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10 CFR 50
10 CFR 51
10 CFR 54

May 21, 2014

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Limerick Generating Station, Units 1 and 2
Facility Operating License Nos. NPF-39 and NPF-85
NRC Docket Nos. 50-352 and 50-353

Subject: Response to Requests for Additional Information and Minor Changes to the LRA Supplement dated March 12, 2014 for the review of the Limerick Generating Station, Units 1 and 2, License Renewal Application.

References: 1. Exelon Generation Company, LLC letter from Michael P. Gallagher to NRC Document Control Desk, "Application for Renewed Operating Licenses," dated June 22, 2011
2. Letter from John W. Lubinski (NRC) to Michael P. Gallagher (Exelon), "Safety Evaluation Report Related To The License Renewal of Limerick Generating Station, Units 1 and 2," dated January 10, 2013
3. Letter from Michael P. Gallagher (Exelon) to NRC Document Control Desk, "Review of Interim Staff Guidance LR-ISG-2012-02, "Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion under Insulation," dated March 12, 2014
4. Letter from Michael P. Gallagher (Exelon) to NRC Document Control Desk, "Requests for Additional Information for the review of the Limerick Generating Station, Units 1 and 2, License Renewal Application (TAC Nos. ME6555 and ME6556)," dated March 14, 2014
5. Letter from Richard A. Plasse (NRC) to Michael P. Gallagher (Exelon) "Requests for Additional Information for the review of the Limerick Generating Station, Units 1 and 2, License Renewal Application (TAC Nos. ME6555 and ME6556)," dated April 24, 2014

In the reference 1 letter, Exelon Generation Company, LLC (Exelon) submitted the License Renewal Application (LRA) for the Limerick Generating Station, Units 1 and 2 (LGS). In the reference 2 letter, the U.S. Nuclear Regulatory Commission issued the Safety Evaluation Report

related to the LGS LRA. In the reference 3 letter, Exelon submitted a supplement to the LRA. Minor changes to that supplement have been identified and are contained within Enclosure B. In the reference 4 letter, Exelon responded to an RAI related to Coatings. In the reference 5 letter the NRC requested additional information to support the staff's review of the LRA and Enclosure A contains the responses to these requests for additional information.

Enclosure C contains updates to sections of the LRA (except for the License Renewal Commitment List).

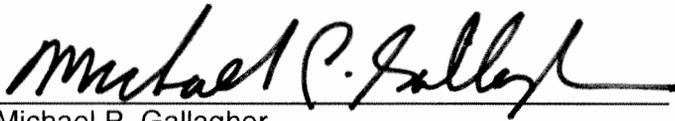
Enclosure D provides an update to the License Renewal Commitment List (LRA Appendix A, Section A.5). There are no other new or revised regulatory commitments contained in this letter.

If you have any questions, please contact Mr. Al Fulvio, Manager, Exelon License Renewal, at 610-765-5936.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 5-21-2014

Respectfully,



Michael P. Gallagher
Vice President - License Renewal Projects
Exelon Generation Company, LLC

Enclosures: A: Responses to Requests for Additional Information
B: Minor Changes to LGS LRA Supplement dated March 12, 2014
C: Updates to affected LRA sections
D: License Renewal Commitment List Changes

cc: Regional Administrator – NRC Region I
NRC Project Manager (Safety Review), NRR-DLR
NRC Project Manager (Environmental Review), NRR-DLR
NRC Project Manager, NRR- DORL Limerick Generating Station
NRC Senior Resident Inspector, Limerick Generating Station
R. R. Janati, Commonwealth of Pennsylvania

Enclosure A

**Responses to Requests for Additional Information Related to
the LGS License Renewal Application (LRA)**

RAI 3.0.3.3.1-1

RAI 3.0.3.3.3-1

RAI 3.0.3.3.3-2

RAI 3.0.3.3.3-3

RAI 3.0.3.4-1

RAI 3.0.3.3.1-1

Background:

By letter dated March 12, 2014, Exelon provided its analysis and impacts to the Limerick License Renewal Application (LRA) for LR-ISG-2012-02, Section A, Recurring Internal Corrosion. The letter states that Exelon identified recurring internal corrosion in several raw water systems managed by the Open-Cycle Cooling Water System program and in a portion of the fire water system managed by the Fire Water System program. For the Open-Cycle Cooling Water System program the letter concludes that the previously documented enhancements to the program detect the presence of and minimize the susceptibility to recurring internal corrosion. For the Fire Water System program, the letter states that the program will be enhanced to perform additional wall thickness measurements to address recurring internal corrosion.

Issue:

For components managed by the Open-Cycle Cooling Water System program, the identification of certain flaws can be addressed through the application of ASME Code Case N-513-3, "Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping, Section XI, Division I." The considerations for applying this approach include augmented volumetric examinations to assess the degradation of the affected system, which typically consists of an initial sample of the five most susceptible locations and additional samples whenever other flaws are detected in any subsequent samples. Based on this, the staff agrees that the previous enhancements to the Open-Cycle Cooling Water System program are adequate to address recurring internal corrosion in those systems managed by that program.

However, since the ASME Code Case does not apply to fire water system piping, there does not appear to be comparable guidance for conducting augmented inspections of additional samples if further piping degradation is detected during the inspections for the new enhancement of the Fire Water System program.

Request:

For the new enhancement of the Fire Water System program to perform annual wall thickness measurements at five selected locations in carbon steel piping associated with the backup diesel fire pump, clarify whether inspections of additional samples will be performed if these wall thickness measurements reveal indications of piping degradation. As applicable, provide details of the additional samples that will be performed or justification that additional samples are not needed to address degradation of the affected system.

