ES/NRC 15-008
June 26, 2015

Enclosure 1

Responses to Third Request for Additional Information

(31 pages total)

The response to the NRC's third Request for Additional Information (RAI) associated with the Energy*Solutions* (ES) request to renew the Certificate of Compliance (CoC) for the VSC-24 Ventilated Dry Cask Storage System for an additional 40 years is provided herein. Each RAI question is repeated herein and followed by the ES response and a summary of the resulting changes to the VSC-24 CoC renewal application.

RAI-1: Update or explain the methodology used to determine the helium leakage rate in the calculation package "VSC-24 Helium Leakage Analysis (17 pages total)", Calc. Pkg. No. VSC-04.3202.

The calculation package refers to ANSI N14.5 when calculating the amount of helium remaining in the multi-assembly sealed basket (MSB) to determine whether sufficient helium remains during a 60 year period. According to ANSI N14.5 Section B.4.1, the leakage rate at conditions other than known conditions is found by first determining the hole diameter at known conditions and using that value to determine the leakage rate at other conditions. However, Section 5.1.3 of the calculation package indicates that the equivalent leakage rate was determined by using a ratio of reference and average temperatures. In order to ensure that aging effects are not operable and that Table 12 of the Certificate of Compliance (CoC) renewal application would not have to be re-evaluated, either update the calculation or explain the reason for the calculation's methodology.

This information is required to evaluate compliance with 10 CFR 72.236.

Response to RAI-1

The VSC-24 Helium Leakage Analysis (Calculation No. VSC-04.3202) uses the methodology recommended in ANSI N14.5 to determine the helium leakage rate under storage conditions. As discussed in Sections 5.1.4 through 5.1.6 of the calculation package, the effective leak path size (i.e., hole diameter and length) is calculated based on the measured test-condition leakage rate and then the leakage rates for normal, off-normal, and accident storage conditions are calculated based on that leak path size. Section 5.1.3 of the calculation package describes the calculation used to express the allowable leakage criterion from units of std-cc/sec (aka, ref-cc/sec) in units of cc/sec at the actual test conditions, which does not involve the calculation of the leak path size. Stating an allowable leakage criterion in terms of ref-cc/sec is simply another way of referring to an allowable molar leakage rate (i.e., moles of helium per second). This equates to the "mass-like" flow rate referred to in Section B.3 of ANSI N14.5. A leak rate of 1.0 ref cc/sec is defined as 1.0 cc/sec leakage of gas at 1.0 atm and 25°C. At standard conditions, one mole of any gas (including helium) occupies a volume of 22,414 cc. Thus, a leak rate of 1.0 ref-cc/sec corresponds to a molar leakage rate of 4.462×10^{-5} moles/sec (1/22,414). A leak rate of 1.0×10^{-4} ref-cc/sec corresponds to a molar leakage rate of 4.462×10^{-9} moles/sec.

Section 5.1.3 of the calculation package determines the volumetric midstream leakage rate that would occur under test conditions, which corresponds to a molar leakage rate

of 4.462 x 10^{-9} moles/sec (i.e., equivalent to the stated allowable test-condition leakage rate of 1.0 x 10^{-4} ref cc/sec). The formulas given in Section B.3 of ANSI N14.5 are then used to determine the effective hole diameter, based on that midstream leakage rate ("L_a" in Eq. B.2), the leak path length, and the gas properties (temperature, stream-average pressure, and viscosity) that apply at the test conditions. Note that the test conditions (for the VSC system) are not the same as reference conditions.

A specified molar leakage rate (in moles/sec) can be directly converted into a volumetric leak rate (in cc/sec) at a given set of conditions (temperature and pressure), using the Ideal Gas Law, without calculating a leak path effective diameter. Also, for a given (constant) molar leakage rate, the corresponding volumetric leakage rate that would occur at one set of conditions can be calculated from the volumetric leakage rate that occurs at another set of conditions using simple ratios of temperature and pressure based on the Ideal Gas Law. Section 5.1.3 of the calculation package uses that approach to convert the specified allowable leakage rate of 1.0 x 10^{-4} cc/sec at reference conditions (1.0 atm, 298 K), to the leakage rate that would occur (midstream) under storage conditions.

For a given number of moles, the gas volume scales up directly with temperature and scales down directly with pressure. Thus, the reference condition volumetric leakage rate of 1.0 x 10^{-4} cc/sec is multiplied by the ratio of the storage condition temperature (in K) over the reference condition temperature of 298 K. It is then divided by the ratio of the storage condition pressure (in atm) over the reference condition pressure of 1.0 atm. That corresponds to the formula shown in Section 5.1.3 of the calculation package.

Summary of Renewal Application Changes

- None

RAI-2: Provide additional information on the operating environment for the following MSB subcomponents identified in Table 9 of the CoC renewal application:

- MSB Structural Lid and MSB Closure Lid Backing Ring. Table 9 of the CoC renewal application lists the operating environment as inert. Drawing MSB-24-001 Rev 5 Sheet 2 of 2 (FSAR Revision 8) suggests that the Structural Lid and the Closure Lid Backing Ring are not in an inert (i.e., He backfilled) environment. Clarify or correct the information in Table 9 of the CoC renewal application.

- MSB Shield Lid Top Plate. Table 9 of the CoC renewal application lists the operating environment as inert. Drawing MSB-24-001 Rev 5 Sheet 2 of 2 suggests that the top surface of the Shield Lid Top Plate is not in an inert environment (i.e., He backfilled) environment. Clarify or correct the information in Table 9 of the CoC renewal application.

- MSB Structural Lid Valve Covers. Table 9 of the CoC renewal application lists the operating environment as inert. Drawing MSB-24-001 Rev 5 Sheet 2 of 2 suggests

that the Structural Lid Valve Covers are not in an inert environment (i.e., He backfilled) environment. Clarify or correct the information in Table 9 of the CoC renewal application.

This information is required to demonstrate compliance with 10 CFR 72.240(d).

Response to RAI-2

The CoC renewal application is revised to define an additional environment called the "Sealed Air-Filled" environment that exists in the space between the MSB inner and outer closure field welds. This environment is similar to the "Sheltered" environment, which has a continuous supply of air, but is not exposed to wind, rain or sun. However, the "Sealed Air-Filled" environment has only a small initial volume of air that is not replenished, so the amount of corrosion that can occur on the steel surfaces exposed to the "Sealed Air-Filled" environment is limited by the amount of oxygen present in the small initial volume of trapped air. Therefore, the potential corrosion on the steel surface of the subcomponents that are exposed to the "Sealed Air-Filled" environment is insignificant and does not affect the safety functions of these subcomponents.

A description of the "Sealed Air-Filled" environment is added to Section 3.1.2. Table 9 is revised to refer to the "Sealed Air-Filled" environment for the components to which it applies.

Summary of Renewal Application Changes

- Section 3.1.2: Revised to include the "Sealed Air-Filled" environment.
- Section 3.2.1.1: Revised to address loss of material in the Sealed Air-Filled environment of the MSB assembly.
- Table 9: Changed the "Inert Gas" environment for Structural Lid, Closure Weld Backing Ring, Shield Lid Top Plate, and Structural Lid Valve Covers to "Sealed Air-Filled"; Changed the environment for the Shell and Swagelok Quick Connect from "Inert Gas" to "Inert Gas/Sealed Air-Filled" because the inside surface of the shell between the inner and outer closure welds and the external surfaces of the Swagelok Quick Connect are exposed to the "Sealed Air-Filled" environment.
- Appendix A, Table 9.3-1: Changed the "Inert Gas" environment for Structural Lid, Shield Lid Top Plate, and Structural Lid Valve Covers to "Sealed Air-Filled"; Changed the environment for the Shell from "Inert Gas" to "Inert Gas/Sealed Air-Filled" because the inside surface of the shell between the inner and outer closure welds is exposed to the "Sealed Air-Filled" environment.

RAI-3: Provide additional information on the materials of construction for the following ventilated concrete cask (VCC) subcomponents identified in Table 10 of the CoC renewal application:

- VCC Air Outlet Weldment. Table 10 of the CoC renewal application indicates that the VCC Air Outlet Weldment is coated. This subcomponent is identified as an Air Outlet Assembly in Drawings VCC-24-001 Rev 6 Sheet 1 of 1 and VCC-24-004 Rev 2 Sheet 1 of 2. Drawing VCC-24-001 Rev 6 Sheet 1 of 1 Note 2 indicates the interior of the VCC surface is coated with Dimetcote 6 or equivalent. It is not apparent from either VCC-24-001 Rev 6 Sheet 1 of 1 and VCC-24-004 Rev 2 Sheet 1 of 2 that the Air Outlet Assembly/Weldment is coated. Clarify or correct the information in Table 10 of the CoC renewal application.

- VCC Air inlet screen hardware. CoC renewal application, Table 10, indicates the VCC Air Inlet screen hardware is galvanized steel. Drawing VCC-24-001 Rev 4 Sheet 2 of 2 indicates the hardware materials are a combination of materials including A36 steel flat stock (Part Number VCC-007), galvanized steel screen (Part Number VCC-005) and zinc plated steel moly bolt (Part Number VCC-008). It is not clear from Drawing VCC-24-001 Rev 4 Sheet 2 of 2 if the A36 flat stock material is coated. Clarify or correct the information in the CoC renewal application, Table 10.

- VCC Lifting Lugs. CoC renewal application, Table 10, identifies the optional lifting lugs as coated. The optional VCC Lifting Lug is shown in Figure 1.1-1 of FSAR Revision 8 but is not included or identified in any VCC Drawing. The VSC-24 FSAR Revision 8 Appendix B does not specify that the VCC Lifting Lugs must be coated or contain information on the type of coating applied or the stated purpose of the coating. Clarify or correct the information in the CoC renewal application, Table 10.

