Transportation Packaging."

This information is needed to determine compliance with the regulatory requirements in 10 CFR 72.124(b) and 72.236(h).

RSI-Ma-2 Provide the alloys of construction of the spent fuel cladding and other fuel assembly components.

The SAR does not define the allowable alloys for the fuel cladding and other assembly materials. The staff needs information on the specific types of assembly alloys (e.g., "Zircaloy-2") to assess the potential for adverse reactions and other assembly performance requirements.

This information is needed to determine compliance with the regulatory requirement in 10 CFR 72.236(h).

D. Shielding Evaluation

RSI-Sh-1 Provide overpack technical drawings that include the necessary material and dimensional detail for the overpack.

The applicant submitted the design drawing for the storage configuration of the CASTOR geo69 in Appendix 1-1 of the SAR. However, the design drawing is missing a significant amount of information and details about the cask, or overpack, design. According to Section 6.5.1.2 of NUREG-2215, "Standard Review Plan for Spent Fuel Dry Storage Systems and Facilities", the design features important to radiation protection safety include the descriptions and drawings clearly identifying the geometric arrangements of dry storage system (DSS) or dry storage facility (DSF) SSCs and features and physical dimensions.

Without information about the overpack materials and dimensions, the staff is unable to confirm the appropriateness of the shielding models and analyses that include the overpack.

This information is needed to determine compliance with the regulatory requirements in 10 CFR and 72.236(b) and (d).

RSI-Sh-2 Provide storage canister and basket technical drawings with sufficient information about the material and dimensional specifications of the canister and basket.

The SAR does not include the drawings for the canister and basket. Also, the staff found that the basket material is credited in the storage shielding analysis models. However, the applicant did not provide sufficient specifications of the basket materials in the drawings (or in the proposed technical specifications). Without information about the canister and basket materials and dimensions, the staff is unable to confirm the appropriateness of the shielding models and analyses.

This information is needed to demonstrate compliance with the regulatory requirements in 10 CFR 72.236(b) and (d).

RSI-Sh-3 Provide evaluations for off-normal conditions, accidents, and natural phenomena for the transfer cask (CLU) with the associated dose rate calculations and dose assessments.

The SAR notes that off-normal conditions, accidents, and natural phenomena were not evaluated for the transfer cask because the applicant assumed that it is operated within a facility building licensed under 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities.” This assumption may not be appropriate as the transfer cask may be used outside the 10 CFR Part 50 structure. For this assumption to be valid, a certificate of compliance for this cask would need to include a condition limiting operations of the transfer cask to occur within the Part 50 structure. Additionally, operations inside a Part 50 structure do not necessarily preclude the occurrence of off-normal conditions such as those described in the standard review plan, NUREG-2215, Sections 3.4.2.4 and 3.5.2.4.2 and, typically, evaluated in storage cask SARs.

Also, the requirements of 10 CFR 72.104 and 72.106 apply to the transfer cask regardless of its location. In 10 CFR 72.236, the regulations state the following:

> "…radiation shielding, and confinement features must be provided sufficient to meet the requirements in 72.104 and 72.106."

The requirements of 10 CFR 72.236 make no exceptions for the transfer cask if it is located within the 10 CFR Part 50 structure. Therefore, the applicant must ensure that the cask design is such that the dose limits in 10 CFR 72.104 and 72.106 will be met. Typical transfer cask operations for typical transfer casks contribute very little to anything for 10 CFR 72.104 doses and the staff has accepted analyses related to 10 CFR 72.104 that do not explicitly include doses from the transfer cask. However, they can contribute to and result in bounding doses for accident conditions and so need to be included in evaluations related to 10 CFR 72.106.

Therefore, Chapter 12 of the SAR should include evaluations of relevant off--normal, accidents, and natural phenomena conditions involving the transfer cask. The SAR sections for the shielding and radiation protection analyses should include dose rate and dose analyses for the transfer cask for these same relevant conditions.

This information is needed for the staff to determine compliance with the regulatory requirements in 10 CFR 72.236(b) and (d).

RSI-Sh-4 Provide descriptions of the acceptance tests, maintenance tests, and acceptance criteria for the fabricated storage cask system items that are relied on to perform a shielding function.

