A.8 AGING MANAGEMENT

This appendix provides a summarized description of the activities for managing the effects of aging at GE-MO. The evaluations of time-limited aging analyses (TLAAs) for the renewal period are also presented.

An assessment of the GE-MO inspection activities identified new and existing activities necessary to provide reasonable assurance that Systems, Structures, and Components (SSC) within the scope of license renewal will continue to perform their intended functions consistent with the current licensing basis (CLB) for the renewal period. This section describes these aging management activities.

This section also discusses the evaluation results for each of the applicable SSCs specific time-limited aging analyses (TLAAs) performed for license renewal. The evaluations have demonstrated that the analyses remain valid for the renewal period; the analyses have been projected to the end of the renewal period; or that the effects of aging on the intended function(s) will be adequately managed for the renewal period.

GE-MO is an away from reactor ISFSI storing spent fuel under 10CFR72 license until such time that the fuel may be shipped off-site for final disposition. The fuel storage basins at GE-MO are designed for below grade storage. Accordingly, the exterior materials are capable of withstanding the anticipated effects of "weathering" under normal conditions.

The purpose of the GE-MO Inspection Activities is to:

1. Determine that no significant deterioration of the basin structure has occurred, such that it can still perform its intended function, and

2. Determine that no significant degradation of the fuel storage components in the basin has occurred. The scope of the Basin Inspection Activities involves; 1) Maintaining water chemistry within approved license specifications through continuous filtration and addition of ultra pure water (typically 0.056 μmho/cm) when needed to maintain basin level. Continue analyzing fuel storage basin water quality in accordance with Compliance Test insuring conformity to license specifications, 2) monthly water samples are taken from the Basins and sent to an independent lab for analysis. 3) the quarterly monitoring of ground water for chemical materials that can deteriorate the basin and filter structure concrete, 4) a visual inspection of exposed concrete and building structures housing spent fuel, and 5) the visual inspection of normally inaccessible components of the fuel storage system in the event a basket is lifted in preparation for movement.

Visual inspections identify degradation of the physical condition of the exposed surfaces of the concrete structures. These inspections check for deterioration of the concrete due to loss of material, cracking or spalling. A visual inspection of normally inaccessible components in the basin, baskets, grid, basin liner, if/when they are moved will identify degradation of the material resulting from corrosion. Inspections provide reasonable assurance that any degradation of the fuel storage system is identified.

Visual inspection acceptance criteria are based on the absence of indications that are signs of degradation. Engineering evaluations determine whether observed deterioration of material condition is significant enough to compromise the ability of the SSC to perform its intended function. Occurrence of degradation that is adverse to quality will be entered into the Corrective Action System. Alarm panel response procedures identify the various criteria for the different fuel storage system monitoring systems at GE-MO, and specify any required corrective actions and responses.

Structures, systems and components at GE-MO that, while not performing a safety-related function, but do perform a function that demonstrates compliance with NRC regulations on environmental qualification, are identified in the CSAR, section 11, paragraph 11.3, as follows:

11.3 STRUCTURES, SYSTEMS, AND COMPONENTS IMPORTANT TO SAFETY
No credible event, planned discharge or design basis accident at GE-MO is identified that would expose a member of the public to radiation in excess of limits specified in 10 CFR 72.104 or 10 CFR 72.106.

It is therefore, the position of GE-MO that the term "basic components" in the sense defined by 10 CFR 21.3(a)(2) and 10 CFR 21.3 (m) is not applicable to GEMO.