This information is required to demonstrate compliance with 10 CFR 72.240(d).

Response to RAI-3

The additional information for the VCC subcomponents in question is provided as follows:

- All duct-facing surfaces of the VCC Air Outlet Weldment are coated, but the concrete-facing surfaces of the VCC Air Outlet Weldment are not coated, as indicated by Note 2 of Table 10. Note 2 on Drawing No. VCC-24-001, Revision 6, requires the interior of the VCC assembly to be coated with Dimetcote 6 or equivalent. The "interior" includes the duct-facing surfaces of the Air Outlet Weldment.

- Table 10 has been revised to clarify the materials and coatings for the VCC Air Inlet Screen/Hardware by changing the material call-out for these subcomponents from "Galvanized Steel" to "Varies[(4)]", where Note 4 identifies the different materials for the Air Inlet Screen and attachment hardware (i.e., Flat Stock and Moly Bolt). Drawing No. VCC-24-001, Revision 4 does not clearly require the Flat Stock (Part No. VCC-007) used to attach the air inlet screens to be coated. Therefore, these parts are assumed to be uncoated and loss of material (i.e.,

corrosion) of these components is managed through an AMP (as discussed in the response to RAI-9 that follows, the examination of the Air Inlet Screen/Hardware and Air Outlet Screen/Hardware has been moved to the Examination of VCC Assembly Exterior AMP that is now described in Section 3.4.2.1 and Table 14 of the CoC renewal application.)

A review of the materials of construction for the VCC air outlet assemblies also revealed that the VCC air outlet screens may be stainless steel, galvanized steel, or fiberglass per Note 4 on Drawing VCC-24-004. While stainless steel and galvanized steel materials are acceptable materials for the period of renewal, fiberglass is not an acceptable material for the VCC air outlet screens during the period of renewal. Therefore, a proposed CoC condition has been added to Section 1 of the CoC renewal application to preclude use of fiberglass material for the air outlet screen during the extended storage period.

- The VSC Lifting Lugs (Optional), which have only been used on the existing VCC at Point Beach, are coated on all exposed surfaces for corrosion protection. However, as noted in RAI-3, these subcomponents are not shown on the FSAR drawings, but are described in Appendix B of the FSAR, which does not discuss coatings. Therefore, the coating on the VSC Lifting Lugs (Optional) is not required and no credit is taken for the coating on the existing VCCs. Furthermore, Section B.1 of the VSC-24 FSAR states that the VSC lifting lugs are not important to safety. Therefore, the VSC lifting lugs have no intended safety functions and do not require aging management activities. Accordingly, the CoC renewal application has been revised to show no intended safety functions for the VSC Lifting Lugs (Optional). Also, the CoC renewal application has been revised to change the VSC Lifting Lugs (Optional) material to carbon steel (i.e., CS) and to indicate that they do not require any aging management activities. Accordingly, examination of the VSC Lifting Lugs (Optional) has been removed from all AMPs.

Summary of Renewal Application Changes

- Section 1, 5th bullet: A proposed CoC condition has been added to Section 1 of the CoC renewal application to preclude use of fiberglass material for the air outlet screen during the extended storage period.

- Table 6: Changed the Intended Function(s) of the VSC Lifting Lugs (Optional) from "SS" to "---".

- Section 3.2.2.1, Other Degradation: The last paragraph that discussed coating failure and corrosion on the VSC Lifting Lugs at Point Beach has been deleted.

- Section 3.4.2.3 (formerly Section 3.4.3.4): Removed examination of the VSC Lifting Lugs (Optional) from the scope of the AMP because they have no intended safety function, and therefore do not require aging management activities.

- Table 10: Changed the Air Inlet Screen/Hardware material from "Galvanized Steel" to "Varies(4)" and added Note 4 to identify the different materials for the Air Inlet Screen and attachment hardware (i.e., Flat Stock and Moly Bolt); Added Note 5 to the Air Outlet Screen/Hardware material call-out to identify the different materials for the screen and screen fasteners; Changed the VCC Lifting Lugs (Optional) material from "Coated CS" to "CS" and deleted the old Note 2 call-out; Changed Aging Effects, Aging Mechanism, and Aging Management Activities for the VCC Lifting Lugs (Optional) to "N/A".

- Table 13: Changed the Air Inlet Screen/Hardware material from "Galvanized Steel" to "Varies(3)", and added Note 3 to identify the different materials for the Air Inlet Screen and attachment hardware (i.e., Flat Stock and Moly Bolt); Added Note 4 to the Air Outlet Screen/Hardware material call-out to identify the different materials for the screen and screen fasteners; Deleted rows for VSC Lifting Lug (Optional) subcomponent.

- Table 16 (formerly Table 17): Removed [VSC] Lifting Lugs from the AMP scope.

- Table 18 (formerly Table 19): Removed VSC Lifting Lugs from the Scope and Acceptance Criteria elements of the AMP.

- Appendix A, Table 9.3-2: Changed the Air Inlet Screen/Hardware material from "Galvanized Steel" to "Varies(3)" and added Note 3 to identify the different materials for the Air Inlet Screen and attachment hardware (i.e., Flat Stock and Moly Bolt); Added Note 4 to the Air Outlet Screen/Hardware material call-out to identify the different materials for the screen and screen fasteners; Deleted rows for VSC Lifting Lugs (Optional).

RAI-4: Provide additional information on the materials of construction for the following MSB Transfer Cask (MTC) subcomponents identified in Table 11 of the CoC renewal application:

- MTC Top Ring and MTC Bottom Ring. CoC renewal application, Table 11, indicates the MTC Top Ring and the Bottom Ring are coated. Drawing MTC-24-001 Rev 5 Sheet 1 of 2 does not specifically identify either the MTC Top Ring or the Bottom Ring. Note 1 of this drawing indicates that the Shield Doors and inside of Rails should be coated with Everlube 823 and all other surfaces are to be coated with Dimetcote 6 or equivalent. CoC renewal application, Table 7, indicates the reference drawing for both the Top Ring and the Bottom Ring is MTC-24-002. Drawing MTC-24-002 sheet 1 of 2 specifically identifies the Top Ring as Part Number MTC-004 and the Bottom Ring as Part Number MTC-11 but does not state that these subcomponents are coated. Drawing MTC-24-002 sheet 1 of 2, Note 1, indicates that the inside surface of the Inner Shell (Part Number MTC-003) and the outside surface of the Outer Shell (Part Number MTC-001) are coated with Dimetcote 6 or equivalent. No other part numbers are identified as being coated in Drawing MTC-

24-002 sheet 1 of 2. Clarify or correct the information in the CoC renewal application, Table 11.

- MTC Angle, Heat Transfer. CoC renewal application, Table 11, indicates that the MTC Angle, Heat Transfer is coated. Drawing MTC-24-001 Rev 5 Sheet 1 of 2 does not specifically identify the MTC Angle, Heat Transfer. CoC renewal application, Table 7, indicates the reference drawing for the Angle, Heat Transfer is MTC-24-002. Drawing MTC-24-002 sheet 1 of 2 specifically identifies the Angle, Heat Transfer as Part Number MTC-045 but does not state that this subcomponent is coated. Drawing MTC-24-002 sheet 1 of 2, Note 1, indicates that the inside surface of the Inner Shell (Part Number MTC-003) and the outside surface of the Outer Shell (Part Number MTC-001) are coated with Dimetcote 6 or equivalent. No other part numbers are identified as being coated in Drawing MTC-24-002 sheet 1 of 2. Clarify or correct the information in CoC renewal application Table 11.

- MTC Shield Door. CoC renewal application, Table 11, indicates the MTC Shield Door is coated. Drawing MTC-24-009 indicates that the doors are coated with Everlube 823. Clarify if all surfaces of the shield doors are coated with Everlube 823 or if another coating such as Dimetcote 6 is used on some of the door surfaces. Clarify or correct the information in the CoC renewal application, Table 11.

This information is required to demonstrate compliance with 10 CFR 72.240(d).

Response to RAI-4

The additional information on the materials of construction for the MSB Transfer Cask (MTC) subcomponents in question is given below:

- Table 11 of the CoC renewal application has been revised to clarify the coatings applied to the various surfaces of the MTC assembly subcomponents. All exposed (air-facing) surfaces of all MTC steel components, except for the drain pipe, trunnion (which is covered by the trunnion cylinder), lid bolts, shim/flange, and hydraulic cylinder assembly, are coated with Dimetcote 6, Carbozinc 11, or equivalent. The general coating requirement, specified in Note 1 of Drawing No. MTC-24-001 applies to all exposed steel surfaces of the finished MTC assembly, including the top surface of the top ring and the portions of the bottom surface of the bottom ring that are not covered by the rail assemblies. Drawing No. MTC-24-002 shows the cask wall subassembly prior to attachment of the rail assemblies. This drawing intentionally does not specify coating on the ends of the MTC cask wall assembly because the coating would interfere with the welds used to attach the rail assemblies on Drawing No. MTC-24-001.

- Table 11 of the CoC renewal application has been corrected to show that the Angle, Heat Transfer subcomponents of the MTC Assembly are not coated because they are embedded inside the neutron shield. The Angle, Heat Transfer subcomponent is specified as Item 10 on Drawing No. MTC-24-002. Per Note 1 of Drawing No.

MTC-24-002, only the inner surface of the Inner Shell and the outside surface of the Outer Shell and are coated at this assembly level. The Angle, Heat Transfer subcomponents, which are embedded inside the Neutron Absorber Shield, are not required to be coated. The Angle, Heat Transfer subcomponents are not identified on Drawing No. MTC-24-001 because this drawing is a higher-level assembly that refers to the Cask Wall Assembly (Item 1), in which the Angle, Heat Transfer subcomponents are included.