Exelon Response

LGS procedures for examination of raw water piping systems include guidance for performing examinations at additional locations when piping degradation is identified as the result of planned examinations. When examinations are performed to identify recurring internal corrosion on the carbon steel backup fire water piping and degradation is identified, additional inspections will be performed in accordance with the following criteria:

- at least four additional locations will be examined if wall loss is greater than 50 percent of nominal wall thickness,

- two additional locations will be examined if wall loss is 30 percent to 50 percent of nominal wall thickness and the calculated remaining life is less than two years,
- no additional examinations will be performed if wall loss is less than 30 percent of nominal wall thickness.

The LGS Fire Water System aging management program will be enhanced to require these examination expansion criteria.

LRA Appendix A, Section A.2.1.18 and LRA Appendix B, Section B.2.1.18 are revised as shown in Enclosure C to include these examination expansion criteria. LRA Table A.5 Commitment 18 is revised as shown in Enclosure D.

RAI 3.0.3.3.3-1

Background:

Changes to the license renewal application to address LR-ISG-2012-02, "Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion Under Insulation," were described in a letter dated March 12, 2014. This letter stated that the backup water storage tank, which backs up the fire water supply, would remain in the scope of its Aboveground Metallic Tanks program. The Aboveground Metallic Tanks program includes biennial external inspections of the backup water storage tank.

LR-ISG-2012-02 AMP XI.M27, "Fire Water System," includes the recommendations in NFPA 25 Section 9.2.5.5 that the exterior insulated surfaces and support structure of fire water storage tanks be inspected on an annual basis.

Issue:

While the staff does not take issue with the backup water storage tank remaining in the scope of the Aboveground Metallic Tanks program, external tank inspections for this program are not conducted as frequently as recommended in LR-ISG-2012-02 AMP XI.M27 (reference NFPA 25 Section 9.2.5.5). No basis was provided for the less frequent inspections than recommended in LR-ISG-2012-02 AMP XI.M27.

Request:

State the basis for why inspection of the backup water storage tank external insulated surfaces on a biennial basis is sufficient to provide reasonable assurance that the current licensing basis intended functions of the tank will be met during the period of extended operation. Alternatively, revise the Aboveground Metallic Tanks program to be consistent with LR-ISG-2012-02 AMP XI.M27.

Exelon Response

The LGS Aboveground Metallic Tanks program will be enhanced to include an annual visual inspection requirement for the tank external surfaces consistent with LR-ISG-2012-02 AMP XI.M27, Fire Water System aging management program, which includes guidance from NFPA 25 Section 9.2.5.5, 2011 Edition. The Backup Water Storage Tank is covered with a spray-on polyurethane foam type insulation with a fiberglass fabric outer layer and is tightly adhered to the tank surface. The LGS Aboveground Metallic Tanks program was enhanced as described in the response to RAI B.2.1.19-2 and SER Section 3.0.3.2.9 to perform visual inspections of the tank external surfaces on a two year frequency, including removing a portion of the tank insulation and includes locations where the insulation has deteriorated or has evidence of water intrusion. This two year inspection is consistent with LR-ISG-2012-02 AMP XI.M29, Aboveground Metallic Tanks aging management program. Additionally, the LGS Aboveground Metallic Tanks program will be enhanced to include a visual external inspection of the tank insulation surface for evidence of deterioration or evidence of water intrusion annually consistent with LR-ISG-2012-02 AMP XI.M27, Fire Water System aging management program. Rips, tears, or gaps in the insulation skin will be repaired. Any evidence of water intrusion beneath the insulation will be evaluated in accordance with the LGS corrective action program.

LRA Appendix A.2.1.19 and LRA Appendix B.2.1.19 are revised as shown in Enclosure C to include the annual tank external inspections. LRA Table A.5 Commitment 19 is revised as shown in Enclosure D.

RAI 3.0.3.3.3-2

Background:

Changes to the license renewal application to address LR-ISG-2012-02, "Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion Under Insulation," were described in a letter dated March 12, 2014. This letter stated that the backup water storage tank is internally coated and it sits on a compacted oil-treated sand bed.

LR-ISG-2012-02 AMP XI.M27, "Fire Water System," includes the recommendations in NFPA 25 Sections 9.2.6 and 9.2.7 that the internal surfaces of coated tanks be inspected every 5 years, and the inspections should include: detection of pitting, corrosion, and local or general failure of the interior coating. It also recommends that tanks on ring-type foundations with sand in the middle should be inspected for evidence of voids beneath the floor. It further recommends that if loss of material or loss of coating integrity is detected, adhesion testing, dry film thickness measurements, ultrasonic test (UT) thickness readings, wet-sponge testing, and vacuum box testing of the seams should be conducted.

The Aboveground Metallic Tanks program includes internal surface visual inspections of the backup water storage tank conducted every five years and UT measurements of the tank bottom within five years prior to entering the period of extended operation and every five years thereafter. If no tank bottom plate material loss is identified after the first two UT inspections, the volumetric inspections will be performed whenever the tank is drained during the period of extended operation. As amended, the program was further enhanced to:

- Perform visual inspections of the Backup Water Storage Tank wetted and non-wetted internal surfaces.
- Require that tank internal inspections be performed within five years prior to entering the period of extended operation and every five years thereafter
- Require nondestructive examination of the tank bottom where visual inspection identifies pitting or general corrosion to below nominal wall thickness and to determine remaining wall thickness where bare metal has been exposed.
- Require that where pitting and general corrosion to below the nominal wall thickness occurs or any coating failure occurs in which bare metal is exposed, additional inspections and tests are performed, including adhesion testing of the coating in the vicinity of the coating failure and nondestructive examination to determine remaining wall thickness where bare metal has been exposed. In addition, adhesion testing shall be performed in the vicinity of blisters even though bare metal may not be exposed.