Section 10.1.4.4 of the SAR notes that acceptance tests of shielding components will be performed to ensure that certain characteristics of the components that are relevant for shielding are met by the fabricated components. However, the application does not include any kind of description of those tests, criteria which will be used in those tests to determine the fabricated components comply with the necessary characteristics (e.g., minimum density, uniformity, minimum hydrogen content, minimum boron content, minimum thickness, lack of internal voids) as defined in the storage cask design and needed to perform the shielding function as designed and evaluated in the application. This is particularly important for those components which are fabricated from non-standard materials, such as the basket plates and the high molecular weight polymer components. For components made from standard materials, ensuring conformance to the standards and the dimensions and tolerances (all of which are specified in the storage cask system's drawings) is sufficient to ensure their shielding function.

It is also not clear that maintenance programs and tests are not needed in Section 10.2 of the SAR for shielding components. Sections 8.5.6.2 and 8.5.7 of the SAR provide a description of the type of information that should be provided in the application. For the basket plates, which also serve a criticality safety function, qualification and acceptance tests that demonstrate the basket plates' performance of that criticality safety function may be sufficient for demonstrating the shielding function of those plates as well (see RSI Ma-1).

This information is needed to determine compliance with the regulatory requirements in 10 CFR 72.234(a) and 72.236(d).

RSI-Sh-5P Provide an occupational dose assessment for the preparation of the storage cask for long-term interim dry storage and the set-up of the CASTOR® geo69 DSS at the storage facility.

[Information Withheld Pursuant 10 CFR 2.390.]

This information is needed to determine compliance with the regulatory requirements in 10 CFR 20.1101(b) and 20.1201(a); and 72.236(b), (g), and (i).

RSI-Sh-6P [Information Withheld Pursuant 10 CFR 2.390.]

This information is needed to determine compliance with the regulatory requirements in 10 CFR 72.236(b) and (d).

E. Operating Procedures

RSI-Op-1 Provide complete operating procedures in Sections 9.1, "Procedure for Loading the Storage Cask," and 9.2, "Procedure for Unloading the Storage Cask," as part of the storage SAR without reference to the transport application for this information.

The storage SAR should not reference information in the transport application unless the transport application has received prior NRC approval. Otherwise changes in the transport operating procedures would require changes to the storage operating procedures, which may be made during review of the storage SAR.

This information is needed to determine compliance with the regulatory requirement in 10 CFR 72.230(a).

F. Acceptance Criteria and Maintenance Program

RSI-Ac-1 Revise Chapter 10 of the SAR to provide an acceptance leakage test of the cask/canister bodies during fabrication that demonstrates that the CASTOR® geo69 storage system meets the "leak-tight" criteria, as described in American National Standards Institute (ANSI) N14.5-2014, "American National Standard for Leakage Tests on Packages for Shipment of Radioactive Materials," by providing for a leakage test of the cask/canister bodies during fabrication."

Section 7.1.3 of the SAR states the following:

> "…that the monolithic cask body and the lids can be considered as leak-tight, so the containment analysis can be reduced to the gasket sealing system."

Further, in Section 7.2.1 of the SAR states the following:

"the design leakage rate of the containment is not greater than 10^{-7} ref-cm^3/s" which is noted as "leak-tight" according to the American National Standards Institute N14.5, "American National Standard for Radioactive Materials—Leakage Tests on Packages for Shipment."

The application implies that leak testing of the entire cask/canister bodies is not done. However, in order to meet the containment criteria in ANSI N14.5, the entire confinement boundary must undergo fabrication leak testing and meet the leak rate acceptance criteria specified in the SAR, since there is no recognized standard that allows for the assumption of monolithic materials to be leak-tight without being leak tested.

This information is needed to determine compliance with the regulatory requirements in 10 CFR 72.236 (d) and (e).

II. OBSERVATIONS

A. Thermal Evaluation

OBS-Th-1 Provide the details of the surface treatments that improve the thermal performance of the cask (and, if relevant, the canister).

In Sections 1.2.1.11.3 and 1.2.2.1.6 of the SAR, the applicant notes that the CASTOR® geo69 cask has surface (i.e., inner and outer surfaces) treatments to improve thermal performance. The details of these surface treatments, including their longevity, should be provided to demonstrate there is improved thermal performance and that it will be maintained over time.

This information is needed to determine compliance with the regulatory requirements in 10 CFR 72.236(f).