However, "structures systems and components important to safety" as promulgated in 10 CFR 72.122, "Overall Requirements" are identified below.

a. Fuel storage basin - concrete walls, floors, and expansion gate are principal elements in protection of stored fuel, and in isolation of basin water from the environment.
b. Fuel storage basin - stainless steel liner forms a second element in fuel protection and basin water isolation, facilitating decontamination.
c. Fuel storage system, including baskets and supporting grids is a principal element in protection of stored fuel.
d. Unloading pit doorway guard - is designed to prevent a loaded fuel basket from being tipped so that fuel bundles could fall into the cask-unloading pit. The unloading pit doorway guard is an element in protection of fuel during movement of a loaded basket.
e. Filter cell structure - the concrete cell part of the basin pump room area provides radiation shielding to reduce occupational exposure.
f. Fuel Storage Basin building – the steel structure that surrounds/protects the fuel Basins.
g. Fuel Basket Grapple – Used to remove the fuel baskets from their storage location in the fuel basin support grid.
h. Fuel Grapple – Used to remove the fuel bundles from the fuel baskets when they are in the unloading pit.
i. Fuel Basin Crane – Crane utilized to move the full fuel baskets to the unloading pit.
j. Fuel Handling Crane – Crane used to remove the fuel bundles from the fuel storage baskets and place into a cask.

k. Cask Crane – 125 Ton overhead crane used to lift a fully loaded cask from the unloading pit and place cask onto transport vehicle.
l. Spent Fuel Cladding – Fuel in GE-MO basins are clad with SS or zircalloy cladding.

However, since these systems do contain the stored fuel or provide support functions, they have been reviewed for aging management and are discussed more thoroughly in Table 1 of this section.

In June 1993, the fuel storage basin was inspected to confirm expectations of continued structural integrity, as well as confirm the absence of microbe-induced corrosion (MIC). To confirm and document the integrity of the liner, a routine inspection plan was developed in accordance with ASME Boiler and Pressure Vessel Code and other industry approved IVVI procedures. The inspection plan included use of underwater TV cameras to inspect the basin welds.

The results of this inspection showed, that based on high-resolution visual inspection and surface examination, the basin liner is judged to have continued integrity, with no environmental degradation associated with 20+ years of fuel storage experience. Also, considering the continuous maintenance of high purity water flow in the fuel storage basins continued long-term service is indicated.

The above is detailed in report GENE 689-013-0893, “Morris Fuel Recovery Center Fuel Storage Basin Liner Visual Examination Summary Report”, dated September 1993.

Additionally, in 1994 an approximately 1.5” x 3.5” coupon was cut from the basin liner in the cask unloading pit. This area then had a patch welded over it. The sample was sectioned for optical metallography and scanning electron microscopy (SEM). Cross sectional views did not find evidence of significant surface attack, and the maximum surface penetration was 0.4 mils. SEM examination of the surface found oxide deposits, which is expected for a stainless steel that has been exposed to a water environment for 20+ years. Chemical analysis of the deposits determined the composition to be mostly iron oxide. No detrimental chemical species were found. No evidence of MIC phenomena was observed.

The nominal liner wall thickness in the unloading pit is 0.125 inches. Assuming the degradation occurred over 20 years and the corrosion rate remained constant, the liner would not be penetrated until 2050.

See report number GENE-689-003-0494, “Morris Fuel Recovery Center Fuel Storage Basin Liner Metallurgical Evaluation”; dated May 1994.

While the above reports speak specifically to the basin liner, all SSC’s in the basin are 304 Stainless Steel. Per IAEA-TECDOC-1012, “Durability of Spent Nuclear Fuels and Facility Components in Wet Storage”, SS wet storage facility components have excellent histories of durability in periods approaching 40 years provided that good water chemistry control is maintained. The GE-MO basin water chemistry provides an excellent media for SS materials. Combining the basin liner coupon examination, and the guidance from the IAEA Report, corrosion is minimal and should have little or no impact on the basin liner of other stainless steel components of the fuel storage (baskets and supporting grid) system for the term of the license renewal. In addition, all of these components have been in a static mode since the last fuel receipt in January 1989, so there also hasn't been any mechanical wear.

With respect to other listed SSCs: Presently, all grapples and miscellaneous tooling associated with moving fuel bundles or fuel baskets are laid away. Each tool will undergo thorough inspection and testing to insure all tooling is in compliance with the original manufacturers specifications prior to utilizing it for lifting any fuel bundle or basket.