Issue:

The staff noted that not all of the testing and inspections recommended by LR-ISG-2012-02 (reference NFPA 25 Sections 9.2.6 and 9.2.7) have been addressed by the enhancements to the Aboveground Metallic Tanks program.

Request:

State the basis for how it can be concluded that the backup water storage tank will meet its current licensing basis intended functions without conducting: (a) inspections for evidence of

voids beneath the floor and (b), dry film thickness measurements, wet-sponge testing, and vacuum box testing of the seams if loss of material or loss of coating integrity is detected. Alternatively, revise the Aboveground Metallic Tanks program to be consistent with LR-ISG-2012-02 AMP XI.M27.

Exelon Response:

The Exelon response to LR-ISG-2012-02 included an enhancement to perform additional examinations and inspections if the inspection of the interior surface of the Backup Water Storage Tank exhibited signs of interior pitting, corrosion, or failure of the coating. The additional inspections and examinations were intended to include those identified in NFPA 25, 2011 Edition, Section 9.2.7, as referenced in LR-ISG-2012-02 AMP XI.M27, "Fire Water System Program." The enhancement will be clarified to state that if the drained tank internal surface inspections identify pitting, corrosion, or failure of the coating, the tests identified in NFPA 25 Section 9.2.7, 2011 Edition, shall be performed. Section 9.2.7 includes a requirement that flat bottoms of tanks shall be vacuum tested at the bottom seams to identify leaks at the floor seams in accordance with test procedures in NFPA 22, *Standard for Water Tanks for Private Fire Protection*, which incorporates by reference AWWA D100, *Welded Carbon Steel Tanks for Water Storage*. The identification of leaks via vacuum box testing may not always be practical due to interferences or internal tank surface geometry. Magnetic particle (MT) examination, which is capable of detecting leaks in weld seams is identified as an acceptable alternative to vacuum box testing as discussed in AWWA D100. The requirement for examination of tank bottom weld seams for leaks in the vicinity of coating failures will be satisfied using a vacuum box test or MT examination.

LR-ISG-2012-02 AMP XI.M27 also includes a recommendation to inspect for evidence of voids beneath the tank floor where tanks are installed on ring type foundations with an oil-treated sand bed. The LGS Backup Water Storage Tank is installed on a sand bed. The LGS Aboveground Metallic Tanks program enhancement will be clarified to include this inspection in accordance with NFPA 25, Section 9.2.6.5.

LRA Appendix A.2.1.19 and LRA Appendix B.2.1.19 are revised as shown in Enclosure C to include the clarification for the augmented tank internal surface inspections and include the inspection of the tank floor for voids. LRA Table A.5 Commitment 19 is revised as shown in Enclosure D.

RAI 3.0.3.3.3-3

Background:

Changes to the license renewal application to address LR-ISG-2012-02, "Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion Under Insulation, " were described in a letter dated March 12, 2014. The letter stated that:

- Air flow testing of dry pipe preaction spray headers to confirm no obstructions to flow will be conducted at a frequency of every three years.
- Air flow testing of open deluge nozzles to confirm no plugged nozzles will be conducted at a frequency of every three years.
- Water flow testing of transformer deluge nozzles to confirm no obstructions to flow will be conducted. The main power and auxiliary transformers are tested on a refueling cycle frequency and other transformer deluge systems are tested every three years. NFPA 25 Section 10.3.4.3, as modified by LR-ISG-2012-02 AMP XI.M27 Table 4a, recommends that spray nozzle discharge patterns be observed on a refueling outage interval to ensure that there are no obstructions to the discharge patterns.

Issue:

The staff noted that the 3-year inspection frequencies exceed a refueling outage interval. The staff also noted that a basis was not provided for the longer inspection intervals (e.g., plant-specific operating experience, alternative testing).

Request:

State the basis for the longer inspection intervals associated with the operational testing of certain fixed water spray systems. Alternatively, revise the Fire Water System program to be consistent with LR-ISG-2012-02 AMP XI.M27.

Exelon Response

As described in the Exelon response to LR-ISG-2012-02, with the exception of the transformer deluge systems, the LGS dry pipe preaction sprinkler systems and deluge systems are located in areas where water cannot be discharged without impacting plant safety. These systems are periodically tested with air to verify the sprinkler headers and spray nozzles are not obstructed. The existing testing frequency of three years is consistent with the NRC approved fire protection program described in the LGS Technical Requirements Manual. The dry pipe preaction sprinkler systems are normally dry and filled with pressurized air until actuated. The LGS design for the preaction systems provides station instrument air to maintain the dry pipe preaction spray headers pressurized using dry air with a dewpoint normally less than -40°F. The dry pipe preaction sprinkler systems are not periodically tested with water. A review of plant specific operating experience since 2000 has not revealed any age related degradation that would warrant increasing the frequency of the air flow tests from three years to two years. This review included 210 air flow test results for the dry pipe preaction systems. Only one of these tests (February 2002) revealed any obstruction to flow, which was corrected upon

discovery. The nature of the obstruction was not documented. This review also included 84 air flow test results for the deluge systems and no instances of flow obstruction were identified. Therefore, continuing to perform air flow tests for the dry pipe preaction systems and deluge systems that are not tested with water on a three year frequency is adequate to assure that degradation will be identified prior to loss of intended function.