- Table 11 of the CoC renewal application has been revised to clarify the coatings applied to the MTC Shield Door Assembly surfaces. All MTC shield door surfaces are coated with Dimetcote 6, Carbozinc 11, or equivalent. Everlube 823 (or equivalent) is a lubricant that is applied on top of the coated sliding surfaces of the shield doors and rail components.

Summary of Renewal Application Changes

- Section 2.2.1.4: Revised end of second paragraph to clarify that lubricant is applied over the coating on the sliding surfaces of the shield door and rail components.

- Section 3.1.1.3: Revised to correct and clarify the description of the coating and lubricants applied to the surfaces of the MTC assembly subcomponents.

- Table 11: Change Angle, Heat Transfer material from "Coated CS" to "CS"; Added Note 2 to clarify that the material for the Outer Shell, Inner Shell, Top Ring, Bottom Ring, Trunnion Cylinder/End Covers, Rail Shield, Rail Lower Plate, Shield Door, and Door Top Cover is coated only on the exposed (air-facing) surfaces of the top-level assembly; Added Note 4 to clarify that lubricant is applied over the coating on the sliding surface of the shield door and rail components; Changed material for Hydraulic Cylinder Assembly to "CS".

- Table 13: Added Note 2 call-out to Outer Shell, Inner Shell, Top Ring, Bottom Ring, Rail Shield, Rail Lower Plate, and Shield Door subcomponents of the MTC assembly to clarify that coating is only on the exposed (air-facing) surfaces of these MTC assembly subcomponents; Revised Note 2 (formerly Note 1) to make definition of embedded surfaces generic to the VCC and MTC assemblies; Added Note 5 to clarify that lubricant is applied over the coating on the sliding surface of the shield door and rail components.

- Appendix A, Table 9.3-3: Added Note 2 call-out to Outer Shell, Inner Shell, Top Ring, Bottom Ring, Rail Shield, Rail Lower Plate, and Shield Door subcomponents of the MTC assembly to clarify that coating is only on the exposed (air-facing) surfaces of these MTC assembly subcomponents; Added Note 3 to clarify that lubricant is applied over the coating on the sliding surface of the shield door and rail components.

RAI-5: Provide additional information to clarify the scoping evaluation of the MTC subcomponents:

- Clarify the important to safety (ITS) scoping evaluation of the Trunnion Cylinder/End Covers. CoC renewal application, Table 7, indicates that the Trunnion Cylinder/End Covers have no identified safety function; however, CoC renewal application, Table 11 and Table 13, indicate the Trunnion Cylinder/End Covers are covered in the Examination of MTC Assembly Aging Management Program (AMP) in CoC renewal application Section 3.4.2.5 and in Table 18. Note that AMPs are used to manage aging of ITS components or subcomponents (Criteria 1) or not-ITS (NITS) components or subcomponents that, if degraded, could affect the safety function of ITS components (Criteria 2).

- Clarify the ITS scoping evaluation of the Trunnion Inner and Outer Plate. CoC renewal application, Table 7, indicates that the safety functions of the Trunnion Inner and Outer Plate are Structural Support (SS) and Radiation Shielding (RS). CoC renewal application, Table 11, indicates that the Trunnion Inner and Outer Plate have been removed by the general licensees in accordance with 10 CFR 72.48 and subsequently adopted by CoC Amendment 4 and incorporated into FSAR Revision 5 and that none of the existing MTCs have these subcomponents. The proposed CoC conditions in Chapter 1 of the CoC renewal application states:

  The initial issue and Amendments 1, 2, and 3 of the VSC-24 Storage System CoC are conditioned to require that all new VSC-24 Storage System Structures, Systems, and Components (SSC) be constructed in accordance with Amendment 4 of the VSC-24 Storage System CoC or subsequent CoC amendments. Subcomponents required for maintenance and repair of the existing loaded VSC-24 Storage System SSC may continue to be constructed in accordance with the CoC under which they were originally constructed.

  CoC renewal application, Table 11, also indicates that the Loss of Material of the Trunnion Inner and Outer Plate is managed using an AMP; however, the Trunnion Inner and Outer Plate are not included in the CoC renewal application, Table 13. It is unclear if this subcomponent could potentially be included in new or replacement MTCs. If the proposed CoC condition eliminates the possibility that these subcomponents may be used in new or replacement MTCs, it is unclear why CoC renewal application, Table 11, indicates an AMP is used to manage aging of a subcomponent that does not presently exist and will not be used in future MTCs.

- Clarify the ITS scoping of the MTC Middle Shell and the Trunnion Lead/Neutron Shield. CoC renewal application, Table 7, indicates the safety functions of the Middle Shell are Structural Support (SS) Radiation Shielding (RS) and Heat Transfer (HT). CoC renewal application, Table 7, also indicates that the safety function of the Trunnion Lead/Neutron Shield is Radiation Shielding (RS). CoC renewal application, Table 11, indicates that both the MTC Middle Shell and the Trunnion Lead/Neutron Shield have been removed by the general licensees in accordance with 10 CFR 72.48 and subsequently adopted by CoC Amendment 4 and incorporated into FSAR Revision 5 and that none of the existing MTCs have these subcomponents. Table 11 indicates TLAAs are identified for aging management

activities for these subcomponents including loss of shielding effectiveness for the Trunnion Lead/Neutron Shield and loss of fracture toughness for the Middle Shell. It is unclear if these subcomponents could potentially be included in new or replacement MTCs. If the proposed CoC condition eliminates the possibility that these subcomponents may be used in new or replacement MTCs, it is unclear why CoC renewal application, Table 11, indicates a TLAA is used to manage aging of a subcomponent that does not presently exist and will not be used in future MTCs.

- Clarify the ITS scoping evaluation of the MTC hydraulic assemblies. CoC renewal application, Table 7, indicates that the MTC hydraulic assemblies have no identified safety function. CoC renewal application, Table 11 and Table 13, do not identify aging management activities for the MTC hydraulic assemblies. However, operational testing along with acceptance criteria and corrective actions are included for the MTC hydraulic assemblies in CoC renewal application, Section 3.4.2.5 and Table 18. AMPs are used to manage aging of ITS components or subcomponents (Criteria 1) or NITS components or subcomponents that, if degraded, could affect the safety function of ITS components (Criteria 2).

This information is required to demonstrate compliance with 10 CFR 72.240(d).

Response to RAI-5

Additional information to clarify the scoping evaluation of the MTC assembly subcomponents is provided as follows:

- As shown in Table 7, the Trunnion Cylinder/End Covers of the MTC assembly have no intended safety functions, and therefore, they do not require aging management. Consequently, Table 11 has been revised to state "N/A" in the "Aging Effect" and "Aging Mechanism" columns and "None" in the "Aging Management Activities" column for the Trunnion Cylinder/End Covers. In addition, the Trunnion Cylinder/End Covers have been removed from Table 13. This approach is consistent with that used for other subcomponents in Table 7 that have no intended safety functions.

- As discussed in Table 7, Note 3 of the CoC renewal application and in the RAI question above, the design of the MTC assembly was modified by all GLs in accordance with 10 CFR 72.48 to remove the Trunnion Inner and Outer Plate, and none of the existing MTC assemblies include these subcomponents. This change was adopted by the CH and incorporated into Amendment 4 of the CoC. The proposed condition in Chapter 1 of the CoC renewal application requires that any new SSCs be constructed in accordance with CoC Amendment 4 or later amendments, but that maintenance and repair of the existing SSCs be performed in accordance with the CoC under which they were originally constructed. Accordingly, maintenance and repair of the existing MTC assemblies would be performed in accordance with the CoC amendment under which they were constructed, including the changes made by the GLs in accordance with

10 CFR 72.48. Therefore, is not permissible (nor practical) for these subcomponents to be added to the existing MTC assemblies under maintenance or repair activities.

Table 7, Note 3 has been revised to clarify that Trunnion Inner and Outer Plate are not included in any of the existing MTC assemblies and the proposed condition prevents them from being used on any existing or new MTC assemblies, and consequently, the Trunnion Inner and Outer Plate are not considered in the Aging Management Activities. Accordingly, the Trunnion Inner and Outer Plate are deleted from Table 11.

- As discussed in Table 7, Note 3 of the CoC renewal application and in the RAI question above, the design of the MTC assembly was modified by all GLs in accordance with 10 CFR 72.48 to remove the MTC Middle Shell and the Trunnion Lead/Neutron Shield, and none of the existing MTC assemblies include these subcomponents. This change was adopted by the CH and incorporated into Amendment 4 of the CoC. The proposed condition in Chapter 1 of the CoC renewal application requires that any new SSCs be constructed in accordance with CoC Amendment 4 or later amendments, but that maintenance and repair of the existing SSCs be performed in accordance with the CoC under which they were originally constructed. Accordingly, maintenance and repair of the existing MTC assemblies would be performed in accordance with the CoC amendment under which they were constructed, including the changes made by the GLs in accordance with 10 CFR 72.48. Therefore, is not permissible (nor practical) for these subcomponents to be added to the existing MTC assemblies under maintenance or repair activities.

  Table 7, Note 3 has been revised to clarify that MTC Middle Shell and the Trunnion Lead/Neutron Shield are not included in any of the existing MTC assemblies and the proposed condition prevents them from being used on any existing or new MTC assemblies, and consequently, the MTC Middle Shell and the Trunnion Lead/Neutron Shield are not considered in the Aging Management Activities. Accordingly, the MTC Middle Shell and the Trunnion Lead/Neutron Shield are deleted from Table 11.