OBS-Th-2 Provide the water vapor pressure used in the transient “vacuum” numerical analysis described in Section 4.7.4 of the SAR and the backfill helium pressure described in Section 4.7.5 of the SAR. Describe the bounding conditions assumed in the thermal numerical analysis for the vacuum drying condition.

In Section 4.7.4 of the SAR, the applicant notes that the thermal analysis for the vacuum drying condition assumed water vapor within the canister. However, the vacuum pressure associated with the process was not stated (e.g., 1 Torr). In addition, a bounding vacuum pressure (e.g., 0 Torr) should be considered to ensure the analyzed condition reflects the potential uncertainties of operation due to instrument or vacuum equipment piping failure.

In addition, the backfill helium pressure used in the Section 4.7.5 of the SAR thermal numerical analysis was not provided and, therefore, the staff could not confirm that it represents the appropriate operating condition.

This information is needed to determine compliance with the regulatory requirement in 10 CFR 72.236(f).

OBS-Th-3 Provide input and output files of the bounding thermal analyses (normal, short-term, and accident conditions) that result in the highest thermal loads (e.g., highest ITS component temperatures) for the CASTOR® geo69 storage system.

Although SAR Chapter 4 described thermal models, the submittal did not provide input and output files used in the normal, short-term, and accident condition thermal analyses. These files are used to verify that the specified inputs (e.g., boundary conditions, material properties, geometry) are consistent with the model and analysis descriptions in the SAR. If the staff receives analysis files before the start of the review, it will facilitate a more efficient review.

This information is needed to determine compliance with the regulatory requirement in 10 CFR 72.236(f).

OBS-Th-4P [Information Withheld Pursuant 10 CFR 2.390.]

This information is needed to determine compliance with the regulatory requirements in 10 CFR 72.236(f).

B. Confinement Evaluation

OBS-Co-1 Provide additional details on the function of the pressure switch and the pressure monitoring system used to ensure seal performance of the CASTOR® geo69 storage system.

Although Sections 1.2, 4.0, 4.3, 4.8.5.1, 4.6.2, 4.8.6.2, 7.1.1, 9.3, 10.2, 11.1.3, 11.3, and 13.2; drawing No. 1014-DD-38566; Tables 4.4-2, 4.6-1, 4.6-2, 4.8-3, 4.8-5, 4.8-9, 4.8-10, 9.3-1, and 13.2-4; and Figure 7.1-4 of the SAR briefly mention the “pressure switch” to detect a low pressure within the CASTOR® geo69 cask, the applicant did not provide a detailed description of the pressure monitoring system or discussion of the performance specifications (e.g., low setpoints, low-low setpoints, etc.) and operational requirements to ensure a functioning system. For example, Section 10.2 of the SAR notes that the pressure switch in the cask lid, which is connected to the pressure monitoring systems, “is a self-reporting component, which means that a defect of the pressure switch will be automatically detected;” but there is no further information provided in the SAR about what actions storage site operators might take in the event of a pressure switch failure or for an indication of a leak in the system.

This information is needed to determine compliance with the regulatory requirements in 10 CFR 72.236(d) and (e).

C. Materials Evaluation

OBS-Ma-1 Revise the SAR to include version-controlled references to the drawings in the CASTOR® geo69 transport package SAR.

Table 1.1-1 of the SAR provides drawing numbers for the cask, canister, and other components for which the drawings are available in the Transport SAR. However, those references do not provide information related to the specific versions of those drawings that are used in the storage system design. To ensure that version control is maintained during licensing and future NRC oversight activities related to the storage system design and fabrication, revise the SAR to provide specific drawing references that include the revision number.

This information is needed to determine compliance with the regulatory requirement in 10 CFR 72.236(b).

OBS-Ma-2 Provide information about how fuel assemblies will be classified as undamaged, considering the requirements for fuel retrievability and fact that the SAR does not credit the mechanical performance of the fuel cladding. As part of your response include the following information to clarify the classification criteria:

a. Clarify what fuel assembly condition would not be bounded by the assumption of full reconfiguration of the fuel pellets and, therefore, be considered “damaged.”