Water flow testing of transformer deluge systems is performed coincident with equipment outages to avoid spraying water directly onto electrically energized equipment with the associated impact on plant safety. The nine deluge systems associated with the main power and auxiliary transformers are flow tested on a refuel cycle interval when the transformers are out of service and de-energized during the refueling outage for each respective reactor unit. The remaining six deluge systems are associated with electrical transformers that are part of the off-site power supplies for both reactor units. These transformers consist of the 10 Station Aux Transformer, the 4A and 4B Station Auto Transformers, the 20 Regulating Transformer, the 101 Safeguard Transformer, and the 201 Safeguard Transformer. As described in LGS UFSAR Section 8.2, "Offsite Power System," and LGS Technical Specification 3/4.8, "Electrical Power Systems," each reactor unit is required to maintain two independent, physically separated circuits between the offsite transmission network and the onsite Class 1E distribution system. Maintenance of these transformers is scheduled to minimize the unavailability of the required off-site power sources while maintaining the reliability of the equipment and is performed on a three year frequency. Therefore, to minimize damaging these critical transformers, the deluge system testing is performed during the transformer outages which occur every three years. NFPA 25, Sections 13.4.3.2.2.3 and 13.4.3.2.2.4 state that when water cannot be discharged unless the protected equipment is shut down, a system test shall be conducted at the next scheduled shutdown, with a frequency not exceeding three years. The deluge system test frequency for these transformers is consistent with this guidance. Increasing the frequency of deluge system testing would have an adverse impact on the off-site power system availability and be detrimental to plant safety.

RAI 3.0.3.4-1

Background:

Based on its review of the response to RAI 3.0.3-1 dated March 14, 2014, the staff noted the following items:

1. The response states that galvanized portions of the fire water system (transformer deluge system piping) are not subject to unanticipated or accelerated corrosion of the base metal due to coating holidays due to the sacrificial zinc-based coating.
2. The response states that galvanized portions of the plant drainage system (normal waste, oily waste, sanitary waste, and storm drain piping) are not subject to accelerated corrosion of the base metal due to coating holidays. However, the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program, as amended by letter dated March 12, 2014 (review of LR-ISG-2012-02), will be used to manage the aging effect of loss of material, which is an indication of the loss of coating, in galvanized plant drainage system piping exposed to a waste water environment.

As amended by letter dated March 12, 2014, the periodic representative sample of each material, environment, and aging effect combination for the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program can consist of inspecting components in a more severe environment.

The GALL Report definition of galvanized steel states, “[i]n the presence of moisture, galvanized steel is classified under the category ‘Steel’.”

3. The response to RAI 3.0.3-1 did not state an upper limit on the period of time prior to a subsequent internal coating inspection for the reactor enclosure cooling water (RECW) heat exchangers, main control room (MCR) chiller condensers, and circulating water system piping; and the response did not incorporate this limit into the Open-Cycle Cooling Water System program, updated final safety analysis report (UFSAR) supplement, and Commitment No. 12. The response also states that the RECW heat exchangers are within the scope of the rule under 10 CFR 54.4(a)(2) for spatial interaction only.
4. In regard to the Emergency Diesel Generator Diesel Oil Storage Tanks, the response to RAI 3.0.3-1 states:

One tank was identified as having two areas of chipped coating in the bottom section of the sump which exposed the carbon steel substrate. A technical evaluation was performed by the site coating coordinator to evaluate the as-found coating defects. The coating damage was evaluated to be mechanical damage and not age related degradation. Only a small amount of surface rust staining was visible on the exposed carbon steel. Significant rusting would not be expected since current fuel oil chemistry practices limit the amount of water, sediment, and particulate contamination collected in the tank. The edges of the damaged coating were scraped to sound coating, re-inspected, and found to have satisfactory adhesion. Several smaller chips were also identified on the sump side walls. Due to the nature of the defects, coating repair was not required. The technical evaluation concluded that the tank could be returned to service without recoating these areas where the coating had been chipped and that the inspection frequency of 10 years was still appropriate. Additionally, minor coating deficiencies were identified in three other tanks. These conditions were within acceptance

criteria. However, baseline inspections will occur in the 10-year period prior to the period of extended operation. The frequency of subsequent inspections will be established based on the baseline inspections.

5. In regard to the reactor core isolation cooling system (RCIC) turbine bearing pedestals and high pressure coolant injection system (HPCI) turbine bearing pedestals and oil reservoir, the response to RAI 3.0.3-1 states that the Lubricating Oil Analysis program will be used to manage loss of coating integrity. It also states that failure of the coatings in the RCIC turbine bearing pedestals and HPCI turbine bearing pedestals and oil reservoir could result in unanticipated or accelerated corrosion of the base metal. It further states that the RCIC turbine bearing pedestals and HPCI turbine bearing pedestals and oil reservoir coating will receive a baseline visual inspection within 10 years prior to the period of extended operation (PEO) and the frequency of subsequent inspections will be established based on the baseline inspections.
6. The response to RAI 3.0.3-1 states that certification to conduct VT-3 to a minimum of Level II including documented orientation in performing coating surveillance would be adequate to conduct inspection of safety-related coatings.
7. The response to RAI 3.0.3-1 states that, in the event the initial inspection of the emergency diesel generator diesel oil storage tanks and MCR chiller condensers is not performed by an ANSI N45.2.6 inspector and the coating condition is considered suspect or requires coating repair, then a qualified N45.2.6 inspector will perform a detailed inspection and oversee/inspect coatings recoats, touch-ups, or repair activities; and that this level of qualification will continue through the PEO for these inspections.

LRA Sections A.2.1.12, A.2.1.20, A.2.1.27, B.2.1.12, B.2.1.20, B.2.1.27, and Commitment Nos. 12, 20, and 27 contain similar wording.