- As shown in Table 7, the MTC hydraulic assemblies of the MTC assembly have no intended safety functions, and therefore, they do not require aging management. Accordingly, Table 11 does not identify any aging management activities for the MTC hydraulic cylinder assembly. Therefore, the MTC hydraulic cylinder assembly has been deleted from Table 13. Also, Section 3.4.2.5 and Table 18 have been revised to remove all AMP examinations of the MTC hydraulic assemblies. Functional testing of the MTC hydraulic assemblies and shield doors is a normal maintenance activity that is not related to aging management.

Summary of Renewal Application Changes

- Table 7: Clarifying text is added to Note 3 concerning repair or replacement of previously removed MTC subcomponents.

- Section 3.4.2.4 (formerly Section 3.4.2.5): Removed functional testing of the MTC shield doors and maintenance of the MTC hydraulic assemblies from the AMP.

- Table 11: Deleted the Trunnion Inner and Outer Plate, MTC Middle Shell, and Trunnion Lead/Neutron Shield subcomponents; Changed Aging Effect and Aging Mechanism to "N/A" and Aging Management Activities to "None" for the Trunnion Cylinder/End Covers subcomponent.

- Table 13: Deleted row for the Trunnion Cylinder/End Covers subcomponent.

- Table 17 (formerly Table 18): Removed requirements related to functional testing of the MTC shield doors and maintenance of the Hydraulic Cylinder Assemblies from the Scope, Preventative Actions, Parameters Monitored or Inspected, Acceptance Criteria, and Corrective Actions AMP elements.

- Appendix A, Table 9.3-3: Deleted the MTC Middle Shell, Trunnion Cylinder/End Covers, Trunnion Inner & Outer Plate, and Trunnion Lead/Neutron Shield subcomponents; Deleted existing Note 2.

RAI-6: Provide additional information on the subcomponents of the spent fuel assemblies (SFA) that are included in Table 12 of the CoC renewal application:

- The Lower End fittings are identified in Table 8 of the CoC renewal application but do not appear in Table 12. The Upper End Fitting is entered in 2 rows suggesting a typographical error in Table 12.

- Verify if upper and lower fittings include the nozzles.

- Verify if guide tubes are Zircaloy or SS. Note that only Zircaloy is listed in CoC renewal application, Table 12.

This information is required to demonstrate compliance with 10 CFR 72.240(d).

Response to RAI-6

Additional information on the subcomponents of the spent fuel assemblies (SFA) that are included in Table 12 of the CoC renewal application is provided as follows:

- Table 12 is revised to correct the typographical error. The table now refers to both the Upper and Lower End Fittings.

- The Upper and Lower End Fittings include the assembly top and bottom nozzles, respectively, as well as other components such as the top and bottom tie plates.

- The guide tubes consist of Zircaloy only. The VSC-24 system technical specifications do not allow loading of assemblies with stainless steel guide tubes (see TS 1.2.1, Table 2).

Summary of Renewal Application Changes

- Table 12: Changed second row of "Upper End Fitting" to "Lower End Fitting" to correct a typographical error.

RAI-7: Identify all coatings and clarify the scoping evaluation for all coatings used on the VSC-24 system components. In some cases, the role of the coating is defined and the CoC renewal application clearly states that the coating is not relied on for corrosion protection of the carbon steel surfaces. In these cases the coating is not within the scope of the review as it is neither criteria 1 nor 2. However, some subcomponents rely on the coating for corrosion protection. CoC renewal application, Section 3.2.1.1, page 3-6 includes the statement:

> *All of the exposed carbon steel surfaces of the in-scope SSC subcomponents are covered with a non-organic epoxy or zinc-based coating that is resistant to high temperature and radiation, although in most cases the coating is not relied upon to prevent corrosion during storage. A conservative corrosion allowance is assumed for the carbon steel surfaces on the outside of the MSB shell and bottom plate, as discussed in Section 3.3.3.3. However, a corrosion allowance has not been included in the CLB for any other carbon steel components in the VSC-24 storage system.*

- Clarify the scoping evaluation of the solvent based inorganic zinc coatings, Dimetcote 6 and Carbozinc 11 specifically identified in the VSC-24 FSAR. CoC renewal application Tables 5, 6, and 7 do not identify a safety function for the coatings used on the MSB, the VCC carbon steel components, or the MTC. However, AMPs in CoC renewal application, including Section 3.4.2.3 Examination of the VCC Assembly Ventilation Ducts and Annulus, Section 3.4.2.4 Examination of VSC Top End Steel Components, Section 3.4.2.5 Examination of the MTC Assembly, and Section 3.4.4 Lead Cask Inspection specifically address detection of aging effects, acceptance criteria and corrective actions for coating degradation. Because the coating is included in these AMPs it is apparent that the inorganic zinc coatings are relied on to maintain the safety function of the coated carbon steel surfaces of the VCC, the MTC and the MSB structural lid and closure weld. As such, the coating on these subcomponents meets scoping evaluation criteria 2 and should be identified as within the scope of the review.

- Identify and include a scoping evaluation for the use of any epoxy or polymer coatings. Note that epoxy or polymer coating may degrade as a result of radiation and or thermal exposure. For all epoxy or polymer coatings that are within the scope of the review, provide descriptions of all aging management activities that will be used to manage the effects of aging.

This information is required to demonstrate compliance with 10 CFR 72.240(d) and 10 CFR 72.240(c).

Response to RAI-7

The CoC renewal application has been revised to identify all coatings and clarify the scoping evaluation for all coatings used on the VSC-24 system components, as discussed below:

- Tables 5, 6, and 7 have been revised to clarify that, while the coating does not have any intended safety functions, it is relied upon to protect against corrosion on most of the underlying steel surfaces of subcomponents that do have intended safety functions, and therefore screens in under criteria 2. One exception to this is the coating on the MSB radial shell and bottom plate, which it not relied upon for corrosion protection. Instead, a TLAA is used to evaluate the effects of general corrosion on the MSB shell and bottom plate.

- Section 3.2.1.1, "Loss of Material," has been revised to delete the words "epoxy or zinc based" from the description of the coating. Although both Dimetcote 6 and Carbozinc 11 are non-organic coatings, neither are epoxy-based or polymer-based coatings.

Summary of Renewal Application Changes

- Section 2.2.1.2: Revised 4th sentence of 1st paragraph to clarify that only the coating on the exterior surfaces of the MSB shell and bottom plate is not relied upon for general corrosion protection.

- Section 2.2.1.3: Changed "steel surfaces of *the* VCC assembly subcomponents" to "steel surfaces of *these* VCC assembly subcomponents" in the 6th sentence of 1st paragraph.

- Table 5: Note 3 revised to clarify the scoping evaluation of coating on MSB assembly.

- Table 6: Note 4 added to clarify the scoping evaluation of coating on VCC assembly.

- Table 7: Note 4 added to clarify the scoping evaluation of coating on MTC assembly.

- Section 3.1.1.1: Revised to clarify the scoping evaluation of the coating on the exterior surfaces of the MSB assembly.

- Section 3.1.1.2: Revised 5th sentence to clarify the coated surfaces of the VCC assembly.

- Section 3.2.1.1, "Loss of Material": Revised 1st sentence of 2nd paragraph to delete "epoxy or zinc based" from the description of the coating and changed "*most* cases" to "*some* cases".

RAI-8: Additional information is needed to address thermal related degradation of the concrete used in the VCC.

- Provide additional information to address the potential for thermal degradation of the concrete considering the full range of operating temperatures. CoC renewal application, Section 3.1.2, states that temperatures at the steel to concrete interfaces could reach as high as 200°F. Table 4.1-1 of the FSAR states that some concrete/steel surfaces can initially start at high temperatures (214°F) exceeding the ACI 349 limit of 200°F.

- Revise CoC renewal application, Section 3.2.1.2, to address the potential for thermal cycling fatigue of the concrete.

This information is required to demonstrate compliance with 10 CFR 72.240(c).

Response to RAI-8

As discussed below, thermal degradation of the concrete is not an aging mechanism that requires management during the extended storage period for the following reasons:

- Maximum Concrete Temperature: As discussed in Section 4.3 of the FSAR, the normal, long-term local temperature limit of concrete is established as 225°F. Per Section 4.3, Condition/Observation 2 of the SER[1], NRC staff considers this temperature limit to be an acceptable alternative to the ACI-349 limit of 200°F based on VCC concrete mix and aggregate specification. This temperature limit is applicable to the peak concrete temperature that occurs at the inside radius of the VCC concrete shell. Per Table 4.1-1 of the FSAR, the highest concrete temperature calculated for all long-term conditions based on the design-basis heat load of 24 kW is 214°F, which is lower than the established temperature limit of 225°F.

  As discussed in Section 1.1.2 of the VSC-24 CoC Renewal Application, the maximum initial heat load for all previously loaded VSC-24 casks is 14.7 kW. Furthermore, per Section 1 of the VSC-24 CoC Renewal Application, a CoC condition has been proposed to limit the decay power per assembly to 0.625 kW for casks loaded under the renewed CoC, which effectively limits the maximum total cask heat load to 15 kW. Given that the maximum initial heat load of any VSC-24 cannot exceed 15 kW, it is assured that the actual peak concrete temperatures will be much less than 200°F under all normal, long-term storage conditions.