All cranes are maintained in compliance with the requirements specified in 10 CFR 1910.179 (OSHA) and tracked by our Preventive Maintenance (PM) program described in MOI 401. The cranes are inspected and routine maintenance items performed quarterly by our on site Maintenance personnel per the manufacturers recommended schedule. Annually an independent inspection company performs a complete inspection, including non-destructive testing, of all cranes and hoists on site.

In broad, generic terms, the design and operation of the GE-MO spent fuel pool is similar to a spent fuel storage pool at a nuclear power plant and some aspects of the reference NUREGs may be applicable, however, significant differences between GE-MO basins and support systems and a nuclear power plants fuel storage basins and the fuel stored in both must also be taken into account. The GE-MO basins are below ground, in native bedrock, water level is maintained at or below grade level. All stored fuel is held in GE-MO unique stainless steel baskets (CSAR Section 5.0, ¶ 5.4.4.2) that that are a "can" style container minus a lid, providing individual support and additional containment and shielding for each fuel bundle. Fuel is not routinely shuffled nor is new fuel added unlike the spent fuel pool in a nuclear power plant, (last fuel moved was January 1989) and there are no plans to do so. The static state of the GE-MO fuel assures there are no mechanical or dynamic stresses placed on the fuel. The large basin water volume and low decay heat input from the stored fuel provide an extended period of time to take corrective action in case of a malfunction of any of the basin support systems. In the event of an earthquake or other extreme natural phenomena, sufficient makeup water is available through either on-site or off-site means to maintain safe storage conditions.

Fuel stored at GE-MO has reactor discharge dates that range from April, 1970 through October 1986. The last fuel was received at GE-MO in January 1989. Burnup rates range from a high of 36.71 GWD/MTU to a low of 0.18 GWD/MTU, and an average burnup of 17.74 GWD/MTU. Due to the robust design of the pool (CSAR Section 5.0, ¶ 5.5) and the time interval from reactor discharge, there are no postulated events that would result in exposure to a member of the public in excess of the limits of 10CFR72.104, as stated in the CSAR, Section 8.0, ¶ 8.1.1. The condition of the fuel is monitored as part of routine activities conducted at GE-MO through basin water analysis and air quality monitoring. The design of the pool, and operational requirements for the basin area assure a depth of water over the stored fuel, which provides for extended passive heat dissipation capability. In May of 2004, a test was performed in to demonstrate the water quality would be minimally affected if there were a total loss of the Basin cooling and filtration systems. Results of the test revealed the conductivity approached 1.24μmho/cm, well below the license specification. Also demonstrated in the test was that heat dissipation from the basin was adequate as the basin water temperature reached a mere 123°F. Basin water level decreased to the 46' 9"el., 9' 6'' above the upper most portion of the fuel bundle, leaving an additional 6" before reaching the license limit of 9' above the upper most part of the fuel bundle.

In general, safe storage of the spent fuel is achieved by maintaining the integrity of the fuel cladding through maintaining a high quality of basin water (CSAR Section 10.0, ¶ 10.4.5) and substantiated by IAEA-TECDOC-1012, "Durability of Spent Nuclear Fuels and Facility Components in Wet Storage". Fuel cladding is designed to withstand a far more severe environment in a reactor than in static storage at GE-MO. The low temperature conditions, removal of both particulate and ionized impurities from the basin water, and absence of chemical materials provides high water clarity, limits corrosion and maintains radiation exposure rates in the vicinity of the basin as low as reasonably achievable. The cladding provides an effective primary barrier to the escape of fission or activation products from stored fuel. The basin water is an effective secondary barrier for the confinement of the small amounts of radioactive materials that may be released from the spent fuel.