   Given that the SAR does not credit the structural performance of the fuel cladding (assuming full reconfiguration of the fuel pellets), it is not clear to the staff why the fuel classification methodology has requirements related to criticality safety, radiological protection, and other functions. Clarify what fuel assembly condition would not be bounded by the assumption of full reconfiguration of the fuel pellets and thus be considered “damaged.”

b. In Section 8.4.1 of the SAR, clarify how the cask design’s methodology for defining acceptable fuel condition will support general licensees’ compliance with 10 CFR 72.122(h)(1) and (l) (i.e., the fuel condition will not pose operational safety problems with respect to its removal from storage and storage systems must be designed to allow ready retrieval the spent fuel).

   In Section 8.4.1 of the SAR, the applicant provides information on how fuel assemblies will be classified as undamaged and considered to be allowable contents. The SAR states that fuel will be qualified based on requirements for criticality safety, decay heat removal, radiological protection, and structural integrity.

This information is needed to determine compliance with the regulatory requirements in 10 CFR 72.236(a) and (m).

OBS-Ma-3 Clarify if the procurement of the cast iron cask body is controlled to ensure that the casting facility does not perform repairs of casting defects, per the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code criteria. Absent such controls, describe how repairs are performed, documented, and examined to ensure mechanical properties of the cask are uniform and meet the minimum requirements of the ASME B&PV Code.

SAR Section 1.2.1.1 states that the cask body is made of ductile cast iron, composed of a hollow cylinder with a closed bottom end, cast in one piece. ASME B&PV Code, Section III, Division 3, WC-2573 states the following:

> "Casting shall not be repaired by plugging, welding, brazing, impregnation, or any other means."

The staff notes that these ASME B&PV Code requirements are in place to eliminate specific issues with each of the repair methods to potentially degrade the microstructure and mechanical properties of ductile cast iron. If controls are not in place to ensure that defects are not repaired, the staff requests information on how defects will be repaired and examined to ensure that code-required properties will be achieved in these localized areas.

The information is needed to determine compliance with the regulatory requirements in 10 CFR 72.234(b) and 72.236(j).

D. Shielding Evaluation

OBS-Sh-1 Ensure the operations descriptions for CASTOR® geo69 for the storage case include the necessary information at the requisite level of detail, including loading and unloading and preparations for storage.

In Sections 9.1 and 9.2 of the SAR, the applicant states that the CASTOR® geo69 is designated as a transport and storage cask and that the procedures for loading and unloading the CASTOR® geo69 via the CLU are identical to those described in Sections 7.1 and 7.2 of the SAR (transport). Therefore, the applicant merely references the sections of the transport SAR in the storage SAR Sections 9.1 and 9.2.

The purpose and scope, including level of detail, often differ between storage and transportation systems and applications. For example, operations descriptions for storage casks will include items to identify conditions that may be more significant from a radiological protection standpoint for protection of personnel operating the storage system. Another example is that the operations descriptions for storage will address the use of auxiliary or temporary shielding to minimize occupational dose

during loading and unloading operations such as the specially designed set of auxiliary shielding mentioned in Section 11.1.4 of the SAR. This is not part of the scope of transportation operations. Therefore, it is not clear that simply referencing the transport operations descriptions is sufficient to describe the storage operations at the level needed to support radiation protection, including the evaluations for radiation protection in the storage SAR. It also appears that some operations may be missing from SAR Section 9.3 and Table 9.3-1.

This information is needed determine compliance with the regulatory requirements in 10 CFR 72.236(d) and ensure the cask is designed to enable the licensee to meet 10 CFR 72.126(a).

OBS-Sh-2P Explain how the normalized burnup profile is determined for the fuel assemblies that contain partial length rods.

[Information Withheld Pursuant 10 CFR 2.390.]

This information is needed to determine compliance with the regulatory requirements in 10 CFR 72.236(d).

OBS-Sh-3P Clarify the specifications of the contents requested as authorized contents in the storage cask, and modify the shielding and radiation protection analyses, as needed, to evaluate the cask system's performance with contents having those specifications.

[Information Withheld Pursuant 10 CFR 2.390.]

If the intent is to have a more flexible description of the authorized contents in the cask certificate of compliance (e.g., maximum burnup limits, minimum enrichment limits, minimum cooling times that apply to all assemblies), either show that the existing analyses bound the additional content descriptions or modify the shielding analysis to demonstrate that radiation levels for a cask containing the additional contents comply with the regulatory limits in 10 CFR Part 72.

This information is needed determine compliance with the regulatory requirements in 10 CFR 72.236(a) and (d).