8. The response to RAI 3.0.3-1 states the examiners currently performing service water side inspections of the RECW heat exchangers are qualified to engineer certification guides, which include knowledge of EPRI Report 1019157 and a knowledge objective requirement to describe the inspection of coatings in heat exchangers. The response also states that this level of qualification will continue through the PEO.
9. The response to RAI 3.0.3-1 states that: (a) the as-found condition of coatings is documented in inspection reports or in completion remarks in the inspection work order; (b) the results of previous inspections are used to determine changes in the condition of the coating over time.
10. The response to RAI 3.0.3-1 did not provide specific acceptance criteria related to coating degradation.
11. The response to RAI 3.0.3-1 states that currently the Site Coating Coordinator (not qualified in accordance with ASTM D-7108, "Standard Guide for Establishing Qualifications for a Nuclear Coatings Specialist") provides oversight of safety-related coating activities and evaluates coating deficiencies. Enhancement No. 1 and Commitment No. 37 of the Protective Coating Monitoring and Maintenance Program, states that the position of Nuclear Coatings Specialist will be created prior to the period of extended operation. This individual will be qualified to ASTM D-7108.

Issue:

1. The staff acknowledges that the zinc-based coating would act as a sacrificial anode; however, there have been instances in the industry where the sacrificial coating has been consumed and the base metal subsequently corroded. It is not clear to the staff how the presence of sufficient coating to prevent unanticipated or accelerated corrosion of the base metal due to coating holidays will be demonstrated.
2. It is not clear to the staff whether the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program representative sample would consist of uncoated steel pipe in lieu of galvanized pipe in verifying the inspection locations for steel piping exposed to waste water. The staff noted that, depending on the characteristics of the waste water environment (e.g., alternating wetting and drying), portions of the galvanized piping may be most susceptible to corrosion; although alternatively, it could be viewed as not susceptible due to the galvanic coating.
3. Based on the response to RAI 3.0.3-1, "the frequency of subsequent inspections will be established based on the baseline inspections," the staff cannot conclude what inspection interval will be used for the RECW heat exchangers, MCR chiller condensers, and circulating water system piping. In the Issue discussion of RAI 3.0.3-1, Part 2, the staff stated its position on coating inspection frequencies. In summary, depending on previous inspection results, subsequent inspections should be no longer than 6 years and could be as low as every other refueling outage interval.

The staff has concluded that alternatives to the inspection frequencies stated in draft LR-ISG-2013-01 are supported by the fact that: (a) it would not be expected that the nonsafety-related service water system would contain chemical compounds that could cause unanticipated or accelerated corrosion of the base material if coating degradation resulted in exposure of the base metal and (b) the RECW Heat Exchangers are in scope for 10 CFR 54.4(a)(2) spatial interaction only. However, before the staff can evaluate the acceptability of the alternative inspection frequencies, the staff has two concerns:

- It is not clear to the staff whether the coated components are located in the vicinity of uncoated components that could cause a galvanic couple to exist.
 - The staff does not know whether the corrosion allowance used for the RECW heat exchangers assumed that the component was not coated.
4. The staff recognizes that an area of minor coating damage that has been characterized as not being age-related and where physical inspections demonstrate that there is sound coating and satisfactory adhesion in the vicinity of the degradation may warrant the extended inspection frequencies of GALL Report AMP XI.M30, "Fuel Oil Chemistry" (at least once every 10 years). However, the response and program changes did not discuss other critical considerations for allowing a longer inspection interval than recommended in Table 4a when small areas of degraded coatings is detected including: (a) demonstration that sufficient wall thickness is available to ensure that the current licensing basis function of the tank can be met; (b) alternative indications that leakage is occurring (e.g., level instrumentation); and (c) the factors to be used by the applicant to determine if loose coatings could transport.

In addition, the statement “[t]he frequency of subsequent inspections will be established based on the baseline inspections,” appears to conflict with the specific inspection frequency specified in the Fuel Oil Chemistry program and Table 4a.

5. The response states that failure of the coatings could result in unanticipated or accelerated corrosion of the base metal and yet it also states that degraded coatings are removed and the uncoated substrate is not recoated. The response states that the internal coatings are inspected on a refueling outage basis; however, it also states that the frequency of subsequent inspections will be established based on the baseline inspections. The response to 3.0.3-1 did not state an upper limit on the period of time prior to subsequent internal coating inspections, and the response did not incorporate this limit into the Lubricating Oil Analysis program, UFSAR supplement, and Commitment No. 27.
6. In regard to using a VT-3 Level II qualified examiner to conduct safety-related coating inspections, the staff noted that ASME Code Section XI, “Rules for Inservice Inspection of Nuclear Power Plant Components,” Subarticle IWA-2300, “Qualification of Nondestructive Personnel,” and ASTM D-4537, “Standard Guide for Establishing Procedures To Qualify and Certify Personnel Performing Coating Work Inspection in Nuclear Facilities,” contain similar vision testing and educational requirements. However, given that VT-3 examinations are associated with determining the general mechanical and structural condition of components and their supports, providing a “documented orientation in performing coating surveillance” lacks sufficient specificity for the staff to conclude that the orientation is equivalent to ASTM D-4537 Section 9, “Examination.” In addition, it is unclear to the staff whether a VT-3 Level II qualified examiner will have 3 or 6 months (depending on their education level) experience in coating inspection activities.
7. It is not clear to the staff why initial inspections that are not conducted by an ANSI N45.2.6 inspector would be credited as a baseline inspection. It is also not clear whether the statement “this level of qualification” refers to ANSI N45.2.6 qualified individuals or those without ANSI N45.2.6 qualifications.
8. As amended, LRA Sections A.2.1.12 and B.2.1.12, and Commitment No. 12, do not include a requirement for the inspectors that conduct service water side inspections of the RECW heat exchangers to have knowledge of EPRI Report 1019157 and a knowledge objective requirement to describe the inspection of coatings in heat exchangers. Without these requirements being included in the program, it is unclear to the staff whether they will be incorporated into plant-specific training documents during the period of extended operation.
9. The staff noted that the RAI response did not state whether a pre-inspection review of the previous two inspections is conducted that includes reviewing the results of inspections and any subsequent repair activities, and the qualification level of the individual completing the inspection reports or completion remarks in the inspection work order. As a result, it is unclear to the staff whether the appropriate information will be reviewed prior to determining inspection locations and conducting the inspections.
10. In regard to acceptance criteria for coating inspections, the staff noted that the RAI response did not state which precursors to coating failures would be considered not acceptable (e.g., peeling, delamination). The staff also noted that the RAI response did not state the extent of blistering that would be found acceptable.