The GE-MO radiation protection program is previously established in the current approved revision of the GE-MO Consolidated Safety Analysis Report (CSAR) Section 7.0, Radiation Protection. Subsection 7.7, Estimated Man-Rem Off Site Dose Assessment, specifies the current approved environmental monitoring program. Under normal operating conditions, Kr-85 provides essentially all the exposure from the GE-MO ventilation exhaust stack. The sum of the values for annual whole body exposure due to inhalation and skin dose out to a radius of 50 miles gives a total of less than 2 x 10^{-6} man-Rem/yr whole body and less than 0.12 man-Rem skin dose. Routine air samples continue to show that exhaust emissions are below detectable limit, as follows:

	Vent Supply	Stack Inlet
Alpha (µCi/ml)	3.0 x 10^{-13}	MDA (~3x10^{-15})
Beta (µCi/ml)	6.0 x 10^{-13}	MDA (~3x10^{-15})

The vent supply is air intake to the facility and stack inlet is air being released to the exhaust stack.

There are no planned or unplanned releases of liquid wastes from the site boundaries.

Analysis of postulated accidents including the causes of such events, consequences, and the ability of GE-MO to cope with each are previously established in the CSAR, Section 8.0, Accident Safety Analysis. The Structures, Systems, and Components (SSCs) Important to Safety are described in Section 11.0, Quality Assurance. Both have been in the CSAR since the original Part 50 license, SNM-1265 was issued for GE-MO and were included during the 1979 license renewal application and subsequent issue of the current Part 72 license SNM-2500 in 1982. As such, both are considered part of the original licensing basis for Morris Operation. Given the robust design of the Morris pool and the passive nature of the SSCs Important to Safety, no scenario involving a support system would result in an exposure to the public in excess of the criteria established in 10CRF72.104.

The current approved safety basis for the Morris facility as defined in the CSAR, designated items important to safety (CSAR Section 11.0, sub-section 11.3) demonstrates that no accident postulated (CSAR Section 8.0) will result in exceeding the limits of 10 CFR 72.104 and 10 CFR 100.20 to demonstrate protection of the public.

As shown in CSAR Sections 7.0 and 8.0, the low value of credible doses which could be received from normal operating and credible accident releases are many orders of magnitude below regulatory limits.

Unlike similar support systems at a nuclear power plant, the combination of the GE-MO radiation safety program, accident analysis and functional classification of equipment demonstrates that failure of a SSC supporting fuel storage basin operation will not cause an immediately reportable event. Ample time has been demonstrated for repair, temporary substitution, or permanent replacement of any SSC to prevent any Technical Specification violation and without exceeding any regulatory limits for radiation exposure is postulated.

Summary

Based on the reference information supplied in IAEA-TECDOC-1012, “Durability of Spent Nuclear Fuels and Facility Components in Wet Storage”, and NUREG 1801, “Generic Aging Lessons Learned (GALL) Report”, the effects of aging are minimal and will be adequately managed for the duration of the license period through the GE-MO Aging Management Program.

Aging Management Program Review
Table 1

Ref. No.	Structure and/or Component	Material	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Required	Discussion
11.3 a	Concrete: Fuel storage basin below grade exterior, foundation: walls and floor	Reinforced concrete	Exposure to aggressive environment / Cracking, loss of bond, loss of material (spalling, scaling)	Continue periodic monitoring of below-grade water chemistry to verify that the below-grade environment is not aggressive.	No, unless an aggressive environment exists.	Consistent with NUREG 1801 (Chapter III Table A5.1-e). The concrete structures at GE-MO were designed and constructed in accordance with the applicable national standards, specifically ACI 318-63, and meet conditions consistent with longevity as described as described by the Gall Report. An aggressive environment condition exists when pH<5.5, chlorides>500ppm, or sulphates>1500ppm. If below grade environment is not aggressive, the aging effects are not significant. The eight NRC reviewed and approved ground water sampling wells at MO are used to monitor for any potential leakage of basin water to the surrounding soil. The wells are sampled routinely per SOP 16-102, Sample Well Analysis Compliance Test. In addition, 3 of the wells positioned around the basin are used to monitor ground water for potential effects on below grade concrete.
11.3 e	Concrete: Basin filter structure below grade exterior, foundation: walls, floor.	Reinforced concrete	Exposure to aggressive environment / Cracking, loss of bond, loss of material (spalling, scaling)	Continue periodic monitoring of below-grade water chemistry to verify that the below-grade environment is not aggressive.	No, unless an aggressive environment exists.	Consistent with NUREG 1801 (Chapter III Table A5.1-e). See discussion for Ref. No. 11.3 a in this table.