- Concrete Thermal Fatigue: A calculation package (No. VSC-04.3207, Revision 0) has been prepared to address the potential for thermal fatigue in the VCC reinforced concrete due to repeated cycles of seasonal and diurnal temperature fluctuations in

[1] United States Nuclear Regulatory Commission, Letter from C. Haughney (U.S. NRC) to J. Massey (Pacific Sierra Nuclear Associates), Safety Evaluation Report on "Safety Analysis Report for the Ventilated Storage Cask System, Revision 0," April 28, 1993.

ambient air temperature and the CoC renewal application has been revised to discuss this analysis. A copy of Calculation No. VSC-04.3207, Revision 0 is included in Enclosure 3 of the response letter.

The VCC reinforced concrete is subjected to repeated cycles of thermal stress due to seasonal and diurnal variations in ambient conditions. Extreme fluctuations in ambient air temperature from -40°F to 100°F (i.e., seasonal variations) are conservatively postulated to occur 10 times per year, for a total of 600 cycles over 60 years. Diurnal fluctuations in ambient air temperature occur once per day, for a total of 21,900 cycles over 60 years. Thus, the combination of seasonal and diurnal variations in ambient temperature result in a total of 22,500 cycles of thermal stress over 60 years.

As shown in Figures 4.4.5, 11.1-1, and 11.1-2 of the VSC-24 FSAR, the maximum through-wall temperature gradient in the VCC concrete shell for all normal and off-normal long-term storage conditions ranges from a low of 73°F for the severe cold (-40°F ambient air temperature) condition to a high of 95°F for the normal long-term storage condition. The results of the thermal stress analysis of the VCC assembly for the steady-state normal long-term storage condition that are presented in Table 3.4-7 of the VSC-24 FSAR show that the maximum compressive stress in the concrete 0.4 ksi and the maximum tensile stress in the rebar is 28.8 ksi. Thermal stress in the reinforced concrete of the VCC is proportional to the through-wall thermal gradient. Thus, the extreme cold condition will result in a maximum concrete compressive stress of approximately 0.3 ksi (i.e., 0.4 ksi x 73°F/95°F) and a maximum tensile stress in the rebar of approximately 22.1 ksi (i.e., 28.8 ksi x 73°F/95°F). Therefore, the maximum range of concrete compressive stress and rebar tensile stress due to seasonal variations in ambient temperature are approximately 0.1 ksi and 6.7 ksi, respectively.

The ratio of the maximum range of concrete compressive strength (S_{max}) to its design strength (f'_c) is only 0.025 (i.e., 0.1 ksi/4 ksi). Based on Figure 3 of ACI 215R-74, *Considerations for Design of Concrete Structures Subjected to Fatigue Loading*, 22,500 cycles at this low concrete compressive stress ratio will not result in fatigue failure of the VCC concrete because it is much lower than the stress-fatigue life (S-N) curves. Similarly, based on Figure 6 of ACI 215R-74, fatigue failure of the reinforcing steel in the VCC concrete will not result from 22,500 cycles at a stress range of 6.7 ksi in the rebar because it is much lower than the S-N curves. Therefore, thermal cyclic fatigue failure of the VCC concrete will not occur over the extended storage period.

Summary of Renewal Application Changes

- Section 3.2.1.2: Added discussion of Thermal Fatigue to the potential aging effects and degradation mechanism for reinforced concrete.

- Section 3.3.2: Added VCC Thermal Fatigue Analysis to list of TLAAs.

- Section 3.3.3.8: Added new section to discuss concrete thermal fatigue analysis.
- Section 3.7 (formerly Section 3.6): Added Reference 3.41 to ACI 225R-74.
- Appendix A, Table A-1: Added Section 9.3.2.7 (VCC Concrete Thermal Fatigue Analysis) to the FSAR; Added Reference 9.3 to Section 14.1 of the FSAR.

RAI-9: Clarify the aging effect managed in CoC renewal application, Section 3.4.2.1, Examination of VCC Assembly Air Inlets and Outlets.

FSAR technical specification (TS) 1.3.1 referenced in CoC renewal application, Section 3.4.2.1, addresses blockage, degradation and breach of the air inlets and outlets. The description provided in CoC renewal application, Section 3.4.2.1, is essentially the same as TS 1.3.1 with additional information on corrective action and operating experience. If TS 1.3.1 is still applicable in the period of extended operation, CoC renewal application, Section 3.4.2.1, as written, is unnecessary. If other aging effects beyond those described in TS 1.3.1 are to be managed in the Examination of VCC Assembly Air Inlets and Outlets AMP, then Section 3.4.2.1 and Table 14 require revision to the Scope, Parameters Monitored or Inspected, Detection of Aging Effects, Monitoring and Trending, Acceptance Criteria and Operating Experience AMP elements. In addition, the timing of inspections with an initial inspection 2 years following the latter of the 20th anniversary of the first cask loaded at the site or the effective date of the CoC renewal is inconsistent with the daily frequency of inspection and either requires revision or justification.

This information is required to demonstrate compliance with 10 CFR 72.240(c).

Response to RAI-9

The AMP for Examination of VCC Assembly Air Inlets and Outlets described in Section 3.4.2.1 and Table 14 is essentially the same as TS 1.3.1, with additional requirements for managing the degradation or damage to the inlet and outlet screens and attachment hardware. Section 3.4.2.1 and Table 14, which previously described the AMP for Examination of VCC Assembly Air Inlets and Outlets, have been deleted and the subsequent sections and tables have been renumbered accordingly. Inspection of the inlet and outlet screens and attachment hardware for damage or degradation has been moved to the AMP for Examination of VCC Assembly Exterior (now Section 3.4.2.1 and Table 14, as renumbered).

Summary of Renewal Application Changes

- Section 3.4.2: Revised section cross-reference in 1st sentence of 2nd paragraph to account for deletion of Section 3.4.2.1 and renumbering of subsequent sections.
- Deleted Section 3.4.2.1 and Table 14 and renumbered subsequent sections and tables, accordingly. (Note: Heading numbers, table numbers, and cross-references

for the renumbered section(s) and table(s) have been updated, but are not marked as revisions.)

- Section 3.4.2.1 (formerly Section 3.4.2.2): Deleted the word "Concrete" from the section heading; Revised to address damage or degradation of VCC air inlet and outlet screens and attachment hardware in the Scope, Acceptance Criteria, Corrective Actions, and Operating Experience elements of the AMP.

- Table 13: Revised the AMP Section(s) for the VCC Assembly, "Air Inlet Screen/Hdwr." and "Air Outlet Screen/Hdwr." to reference the AMP for Examination of VCC Assembly Exterior Concrete (i.e., Section 3.4.2.1, as renumbered.)

- Table 14 (formerly Table 15): Revised the table caption to delete the word "Concrete" and update the number of pages; Revised Scope, Preventative Actions, Parameters Monitored or Inspected, Detection of Aging Effects, Detection of Aging Effects-Method or Technique, Monitoring and Trending, Acceptance Criteria, Corrective Actions, and Operating Experience AMP elements to address air inlet and outlet screens and attachment hardware.

- Appendix A, Table A-1, FSAR Section 9.3.3: Delete "Examination of VCC Air Inlets and Outlets" from the AMPs to be added to the FSAR and renumber the subsequent table numbers.

RAI-10: Provide additional information on the Examination of VCC Assembly Exterior Concrete AMP described in CoC renewal application Section 3.4.2.2 and Table 15.

- Detection of Aging Effects: Justify the Timing of Inspection that states the initial inspection is to be completed within 2 years of the 20 year mark for the first cask or the CoC renewal when the required Frequency of Inspection is yearly.

- Acceptance Criteria: Include acceptance criteria for spalling. Note that spalling is identified in the Parameters Monitored or Inspected.

- Corrective Actions: Include corrective actions that align with the Parameters Monitored or Inspected including freeze-thaw and loss of material from spalling and scaling.

- Operating Experience: Include a description on how additional operating experience would be collected, processed, and utilized by general licensees. Consider, at a minimum, the direct operating experience from general licensees that utilize the VSC-24 system gained from future examinations and inspections that are performed in accordance with Examination of VCC Assembly Exterior Concrete AMP, the Institute of Nuclear Power Operations (INPO) Operational Experience database, NRC Information Notices, and Electric Power Research Institute (EPRI) Reports.

This information is required to demonstrate compliance with 10 CFR 72.240(c)(3).

Response to RAI-10

Additional information on the Examination of VCC Assembly Exterior Concrete AMP described in CoC renewal application Section 3.4.2.1 and Table 14 (formerly Section 3.4.2.2 and Table 15) is provided as follows:

- Detection of Aging Effects: Timing of Inspections has been revised to require the initial inspection to be completed "within 1-year after the 20th anniversary of the first cask loaded at the site or within 2-years after the effective date on the CoC renewal, whichever is later." This allows sufficient time for all GLs to complete CoC renewal implementation activities, which may include budgeting and funding for AMP inspection activities, preparation of programs and procedures, updating the 10 CFR 72.212 report, planning of work activities, qualifying inspection personnel and inspection methods, procuring equipment, supplies, and services, as well as performing and documenting the AMP inspections. However, this timing will also avoid undue delays for the completion of the first AMP inspection for those sites having a 20th anniversary of the first cask loaded that is more than 1-year after the effective date on the CoC renewal. Furthermore, although the initial AMP inspection may be completed up to 2-years following the effective date on the CoC renewal for some sites, the exterior concrete surface of all VCCs will continue to be examined yearly in accordance with the requirements of TS 1.3.2.

- Acceptance Criteria: Section 3.4.2.1 and Table 14 (formerly Section 3.4.2.2 and Table 15) have been revised to include acceptance criteria for spalling. The acceptance criterion for spalling, which is based on the first-tier criteria of ACI 349.3R-02, is specified as less than 3/8-inch deep and 4-inch wide (in any direction).