11. It is not clear to the staff whether an individual qualified to ASTM D-7108 will evaluate the results of the baseline coating inspections conducted prior to the period of extended operation. It is also not clear to the staff whether testing or examination will be conducted to ensure that the extent of repaired or replaced coatings encompasses sound coating material.

Request 1

State how it will be demonstrated that an adequate amount of the zinc-based coating remains intact throughout the period of extended operation to prevent unanticipated or accelerated corrosion of the galvanized portions of the fire water system.

Exelon Response:

The Fire Water System (B.2.1.18) aging management program (AMP) will be used to demonstrate that an adequate amount of the zinc-based coating remains intact throughout the period of extended operation. As discussed in the "Obstruction Investigation – Obstruction, Internal inspection of piping (NFPA 25 Sections 14.2 and 14.3)" section of Exelon's letter dated March 12, 2014 (review of LR-ISG-2012-02), the LGS Fire Water System (B.2.1.18) AMP will be enhanced to perform an internal visual inspection for evidence of corrosion and flow obstruction on a representative sample of deluge systems of the internal surfaces made accessible during valve maintenance activity every three years. The representative sample will include inspection of at least ten of the 51 deluge systems. To provide reasonable assurance of the presence of sufficient coating, two of the ten inspections will be associated with the galvanized transformer deluge system piping.

LRA Sections A.2.1.18 and B.2.1.18 are revised as shown in Enclosure C. Commitment No. 18 is revised as shown in Enclosure D.

Request 2

State whether the steel and galvanized steel portions of the plant drainage system (normal waste, oily waste, sanitary waste and storm drain piping) would be treated as two separate populations when determining a representative sample for the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program. If not, state the criteria for selecting inspection locations that gives assurance that galvanized piping exposed to aggressive environments (e.g., alternating wetting and drying) will have an adequate number of inspection to ensure the presence of sufficient coating to prevent unanticipated or accelerated corrosion.

Exelon Response:

As discussed in the "Representative Minimum Sample Size for Periodic Inspections in GALL Report AMP XI.M38" section of Exelon's letter dated March 12, 2014 (review of LR-ISG-2012-02), the LGS Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.1.26) AMP will be revised to conduct inspections on a representative sample of all material, environment, and aging effect combinations of components within the scope of the program. It further states that at a minimum, in each 10-year period during the period of extended operation, a representative sample of 20 percent of the population (defined as components having the same combination of material, environment, and aging effect) or a maximum of 25 components per population will be inspected. For the waste water environment,

a maximum of 25 components per population will be inspected. GALL Table IX.C states that galvanized steel in the presence of moisture is classified under the category of "steel." Therefore, for the purposes of aging management in a wastewater environment, galvanized steel and steel will be considered the same population when managed by the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.1.26) AMP. To provide reasonable assurance of the presence of sufficient coating, 10 of the 25 internal inspections will be of the normal waste, oily waste, sanitary waste and storm drain galvanized piping, and 15 of the internal inspections will be of the radioactive floor and equipment drain carbon steel piping.

LRA Sections A.2.1.26 and B.2.1.26 are revised as shown in Enclosure C. Commitment No. 26 is revised as shown in Enclosure D.

Request 3

State the maximum interval of subsequent coating inspections, and incorporate the inspection interval into the Open-Cycle Cooling Water System program, UFSAR supplement and Commitment No. 12 for the RECW heat exchangers, MCR chiller condensers, and circulating water system piping. In addition, for the RECW heat exchangers:

- State whether the coated portions of the RECW heat exchangers are located in the vicinity of uncoated components that could cause a galvanic couple to exist.
- State whether the corrosion allowance used for the RECW heat exchangers assumed that the component was not coated. If not, state the basis for why the maximum interval between coating inspections could not result in sufficient loss of material to potentially challenge the current licensing basis intended function of these heat exchangers.

Exelon Response:

The maximum interval of subsequent coating inspections for the RECW heat exchangers, MCR chiller condensers, and circulating water system piping will comply with Table 4a of GALL Report AMP XI.M42 in draft LR-ISG-2013-01 dated January 6, 2014 (ADAMS Accession No. ML13262A442).

The inspection interval requirement will be included in the implementing documents for the Open-Cycle Cooling Water System AMP so that aging will be adequately managed during the PEO.

Commitment No. 12 is revised as shown in Enclosure D.

As stated in the Issue section of this RAI, the additional information requested for the RECW heat exchangers is required by the staff in order to evaluate the acceptability of alternative inspection frequencies to those specified in draft LR-ISG-2013-01. Since the RECW heat exchangers will not have alternative inspection frequencies to those specified in draft LR-ISG-2013-01 this additional information is not required.