Ref. No.	Structure and/or Component	Material	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Required	Discussion
11.3 a.1	Concrete elements: Fuel storage basin above grade exterior walls.	Reinforced concrete	Loss of material (spalling, scaling and cracking)/Freeze-thaw	All the concrete structures were constructed in accordance with the applicable national standards, ACI 318-63. Hence, when exposed to freeze-thaw conditions the loss of material from such concrete is not significant in areas in which weathering conditions are severe, which meet conditions consistent with longevity as described in the GALL report, section A.1.1.	No.	As described in NUREG-1557, freeze-thaw does not cause loss of material from reinforced concrete in foundations, and in above- and below-grade exterior concrete, for plants located in a geographic region of negligible weathering conditions (weathering index <100 day-inch/yr). Loss of material from such concrete is not significant at plants located in areas in which weathering conditions are severe (weathering index >500 day-inch/yr) or moderate (100-500 day-inch/yr), provided that the concrete mix design meets the air content (entrained air 3-6%) and water-to-cement ratio (0.35-0.45) specified in ACI 318-63 or ACI 349-85. Therefore, if these conditions are satisfied, aging management is not required. The weathering index is defined in ASTM C33-90, Table 3, Footnote E. Fig. 1 of ASTM C33-90 illustrates the various weathering index regions throughout the U.S.
11.3 e.1	Concrete elements: Basin filter structure above grade exterior walls.	Reinforced concrete	Loss of material (spalling, scaling and cracking)/Freeze-thaw	All the concrete structures were constructed in accordance with the applicable national standards, ACI 318-63. Hence, when exposed to freeze-thaw conditions the loss of material from such concrete is not significant in areas in which weathering conditions are severe, which meet conditions consistent with longevity as described in the GALL report, section A.1.1.	No	See discussion for Ref. No. 11.3 a.1 in this table.

Ref. No.	Structure and/or Component	Material	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Required	Discussion
11.3 a.2	Concrete: Basin structure interior and above-grade exterior.	Reinforced concrete	Exposure to aggressive environment / Increase in porosity and permeability, cracking, loss of material (spalling, scaling)	All structures are not subject to an aggressive environment so; perform a one-time inspection verifying no signs of any type of deterioration after thirty years of in service operation.	No, unless an aggressive environment exists.	Consistent with NUREG 1801 (Chapter III Table A5.1-f). An aggressive environment condition exists when pH<5.5, chlorides>500ppm, or sulphates>1500ppm. If interior or above-grade exterior reinforced concrete is not exposed to an aggressive environment, the aging effects are not significant.
11.3 e.2	Concrete: Basin Filter structure interior and above-grade exterior.	Reinforced concrete	Exposure to aggressive environment / Increase in porosity and permeability, cracking, loss of material (spalling, scaling)	All structures are not subject to an aggressive environment so; perform a one-time inspection verifying no signs of any type of deterioration after thirty years of in service operation.	No, unless an aggressive environment exists.	Consistent with NUREG 1801 (Chapter III Table A5.1-f). An aggressive environment condition exists when pH<5.5, chlorides>500ppm, or sulphates>1500ppm. If interior or above-grade exterior reinforced concrete is not exposed to an aggressive environment, the aging effects are not significant.
11.3 a.3	Steel component: Expansion Gate	Stainless steel	Exposed to water causing crack initiation and growth, Loss of material / Stress corrosion cracking and crevice corrosion.	Maintain water chemistry within approved license specifications through continuous filtration and addition of ultra pure water (typically 0.056 μmho/cm) when needed to maintain basin level. Continue analyzing fuel storage basin water quality in accordance with Compliance Test SOP 16-10 insuring conformity to license specifications.	No.	Consistent with IAEA-TEDOC-1012, “Durability of Spent Nuclear Fuels and Facility Components in Wet Storage”, SS wet storage facility components have excellent histories of durability in periods approaching 40 years provided good water chemistry is maintained. The GE-MO basin water chemistry (CSAR 5.5.2.1) provides an excellent media for SS materials. Using the coupon taken from the basin liner and its specific supporting report, corrosion is minimal, 0.004” maximum surface penetration in 20+ years, and should have little or no impact on the basin liner for an extensive period of time. (See report number GENE-689-003-0494, “Morris Fuel Recovery Center Fuel Storage Basin Liner Metallurgical Evaluation”; dated May 1994, also briefly discussed in Appendix A.8.)