- Corrective Actions: The corrective actions in Table 14 (formerly Table 15) for "Repair of Defects" are applicable to aging effects related to freeze-thaw, such as scaling and spalling. Table 14, "Repair of Defects" has been revised to clarify that the section is applicable to defects in the concrete exterior that include popouts, voids, scaling and spalling.

- Operating Experience: Section 3.4.2.1 and Table 14 (formerly Section 3.4.2.2 and Table 15) have been revised to discuss the requirement to perform periodic "tollgate" assessments during the period of extended operation. In addition, Section 3.6 has been added to describe the general requirements for periodic tollgate assessments.

Additionally, in response to this RAI and others, Section 3.4.2.1 and Table 14 (formerly Section 3.4.2.2 and Table 15) have been reviewed for clarity and internal consistency, and revised as follows:

- Detection of Aging Effects – Data Collection: Table 14 (formerly Table 15) has been revised to include more specific requirements for data collection, based on the guidelines provided in ACI 201.1 R-08.

- Monitoring and Trending: The discussion in Table 14 (formerly Table 15) has been revised to identify trends that require monitoring, and to discuss evaluation of the results and corrective actions.

- Section 3.4.2.1 (formerly Section 3.4.2.2) has been revised to include discussions of Detection of Aging Effects – Method or Technique, Detection of Aging Effects – Data Collection, Monitoring and Trending, and Extent of Condition, similar to those contained in Table 14 (formerly Table 15). In addition, Section 3.4.2.1 (formerly Section 3.4.2.2) has been revised to discuss corrective actions for concrete showing evidence of leaching and/or increased porosity.

Summary of Renewal Application Changes

- Table 2: Added row for new Section 3.6, Periodic Tollgate Assessments.

- Section 3.4.2: Revised last sentence of 2nd paragraph to refer to new Section 3.6 for the requirement for periodic tollgate assessments.

- Section 3.4.2.1 (formerly Section 3.4.2.2): Revised 1st sentence of 1st paragraph to discuss the timing of inspections; Added discussions of Detection of Aging Effects – Method or Technique, Detection of Aging Effects – Data Collection, Monitoring and Trending, and Extent of Condition, similar to those contained in Table 14 (formerly Table 15); Revised 1st paragraph under Acceptance Criteria subheading to discuss the basis for the acceptance criteria for defects on the exposed concrete surfaces and include the acceptance criteria for concrete spalling; Revised 1st paragraph under Corrective Actions subheading to discuss the corrective actions for defects on the concrete surface and steel-to-concrete interfaces that exceed the acceptance criteria; Revised 3rd paragraph under Corrective Actions subheading to discuss corrective actions for concrete showing evidence of leaching and/or increased porosity; Added paragraph to end of section to discuss the requirements for periodic tollgate assessments.

- Section 3.6: Added new section to discuss the requirements for periodic tollgate assessments. Renumbered subsequent section. (Note: Section numbers and cross-references to the renumbered section(s) have been updated, but are not marked as revisions.)

- Section 3.7: Added Reference 3.40 for NEI 14-03.

- Table 14 (formerly Table 15): Revised Detection of Aging Effects-Data Collection to include more specific requirements for data collection, based on the guidelines provided in ACI 201.1 R-08; Revised Detection of Aging Effects-Timing of Inspections AMP element to require completion of the initial AMP inspection within 1-year after the 20th anniversary of the first cask loaded at each site or 2-years after the effective date on the CoC renewal, whichever is later; Revised Monitoring and Trending to require a baseline crack/defect map to be developed from the initial inspection during the extended storage period (based on RAI-11), to

clarify that data from inspections performed during the initial storage period may be used to inform the baseline, to identify trends that require monitoring, and to discuss evaluation of the results and corrective actions; Revised Acceptance Criteria AMP element to include acceptance criteria for concrete spalling, added a subheading for "Concrete Surfaces", and moved acceptance criteria for steel-to-concrete interfaces to separate subheading for clarity; Revised Corrective Actions AMP element, Repair of Defects subheading to change subheading title to "Repair of Surface Defects" and revised second sentence to include a parenthetical example of the types of defects on the concrete exterior surface that are included; Revised Operating Experience AMP element to include a discussion of the requirement to perform periodic tollgate assessments during the period of extended operation.

- Appendix A, Table A-1, FSAR Section 9.3.5: Add new section, based on Section 3.6 of the CoC renewal application, to address requirement to performed periodic tollgate assessments during the extended storage period.

RAI-11: Provide additional information on the Examination of VCC Assembly Ventilation Ducts and Annulus in the CoC renewal application, Section 3.4.2.3.

- Detection of Aging Effects: Justify the Timing of Inspection where the initial inspection is to be completed within the first 5-year period following the latter of the 20th anniversary of the first cask loaded at the site or the effective date of the CoC renewal. Clarify the timing of the initial inspection with respect to previous inspections performed to meet the requirement of TS 1.3.3 which also requires an inspection every 5 years.

- Monitoring and Trending: Clarify the use of previous inspections performed in accordance with TS 1.3.3 to serve as a baseline for the period of extended operation. The Detection of Aging Effects element in the Examination of VCC Assembly Ventilation Ducts and Annulus AMP identifies remote visual inspection meeting the requirements of VT-3 performed by personnel qualified in accordance with industry guidelines for implementing the requirements of the Maintenance Rule (10 CFR 50.65). It is not clear from the description in the VSC-24 FSAR that inspections performed in accordance with TS 1.3.3 would be sufficient to serve as a baseline for the period of extended operation.

- Operating Experience: Include a description on how additional operating experience would be collected, processed, and utilized by general licensees. Consider, at a minimum, the direct operating experience from general licensees that utilize the VSC-24 system gained from future examinations and inspections that are performed in accordance with Examination of VCC Assembly Ventilation Ducts and Annulus AMP, the INPO Operational Experience database, NRC Information Notices, and EPRI Reports.

This information is required to demonstrate compliance with 10 CFR 72.240(c)(3).

Response to RAI-11

Additional information on the Examination of VCC Assembly Ventilation Ducts and Annulus AMP described in CoC renewal application Section 3.4.2.2 and Table 15 (formerly Section 3.4.2.3 and Table 16) is provided as follows:

- Detection of Aging Effects: Timing of Inspections has been revised to require the initial inspection to be completed "within 5-year after the 20th anniversary of the first cask loaded at the site." This timing will maintain the current 5-year interval between successive inspections (i.e., those currently performed in accordance with TS 1.3.3) and allows sufficient time for all GLs to complete CoC renewal implementation activities, which may include budgeting and funding for AMP inspection activities, preparation of programs and procedures, updating the 10 CFR 72.212 report, planning of work activities, qualifying inspection personnel and inspection methods, procuring equipment, supplies, and services, as well as performing and documenting the AMP inspections.

- Monitoring and Trending: This AMP element has been revised to clarify that the baseline is developed from the initial inspection performed during the extended storage period. Although the examinations of the VCC ventilation ducts and annulus performed during the initial storage period do provide some information that could inform monitoring and trending, those examinations were not required to be performed to the same standards and qualifications, and should only be considered as anecdotal evidence, which is not be sufficient to serve as a baseline for the period of extended operation.

- Operating Experience: Section 3.4.2.2 and Table 15 (formerly Section 3.4.2.3 and Table 16) have been revised to discuss the requirements for periodic "tollgate" assessments. In addition, Section 3.6 has been added to describe the general requirements for periodic tollgate assessments.

Additionally, in response to this RAI and others, Section 3.4.2.2 and Table 15 (formerly Section 3.4.2.3 and Table 16) have been reviewed for clarity, completeness, and internal consistency, and revised as follows:

- Table 15 (formerly Table 16): Detection of Aging Effects – Data Collection, has been revised to include more specific requirements for data collection; Monitoring and Trending has been revised to identify the data that must be collected and the form in which it shall be recorded, the trends that require monitoring, and the requirements for evaluation of the results and corrective actions; Corrective Actions, Coating Degradation and Corrosion subheading, has been revised to clarify the required corrective actions for localized corrosion on the surfaces of the VCC Cask Liner Bottom, VCC Cask Liner Shell, VCC Shielding Ring Plates (Liner Assembly and Shield Ring), and MSB Shell (includes addition of Notes 2 and 3), specifically that non-repairs of localized corrosion are permitted only when mitigating actions are taken to prevent further progression of localized corrosion and additional inspections are performed to confirm the effectiveness of the mitigating action.

- Section 3.4.2.2 (formerly Section 3.4.2.3) has been revised to include discussions of Detection of Aging Effects – Method or Technique, Detection of Aging Effects – Data Collection, Monitoring and Trending, Acceptance Criteria, Corrective Actions, and Extent of Condition for completeness and consistency with Table 15 (formerly Table 16).

Summary of Renewal Application Changes

- Section 3.4.2.2 (formerly Section 3.4.2.3): Revised first sentence of section to discuss timing of inspections; Added/revised discussions of Detection of Aging Effects – Method or Technique, Detection of Aging Effects – Data Collection, Monitoring and Trending, Acceptance Criteria, Corrective Actions, and Extent of Condition for completeness and consistency with Table 15 (formerly Table 16); Revised corrective actions for consistency with Lead Cask Inspection AMP - paragraphs were added to clarify the required corrective actions for localized corrosion on the annulus facing steel surfaces of the VCC Cask Liner Bottom, VCC Cask Liner Shell, VCC Shielding Ring Plates (Liner Assembly and Shield Ring), and MSB Shell; Added paragraph to end of section to discuss the requirements for periodic tollgate assessments.