Request 4

State the basis for the periodicity of inspections for the emergency diesel generator diesel oil storage tank coatings if the prior inspection detects peeling, delamination, blisters, rusting, or unacceptable cracking and flaking.

Where small areas of degraded coatings are detected and the inspection interval will be greater than every other refueling outage interval, state: (a) the type of degradation that will be allowed (e.g., rusting, cracking, chipped coating); (b) what physical inspections will be conducted; (c) how sufficient wall thickness will be demonstrated; (d) available alternative indications that leakage is occurring; and (e) the factors to be used to determine that loose coatings would not transport.

State the intent of the wording, "[t]he frequency of subsequent inspections will be established based on the baseline inspections," in relation to the 10-year inspection intervals in the Fuel Oil Chemistry program and Table 4a.

Include appropriate changes to the Fuel Oil Chemistry program, UFSAR supplement and Commitment No. 20.

Exelon Response:

Cleaning and internal inspection of the Emergency Diesel Generator Diesel Oil Storage Tanks is currently being performed, and, will continue to be performed in the PEO as part of the LGS Fuel Oil Chemistry AMP. These tanks are drained, cleaned, and inspected on a 10-year frequency. The 10 year inspection frequency has been successful in monitoring and managing coating degradation and aging effects in a fuel oil environment. In addition, the Fuel Oil Chemistry AMP includes periodic internal inspection of each fuel oil tank at least once during the 10-year period prior to the period of extended operation and at least once every 10 years during the period of extended operation. Therefore, Commitment No. 20 is revised as shown in Enclosure D to clarify that the timing and frequency of initial and subsequent inspections will be in accordance with our existing commitments for the Fuel Oil Chemistry AMP.

The rationale for the 10-year frequency is as described below:

- The material condition of the coating in all eight tanks as identified by prior inspections is excellent. Only minor mechanical damage has been observed. This mechanical damage was documented in an engineering evaluation as attributable to either lowering a ladder into the sump area for tank inspections, or, from lowering the water sampling apparatus into the sump area for the periodic tank bottom water checks.
- Periodic surveillance and maintenance procedures performed under the Fuel Oil Chemistry (B.2.1.20) AMP mitigate aging effects on coated and uncoated surfaces inside the tanks by maintaining potentially harmful contaminants at low concentrations.
 - The fuel oil in the tanks is maintained by monitoring and controlling fuel oil contaminants in accordance with the Technical Specifications and ASTM guidelines
 - Fuel oil sampling and analysis is performed for new fuel oil and stored fuel oil
 - The tanks are periodically drained of accumulated water and sediment, cleaned, and internally inspected

- Design features of the fuel oil system identify tank leakage and system flow blockage as described in (d) and (e) below.

Where areas of degraded coatings are detected:

- (a) The acceptance criteria for coating degradation will be in accordance with Element 6 of GALL Report AMP XI.M42 in draft LR-ISG-2013-01 dated January 6, 2014.
- (b) The requirements for physical inspections will be in accordance with Element 6 of GALL Report AMP XI.M42 in draft LR-ISG-2013-01 dated January 6, 2014.
- (c) Should there be a loss of coating, significant rusting would not be expected since current fuel oil practices limit the amount of water, sediment, and particulate contamination collected in the tank. These fuel oil activities will continue in the PEO as part of the Fuel Oil Chemistry (B.2.1.20) AMP. Additionally, the Fuel Oil Chemistry (B.2.1.20) AMP requires UT wall thickness examination if there is visual evidence of material loss.
- (d) The emergency diesel generator diesel oil storage tanks are equipped with level instrumentation and alarms that provide indication that leakage is occurring.
- (e) In the unlikely event of coating transport, the engine driven fuel pump piping and motor driven fuel pump piping located downstream from the oil storage tanks are each equipped with basket strainers and duplex filters. Both the basket strainers and duplex filters are provided with differential pressure instrumentation and high differential pressure alarms which provide indication of flow blockage. Each diesel generator is run monthly for testing. Basket strainer differential pressure and duplex filter inlet and outlet pressures are recorded during each diesel test run.

The acceptance criteria, evaluation, and physical testing requirements will be included in the implementing documents for the Fuel Oil Chemistry AMP so that aging will be adequately managed during the PEO.

Commitment No. 20 is revised as shown in Enclosure D.

Request 5

State the basis for not recoating areas where the coating has been removed. In addition, state the maximum interval to subsequent coating inspections and incorporate the inspection interval into the Lubricating Oil Analysis program, UFSAR supplement and Commitment No. 27.

Exelon Response:

The EPRI Terry Turbine Maintenance Guides for the Reactor Core Isolation Cooling System (RCIC) and High Pressure Coolant Injection System (HPCI) state to not attempt to repaint the surfaces of the oil reservoir or pedestals. In Exelon's response to RAI 3.0.3-1 it was stated that failure of the coatings in the RCIC turbine bearing pedestals and HPCI turbine bearing pedestals and oil reservoir could result in unanticipated or accelerated corrosion of the base metal. This is true if the lubricating oil has been contaminated (e.g., from moisture intrusion). However, when contaminants are not present, lubricating oil systems do not suffer appreciable degradation by loss of material since the environment is not conducive to corrosion mechanisms. The LGS Lubricating Oil Analysis (B.2.1.27) AMP provides for sampling, analysis, and condition monitoring for the identification of specific wear products and contamination in lubricating oil environments. Oil sampling frequency for the HPCI and RCIC Systems is every

91 days. These activities ensure that the oil environment in the oil reservoir and pedestals is maintained within acceptable limits to prevent or mitigate age related degradation. Therefore coating is not necessary to mitigate aging effects.