Ref. No.	Structure and/or Component	Material	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Required	Discussion
11.3 b	Steel components: Liners; Fuel storage basin liner.	Stainless steel	Exposed to water causing crack initiation and growth, Loss of material / Stress corrosion cracking and crevice corrosion.	Maintain water chemistry within approved license specifications through continuous filtration and addition of ultra pure water (typically 0.056 μmho/cm) when needed to maintain basin level. Continue analyzing fuel storage basin water quality in accordance with Compliance Test SOP 16-10 insuring conformity to license specifications.	No.	Consistent with IAEA-TEDOC-1012, "Durability of Spent Nuclear Fuels and Facility Components in Wet Storage", SS wet storage facility components have excellent histories of durability in periods approaching 40 years provided good water chemistry is maintained. The GE-MO basin water chemistry (CSAR 5.5.2.1) provides an excellent media for SS materials. Using the coupon taken from the basin liner and its specific supporting report, corrosion is minimal, 0.004" maximum surface penetration in 20+ years, and should have little or no impact on the basin liner for an extensive period of time. (See report number GENE-689-003-0494, "Morris Fuel Recovery Center Fuel Storage Basin Liner Metallurgical Evaluation"; dated May 1994, also briefly discussed in Appendix A.8.)
11.3 c	Steel component; Fuel storage system, including storage baskets and supporting grid.	Stainless steel	Exposed to water causing crack initiation and growth, Loss of material / Stress corrosion cracking and crevice corrosion.	Maintain water chemistry within approved license specifications through continuous filtration and addition of ultra pure water (typically 0.056 μmho/cm) when needed to maintain basin level. Continue analyzing fuel storage basin water quality in accordance with Compliance Test SOP 16-10 insuring conformity to license specifications.	No.	The baskets and support grid are inaccessible for meaningful inspection purposes but the static, low mechanical stress (no baskets moved since January 1989), low thermal stresses (basin water maintained at 77°F =/- 2°) environment they are in would lead to their primary means of corrosion. Consistent with IAEA-TEDOC-1012, "Durability of Spent Nuclear Fuels and Facility Components in Wet Storage", SS wet storage facility components have excellent histories of durability in periods approaching 40 years provided good water chemistry is maintained. The GE-MO basin water chemistry (CSAR 5.5.2.1) provides an excellent media for SS materials.