- Table 15 (formerly Table 16): Revised Detection of Aging Effects-Timing of Inspections AMP element to require the initial inspection to be completed within 5-years of the 20th anniversary of the 1st cask loaded at the site; Revised Monitoring and Trending to clarify that the baseline should be based on the initial inspection during the extended storage period, to clarify that data from inspections performed during the initial storage period may be used to inform the baseline, to identify trends that require monitoring, and to discuss evaluation of the results and corrective actions; Revised Corrective Actions to clarify corrective actions for blockage of VCC ventilation ducts and annulus and coating degradation and corrosion on the steel surfaces that line the ventilation ducts and annulus, clarify the required corrective actions for localized corrosion on the surfaces of the VCC Cask Liner Bottom, VCC Cask Liner Shell, VCC Shielding Ring Plates (Liner Assembly and Shield Ring), and MSB Shell (includes addition of Notes 2 and 3), and move discussion on Extent of Condition the end of section; Revised Operating Experience AMP element to include a discussion of the requirement to perform periodic tollgate assessments during the period of extended operation.

RAI-12: Provide additional information on the Examination of VSC Top End Steel Components in CoC renewal application, Section 3.4.2.4.

- Parameters Monitored or inspected: Remove lid gasket from this section. The Scope of the AMP states the lid gasket will be replaced regardless of its condition.

- Operating Experience: Include a description on how additional operating experience would be collected, processed, and utilized by general licensees. Consider, at a minimum, the direct operating experience from general licensees that utilize the

VSC-24 system gained from future examinations and inspections that are performed in accordance with Examination of VSC Top End Steel Components AMP, the INPO Operational Experience database, NRC Information Notices, and EPRI Reports.

This information is required to demonstrate compliance with 10 CFR 72.240(c)(3).

Response to RAI-12

Additional information on the Examination of VSC Top End Steel Components AMP described in CoC renewal application Section 3.4.2.3 and Table 16 (formerly Section 3.4.2.4 and Table 17) is provided as follows:

- Parameters Monitored or Inspected: The requirement to monitor degradation of the VCC lid gasket has been removed from this section of Table 16 (formerly Table 17.)

- Operating Experience: Section 3.4.2.3 and Table 16 (formerly Section 3.4.2.4 and Table 17) have been revised to discuss the requirements for periodic "tollgate" assessments. In addition, Section 3.6 has been added to describe the general requirements for periodic tollgate assessments.

Additionally, in response to this RAI and others, Section 3.4.2.3 and Table 16 (formerly Section 3.4.2.4 and Table 17) have been reviewed for clarity, completeness, and internal consistency, and revised as follows:

- Table 16 (formerly Table 17): Detection of Aging Effects – Data Collection, has been revised to include more specific requirements for data collection; Monitoring and Trending has been revised to identify the data that must be collected and the form in which it shall be recorded, the trends that require monitoring, and the requirements for evaluation of the results and corrective actions.

- Section 3.4.2.3 (formerly Section 3.4.2.4) has been revised to include discussions of Detection of Aging Effects – Data Collection, Monitoring and Trending, Acceptance Criteria, and Corrective Actions for completeness and consistency with Table 16 (formerly Table 17).

Summary of Renewal Application Changes

- Section 3.4.2.3 (formerly Section 3.4.2.4): Revised second sentence of first paragraph to discuss timing of inspections; Added/revised discussions of Detection of Aging Effects – Data Collection, Monitoring and Trending, Acceptance Criteria, and Corrective Actions for completeness and consistency with Table 16 (formerly Table 17); Revised last paragraph of Corrective Actions subheading to require removal of coating from area to be repaired by welding to avoid potential for liquid metal embrittlement; Added paragraph to end of section to discuss the requirements for periodic tollgate assessments.

- Table 16 (formerly Table 17): Revised Parameters Monitored or Inspected AMP element to delete "lid gasket," from sentence; Revised Detection of Aging Effects-Data Collection to include more specific requirements for data collection; Revised Detection of Aging Effects-Timing of Inspections AMP element to require the initial inspection to be completed within 1-year after the 20th anniversary of the 1st cask loaded at the site or within 2-years after the effective date of the CoC renewal, whichever is later; Revised Monitoring and Trending to require a baseline to be developed from the initial inspection during the extended storage period (based on RAI-11), to clarify that data from inspections performed during the initial storage period may be used to inform the baseline, to identify trends that require monitoring, and to discuss evaluation of the results and corrective actions; Added Note 4 to 2nd paragraph (2 places) of Corrective Actions and in Notes section to require removal of coating from area to be repaired by welding to avoid potential for liquid metal embrittlement; Revised Operating Experience AMP element to add discussion of the requirement to perform periodic tollgate assessments during the period of extended operation.

RAI-13: Provide additional information on the Examination of MTC Assembly in the CoC renewal application, Section 3.4.2.5

- Detection of Aging Effects: Revise the Detection of Aging Effects element description and specify the visual examination that will be required for the MTC assembly. In addition, identify the qualifications of staff performing the examination. Note that other AMPs included in the VSC-24 CoC renewal application such as the VSC Top End Steel Components, contain specific information on both inspection and inspector requirements in the Detection of Aging Effects AMP element.

- Detection of Aging Effects-Data Collection: Revise the data collection description in CoC renewal application Section 3.4.2.5 and Table 18 and include documentation of the examination including areas of coating degradation and corrosion, results of function testing of the shield doors and records of corrective actions. Note that the documentation may include photographs of examination but photographs alone are unlikely to be sufficient for monitoring and trending or operational experience.

- Monitoring and Trending: Revise Table 18 and include location of coating degradation and corrosion, degradation of the hydraulic assemblies, functional testing of the MTC doors, and repairs or corrective actions.

- Corrective Action: Clarify the corrective actions required for corrosion that results in loss of material that exceeds the acceptance criteria. As stated, the corrective actions indicate that if there is loss of material identified that exceeds the acceptance criteria the MTC assembly must be evaluated for continued use. It is unclear if it is permissible for the evaluation to conclude and justify non-repairs, and there is not sufficient information provided to assess the requirements for calculating specific

numerical values of conditional acceptance criteria to ensure that the design bases are maintained.

- Operating Experience: Include a description on how additional operating experience would be collected, processed, and utilized by general licensees. Consider, at a minimum, the direct operating experience from general licensees that utilize the VSC-24 system gained from future examinations and inspections that are performed in accordance with Examination of MTC Assembly AMP, the INPO Operational Experience database, NRC Information Notices, and EPRI Reports.

This information is required to demonstrate compliance with 10 CFR 72.240(c)(3).

Response to RAI-13

Additional information on the Examination of MTC Assembly AMP described in CoC renewal application Section 3.4.2.4 and Table 17 (formerly Section 3.4.2.5 and Table 18) is provided as follows:

- Detection of Aging Effects: This AMP element has been revised to specify the type of visual examination required for the coated steel surfaces of the MTC assembly (VT-3) and the qualification for personnel performing the examination, similar to the Examination of VSC Top End Steel Components AMP.

- Detection of Aging Effects-Data Collection: This element of the AMP has been revised to require documentation of the examination on a checklist/inspection form, written descriptions, sketches, and photographs of observed aging effects, records of corrective actions, and to clarify that video may also be used to document the inspection.

- Monitoring and Trending: This element has been revised to require a baseline to be developed from the initial inspection during the extended storage period (based on RAI-11), to clarify that data from maintenance activities performed during the initial storage period may be used to inform the baseline, to identify trends that require monitoring, and to discuss evaluation of the results and corrective actions.

  As discussed in the response to RAI-5, the Examination of MTC Assembly AMP has been revised to remove the requirements for functional testing of MTC shield doors and examination of the hydraulic cylinders.

- Corrective Actions: The AMP element has been revised to clarify that any components of the MTC assembly with corrosion that exceeds the acceptance criteria shall be repaired or replaced.

- Operating Experience: Section 3.4.2.4 and Table 17 (formerly Section 3.4.2.5 and Table 18) have been revised to discuss the requirements for periodic "tollgate"

assessments. In addition, Section 3.6 has been added to describe the general requirements for periodic tollgate assessments.

Additionally, in response to this RAI and others, Section 3.4.2.4 and Table 17 (formerly Section 3.4.2.5 and Table 18) have been reviewed for clarity, completeness, and internal consistency, and revised as follows:

- Table 17 (formerly Table 18): Detection of Aging Effects – Data Collection, has been revised to include more specific requirements for data collection; Monitoring and Trending has been revised to identify the data that must be collected and the form in which it shall be recorded, the trends that require monitoring, and the requirements for evaluation of the results and corrective actions.

- Section 3.4.2.4 (formerly Section 3.4.2.5) has been revised to include discussions of Detection of Aging Effects – Data Collection, Monitoring and Trending, Acceptance Criteria, and Corrective Actions for completeness and consistency with Table 17 (formerly Table 18).

Summary of Renewal Application Changes

- Section 3.4.2.4 (formerly Section 3.4.2.5): Revised 1st paragraph to require initial inspection to be completed within 1-year after the 20th anniversary of the first cask loaded at the site or within 2-years after the CoC renewal date, whichever is later; Added/revised discussions of Detection of Aging Effects – Data Collection, Monitoring and Trending, Acceptance Criteria, and Corrective Actions for completeness and consistency with Table 17 (formerly Table 18); Revised 3rd paragraph to clarify that any components of the MTC assembly with corrosion that exceeds the acceptance criteria shall be repaired or replaced; Added paragraph to end of section to discuss the requirements for periodic tollgate assessments.