Ref. No.	Structure and/or Component	Material	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Required	Discussion
11.3 d	Steel component; Unloading pit doorway guard.	Stainless steel	Exposed to water causing crack initiation and growth, Loss of material / Stress corrosion cracking and crevice corrosion.	Maintain water chemistry within approved license specifications through continuous filtration and addition of ultra pure water (typically 0.056 μmho/cm) when needed to maintain basin level. Continue analyzing fuel storage basin water quality in accordance with Compliance Test SOP 16-10 insuring conformity to license specifications.	Yes	The unloading pit doorway guard is used to protect a basket in case it is tipped as it enters the basin from the unloading pit. The doorway guard is a component that is only used during fuel movement into or out of the unloading pit. The doorway guard is constructed of 304 SS and subject to the same environment as the fuel storage system (11.3 c of this table). Consistent with IAEA-TEDOC-1012, “Durability of Spent Nuclear Fuels and Facility Components in Wet Storage”, SS wet storage facility components have excellent histories of durability in periods approaching 40 years provided good water chemistry is maintained. The GE-MO basin water chemistry (CSAR 5.5.2.1) provides an excellent media for SS materials. Prior to fuel movement, as part of the Aging Management Program, the doorway guard will be thoroughly inspected and tested to assure its ability to perform its intended function.
11.3 f	Steel components: All structural steel; Fuel storage basin building.	Carbon steel	Various Loss of material / corrosion.	Protective coating applied to all interior structural members of the building are monitored for any signs of flaking, peeling or cracking that would affect the integrity of the coatings protective capabilities. Upon visual observation of any such defect the degraded coating will be removed and new coating reapplied to protect the building structural members.	No.	Original construction was performed in accordance with the Uniform Building Code (1967) as a freestanding structure that would not be subject to any abnormal stresses. Plant maintenance has been ongoing since construction of the fuel storage basin and during the plants continuing operation. The continuing structure inspections are performed to verify all coatings are in tact and there are no signs of deterioration that would have deleterious affects on the integrity of the building.

Ref. No.	Structure and/or Component	Material	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Required	Discussion
11.3 g	Steel components; Fuel basket grapple.	Stainless steel	Exposed to water causing crack initiation and growth, Loss of material / Stress corrosion cracking and crevice corrosion.	Since the grapple is in lay-away status in the fuel basin, maintain water chemistry within approved license specifications through continuous filtration and addition of ultra pure water (typically 0.056 μmho/cm) when needed to maintain basin level. Continue analyzing fuel storage basin water quality in accordance with Compliance Test SOP 16-10 insuring conformity to license specifications.	Yes.	Consistent with IAEA-TEDOC-1012, "Durability of Spent Nuclear Fuels and Facility Components in Wet Storage", SS wet storage facility components have excellent histories of durability in periods approaching 40 years provided good water chemistry is maintained. The GE-MO basin water chemistry (CSAR 5.5.2.1) provides an excellent media for SS materials. All grapples and associated equipment used to handle fuel or fuel storage baskets are laid away. Prior to use they will be thoroughly inspected, repaired and tested so they are in compliance with the original manufacturers specifications.
11.3 h	Steel components; Fuel grapple.	Stainless steel	Exposed to water causing crack initiation and growth, Loss of material / Stress corrosion cracking and crevice corrosion.	Since the grapple is in lay-away status in the fuel basin, maintain water chemistry within approved license specifications through continuous filtration and addition of ultra pure water (typically 0.056 μmho/cm) when needed to maintain basin level. Continue analyzing fuel storage basin water quality in accordance with Compliance Test SOP 16-10 insuring conformity to license specifications.	Yes.	Consistent with IAEA-TEDOC-1012, "Durability of Spent Nuclear Fuels and Facility Components in Wet Storage", SS wet storage facility components have excellent histories of durability in periods approaching 40 years provided good water chemistry is maintained. The GE-MO basin water chemistry (CSAR 5.5.2.1) provides an excellent media for SS materials. All grapples and associated equipment used to handle fuel or fuel storage baskets are laid away. Prior to use they will be thoroughly inspected, repaired and tested so they are in compliance with the original manufacturers specifications.

Ref. No.	Structure and/or Component	Material	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Required	Discussion
11.3 i	Cranes, including bridge and trolley; Fuel Basin Crane	Structural steel	Cumulative fatigue damage / fatigue. Loss of material / General corrosion & wear.	Continue on site preventive maintenance program that follows, at a minimum, the manufacturers schedule for greasing, lubricating and gearbox oil fill/change, wire rope lube, brake check/adjustment, painting as required, electrical component testing and annual inspection of all cranes by certified inspection service.	No.	The fuel basin crane is used to move the full fuel baskets to the unloading pit and is maintained under the GE-MO preventive maintenance program and inspected in accordance with the requirements specified in 10 CFR 1910.179 and ANSI B30-2. Yearly inspections are performed by an independent contractor whose crane inspection services are accredited by the U.S. Department of Labor under 29 CFR 1919; to inspect, test and certify cranes.
11.3 j	Cranes, including bridge and trolley; Fuel Handling Crane	Structural steel	Cumulative fatigue damage / fatigue. Loss of material / General corrosion & wear.	Continue on site preventive maintenance program that follows, at a minimum, the manufacturers schedule for greasing, lubricating and gearbox oil fill/change, wire rope lube, brake check/adjustment, painting as required, electrical component testing and annual inspection of all cranes by certified inspection service.	No.	The fuel handling crane is utilized to move the full bundles from the fuel storage baskets and place into the cask. They are maintained under the GE-MO preventive maintenance program and inspected in accordance with the requirements specified in 10 CFR 1910.179 and ANSI B30-2. Yearly inspections are performed by an independent contractor whose crane inspection services are accredited by the U.S. Department of Labor under 29 CFR 1919; to inspect, test and certify cranes.

Ref. No.	Structure and/or Component	Material	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Required	Discussion
11.3 k	Cranes, including bridge and trolley; Cask Crane	Structural steel	Cumulative fatigue damage / fatigue. Loss of material / General corrosion & wear.	Continue on site preventive maintenance program that follows, at a minimum, the manufacturers schedule for greasing, lubricating, gearbox oil fill/change, wire rope lube, brake check/adjustment, painting as required, electrical component testing and annual inspection of all cranes by certified inspection service.	No.	At one time this 125 Ton overhead crane was used to lift fully a loaded cask from the unloading pit and place it onto a transport vehicle. Presently, since 1989, it is infrequently used and when used it rarely lifts above 20% of rated capacity. The crane is maintained under the GE-MO preventive maintenance program and inspected in accordance with the requirements specified in 10 CFR 1910.179 and ANSI B30-2. Yearly inspections are performed by an independent contractor whose crane inspection services are accredited by the U.S. Department of Labor under 29 CFR 1919; to inspect, test and certify cranes.

Ref. No.	Structure and/or Component	Material	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Required	Discussion
11.3.l	Spent fuel cladding	Stainless Steel and Zircalloy	Exposed to water causing crack initiation and growth, Loss of material / Stress corrosion cracking and crevice corrosion.	Maintain water chemistry within approved license specifications through continuous filtration and addition of ultra pure water (typically 0.056 μmho/cm) when needed to maintain basin level. Continue analyzing fuel storage basin water quality in accordance with Compliance Test SOP 16-10 insuring conformity to license specifications.	No	Spent fuel in the GE-MO basins are clad with both stainless steel and zircalloy. Per IAEA-TECDOC-1012, "Durability of Spent Nuclear Fuels and Facility Components in Wet Storage", the zirconium alloys represent a class of materials that is highly resistant to degradation in wet storage, including some experience in aggressive waters. The database for the zirconium alloys supports a judgment of satisfactory wet storage in the time frame of 50 to 100 years or more." (IAEA 5). Stainless steel components in wet storage facilities have an excellent history of performance, including service in aggressive waters. Specific examinations of LWR SS fuel claddings indicate no evidence of degradation after periods of wet storage. Satisfactory service of SS clad fuels and facility components can be expected for several decades if materials with favorable microstructures and low stress levels are involved (IAEA 5). Results of basin air and water sampling since the last fuel was received in January 1989 have been consistent, indicating the fuel cladding isn't deteriorating.

Operating under the current plant conditions if there was a failure of any auxiliary support system, it would not affect the capability of any SSC important to safety from performing its intended function.