- Table 17 (formerly Table 18): Revised Detection of Aging Effects-Method or Technique AMP element to specify VT-3 visual examination and qualification requirements for personnel performing the examination; Revised Detection of Aging Effects-Data Collection to require documentation of the examination on a checklist/inspection form, written descriptions, sketches, and photographs of observed aging effects, records of corrective actions, and to clarify that video may also be used to document the inspection; Revised Detection of Aging Effects-Timing of Inspections AMP element to require the initial inspection to be completed within 1-year of the 20th anniversary of the 1st cask loaded at the site, or 2-years of the effective date of the CoC renewal, whichever is later; Revised Monitoring at Trending to require a baseline to be developed from the initial inspection during the extended storage period (based on RAI-11), to clarify that data from maintenance activities performed during the initial storage period may be used to inform the baseline, to identify trends that require monitoring, and to discuss evaluation of the results and corrective actions; Revised Corrective Actions AMP element to clarify that any components of the MTC assembly with corrosion that exceeds the acceptance criteria shall be repaired or replaced (also added Note 1

to require removal of coating from area to be repaired by welding to avoid potential for liquid metal embrittlement); Revised Operating Experience AMP element to add discussion of the requirement to perform periodic tollgate assessments during the period of extended operation.

RAI-14: Provide additional information on the Lead Cask Inspection in CoC renewal application, Section 3.4.4.

- Detection of Aging Effects-Sample Size: Revise selection criteria to state that the Lead Cask Inspection must be performed on a different cask than the system used in the VSC Top End Steel Examination AMP.

- Detection of Aging Effects-Data Collection: Revise the data collection description in CoC renewal application Section 3.4.4 and Table 19 and include: documentation of the examination including areas of coating degradation and corrosion and records of corrective actions. Note that the documentation may include photographs of examination but photographs alone are unlikely to be sufficient for monitoring and trending or operational experience.

- Corrective Actions: Clarify corrective actions required for a VCC or MSB assembly with unacceptable corrosion. The Acceptance Criteria indicates that localized corrosion is not acceptable but the stated corrective action is an evaluation in accordance with the general licensee's corrective action program (CAP). It is unclear if it is permissible for the evaluation to conclude and justify non-repairs, and there is not sufficient information provided to assess the requirements for calculating specific numerical values of conditional acceptance criteria to ensure that the design bases are maintained.

- Operating Experience: Include a description on how additional operating experience would be collected, processed, and utilized by general licensees. Consider, at a minimum, the direct operating experience from general licensees that utilize the VSC-24 system gained from future examinations and inspections that are performed in accordance with Lead Cask Inspection, the INPO Operational Experience database, NRC Information Notices, and EPRI Reports.

This information is required to demonstrate compliance with 10 CFR 72.240(c)(3).

Response to RAI-14

Additional information on the Lead Cask Inspection AMP described in CoC renewal application Section 3.4.4 and Table 18 (formerly Table 19) is provided as follows:

- Detection of Aging Effects: Section 3.4.4 and Table 18 (formerly Table 19) have both been revised to require that the cask(s) selected for the Lead Cask Inspection AMP are not be the same cask used for the Examination of VSC Top End Steel Components AMP. In addition, Section 3.4.2.3 and Table 16 (formerly Section

3.4.2.4 and Table 17) have been revised to require that the cask selected for the Examination of VSC Top End Steel Components AMP is different than the cask(s) selected for the Lead Cask Inspection AMP.

- Detection of Aging Effects-Data Collection: This element of the AMP has been revised to clarify the requirements for data collection, including documentation of the examination on a checklist or inspection form, along with written descriptions of observed aging effects, accompanied by sketches that identify location and size, and photographs. This element of the AMP has also been revised to clarify that video coverage of the examination should be used to document the inspection, and that corrective actions resulting from each AMP inspection shall be documented.

- Corrective Actions: The Lead Cask Inspection AMP has been revised to clarify the required corrective actions for localized corrosion on the surfaces of the VCC Cask Liner Bottom, VCC Cask Liner Shell, VCC Shielding Ring Plates (Liner Assembly and Shield Ring), MSB Shell, and MSB Bottom Plate. Non-repairs of localized corrosion are permitted only when mitigating actions are taken to prevent further progression of localized corrosion and additional inspections are performed to confirm the effectiveness of the mitigating action.

  Localized corrosion on the surfaces of the VCC Cask Liner Bottom, VCC Cask Liner Shell, VCC Shielding Ring Plates (Liner Assembly and Shield Ring), MSB Shell, and MSB Bottom Plate requires additional examination of the affected surface(s) to determine the corrosion depth. Each location with localized corrosion that exceeds a depth equal to 0.003 inches times the number of years that the lead cask has been in service must be repaired and recoated. Each location with localized corrosion that does not exceed a depth equal to 0.003 inches times the number of years that the lead cask has been in service may be repaired and recoated, but does not require repair if mitigating action is taken (i.e., the affected location is recoated) to prevent further localized corrosion and the frequency of subsequent examinations is increased to confirm the effectiveness of the mitigating actions. Also, prior to making a weld repair on a coated steel surface of a VCC or MSB assembly, the coating is required to be removed in the vicinity of the weld repair (to avoid the potential for liquid metal embrittlement), and the surface must be recoated after completing the weld repair. If no mitigating action is taken, then the affected VCC assembly or MSB assembly shall be removed from service.

  The corrective actions for the Examination of VCC Assembly Ventilation Ducts and Annulus AMP (Section 3.4.2.2 and Table 15) have also been revised to include the requirements discussed above for consistency.

- Operating Experience: Section 3.4.4 and Table 18 (formerly Table 19) have been revised to discuss the requirements for periodic "tollgate" assessments. In addition, Section 3.6 has been added to describe the general requirements for periodic tollgate assessments.

Additionally, in response to this RAI and others, Section 3.4.4 and Table 18 (formerly Table 19) have been reviewed for clarity, completeness, and internal consistency, and revised as follows:

- Table 18 (formerly Table 19), Monitoring and Trending, has been revised to clarify the requirements for monitoring and trending. The baseline shall be developed from the initial lead cask inspection, and any information from previous inspections performed during the initial storage period may also be used to inform the baseline. The discussion also addresses trends that require monitoring, evaluation of the results, and corrective actions required when trends indicate that acceptance criteria may be exceeded prior to the next scheduled inspection.

- Section 3.4.4 has been revised for consistency with Table 18 and other AMPs with similar scopes. The discussion of Inspection Scope and Methods has been expanded to include specific information for each inspection and general information on methods and techniques, including qualifications for inspection personnel. In addition, discussions have been added for Detection of Aging Effects – Data Collection and Monitoring and Trending. Finally, the Acceptance Criteria and Corrective Actions subheading has been divided into two separate subheadings. The Acceptance Criteria discussion has been expanded to discuss the acceptance criteria for coating degradation and corrosion on the VSC top end steel components, the duct-facing surfaces of the VCC air inlet and outlets, the annulus-facing surfaces of the VCC Cask Liner Bottom, VCC Cask Liner Shell, Shielding Ring Plates (Liner Assembly and Shield Ring), and MSB Shell, and the normally inaccessible bottom surfaces of the MSB Bottom Plate and VCC Cask Liner Bottom. The Corrective Actions discussion has been revised for completeness and consistency with Table 18.

Summary of Renewal Application Changes

- Section 3.4.2.3 (formerly Section 3.4.2.4): Revised 1st paragraph to delete footnote 14 from the 2nd to last sentence and added sentence to end of paragraph to require that the cask selected for the Examination of VSC Top End Steel Components AMP is not the same cask that is selected for the Lead Cask Inspection AMP.

- Section 3.4.4: Revised timing of inspections discussed in 2nd sentence of first paragraph and deleted footnote 16; Revised 1st paragraph of Detection of Aging Effects – Sample Size (Lead Cask Selection) subheading to add last sentence to require that the cask(s) selected for the Lead Cask Inspection AMP are not the same cask that is selected for the Examination of VSC Top End Steel Components AMP; Revised/added discussions of Inspection Scope and Methods, Detection of Aging Effects – Data Collection, Monitoring and Trending, Acceptance Criteria, and Corrective Actions for completeness and consistency with Table 18 (formerly Table 19); Added paragraph to end of section to discuss the requirement to perform periodic tollgate assessments during the period of extended operation.

- Table 16 (formerly Table 17): Revised Detection of Aging Effects, Sample Size AMP element to add Note 3 to require a different cask to be used for the VSC Top End Steel Examination AMP and Lead Cask Inspection AMP.

- Table 18 (formerly Table 19): Revised Detection of Aging Effects-Data Collection to require documentation of the examination on a checklist/inspection form, written descriptions, sketches, and photographs of observed aging effects, records of corrective actions, and to clarify that video should also be used to document the inspection; Revised Detection of Aging Effects-Timing of Inspections AMP element to require the initial inspection to be completed within 1-year of the 20th anniversary of the 1st cask loaded at the site, or 2-years of the effective date of the CoC renewal, whichever is later, delete Note 4, and delete the last sentence discussing frequency because it redundant; Revised Monitoring and Trending AMP element to clarify that the baseline shall be developed from the initial lead cask inspection and any information from previous inspections performed during the initial storage period may also be used to inform the baseline, and to discuss trends that require monitoring, evaluation of the results, and corrective actions required when trends indicate that acceptance criteria may be exceeded prior to the next scheduled inspection; Revised Corrective Actions AMP element, Coating Degradation and Corrosion subheading, to include corrective actions for the VSC top end steel components, and to clarify the required corrective actions for localized corrosion on the surfaces of the VCC Cask Liner Bottom, VCC Cask Liner Shell, VCC Shielding Ring Plates (Liner Assembly and Shield Ring), MSB Shell, and MSB Bottom Plate (includes addition of Notes 4 and 5); Revised Operating Experience AMP element to add a discussion of the requirement to perform periodic tollgate assessments during the period of extended storage; Revised Note 3 to require that the cask(s) selected for the lead cask inspection are different from the cask selected for the Examination of VSC Top End Steel Components AMP.