Baseline inspections for the RCIC turbine bearing pedestals and HPCI turbine bearing pedestals and oil reservoir will occur in the 10-year period prior to the period of extended operation. The maximum interval of subsequent coating inspections will comply with Table 4a of GALL Report AMP XI.M42 in draft LR-ISG-2013-01 dated January 6, 2014.

The inspection interval requirement will be included in the implementing documents for the Lubricating Oil Analysis AMP so that aging will be adequately managed during the PEO.

Commitment No. 27 is revised as shown in Enclosure D.

Request 6

Provide a sufficient level of detail related to the orientation in performing coating surveillances provided to inspectors for the staff to independently conclude that the orientation is consistent with ASTM D-4537 Section 9; and (b) state whether VT-3 Level II qualified examiners will have 3 or 6 months (depending on their education level) experience in coating inspection activities.

Exelon Response:

VT-3 qualified examiners will not be used for either the baseline or periodic inspection of coatings. Individuals performing the inspection of coatings will be qualified to international standards endorsed in RG 1.54, including, ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II.

LRA Sections A.2.1.12, A.2.1.20, A.2.1.27, B.2.1.12, B.2.1.20, and B.2.1.27 are revised as shown in Enclosure C. Commitment Nos. 12, 20, and 27 are revised as shown in Enclosure D.

Request 7

For the Open-Cycle Cooling Water System, Fuel Oil Chemistry, and Lubricating Analysis programs, state the basis for why inspections conducted by individuals who do not have an ANSI N45.2.6 qualification should be credited as a baseline inspection; and clarify the intent of the statement, "this level of qualification."

Exelon Response:

VT-3 qualified examiners will not be used for either the baseline or periodic inspection of coatings. Individuals performing the inspection of coatings will be qualified to international standards endorsed in RG 1.54, including, ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II.

LRA Sections A.2.1.12, A.2.1.20, A.2.1.27, B.2.1.12, B.2.1.20, and B.2.1.27 are revised as shown in Enclosure C. Commitment Nos. 12, 20, and 27 are revised as shown in Enclosure D.

Request 8

Amend LRA Sections A.2.1.12 and B.2.1.12, and Commitment No. 12, to state that the inspectors that conduct service water side inspections of the RECW heat exchangers have knowledge of EPRI Report 1019157 and a knowledge objective requirement to describe the inspection of coatings in heat exchangers.

Exelon Response:

RECW heat exchanger inspector qualification requirements will be included in the implementing documents for the Open-Cycle Cooling Water System AMP so that aging will be adequately managed during the PEO.

LRA Sections A.2.1.12 and B.2.1.12 are revised as shown in Enclosure C. Commitment No. 12 is revised as shown in Enclosure D.

Request 9

State the qualification level of the individual completing the inspection reports or completion remarks in the inspection work order. Make appropriate changes to the applicable programs, UFSAR supplement, and Commitments.

Exelon Response:

Inspection reports will be prepared by the ASTM D 4537 and ANSI N45.2.6 qualified examiner and submitted to the Limerick Site Coating Coordinator. For the RECW heat exchanger inspections, inspection results are documented by the inspector in a heat exchanger report.

The qualification level of the individual completing the inspection reports or completion remarks in the inspection work order will be included in the implementing documents for the Open-Cycle Cooling Water System AMP, Lubricating Oil Analysis AMP, and Fuel Oil Chemistry AMP so that aging will be adequately managed during the PEO.

Request 10

State which precursors to coating failures would be considered not acceptable and the extent of blistering that would be found acceptable. Make appropriate changes to the applicable programs, UFSAR supplement, and Commitments.

Exelon Response:

Acceptance criteria for peeling, delamination, blistering, cracking, flaking, and rusting will be in accordance with Element 6 of GALL Report AMP XI.M42 in draft LR-ISG-2013-01 dated January 6, 2014.

Acceptance criteria requirements will be included in the implementing documents for the Open-Cycle Cooling Water System AMP, Lubricating Oil Analysis AMP, and Fuel Oil Chemistry AMP so that aging will be adequately managed during the PEO.

Commitment Nos. 12, 27, and 20 are revised as shown in Enclosure D.

Request 11

State: (a) whether an individual qualified to ASTM D-7108 will evaluate the results of the baseline coating inspections conducted prior to the PEO; and (b) whether testing or examination will be conducted to ensure that the extent of repaired or replaced coatings encompasses sound coating material. Make appropriate changes to the applicable programs, UFSAR supplement, and Commitments.

Exelon Response:

- (a) A coatings specialist qualified to ASTM D-7108 will evaluate the results of the baseline coating inspections conducted prior to the PEO.
- (b) Testing or examination of repaired or replaced coating will be performed based on the type of coating system and type of repair made and may include attributes such as wet film thickness, dry film thickness, discontinuity, and adhesion.

The qualification of individuals evaluating baseline inspection results and the testing requirements for repaired or replaced coatings will be included in the implementing documents for the Open-Cycle Cooling Water System AMP, Lubricating Oil Analysis AMP, and Fuel Oil Chemistry AMP so that aging will be adequately managed during the PEO.

Enclosure B

Minor Changes to LGS LRA Supplement dated March 12, 2014

On March 12, 2014, Exelon submitted a supplement to the LRA which incorporates recommendations from LR-ISG-2012-02, "Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion under Insulation." Changes are being made to that information as follows:

1. Appendix A.2.1.25 and Appendix B.2.1.25 are amended to clarify that initial external surface inspections under insulation will inspect for evidence of cracking as well as loss of material.
2. The following Tables are amended to correctly identify the External Surfaces Monitoring of Mechanical Components aging management program as B.2.1.25, not B.2.1.23:
 - a. Table 3.3.2-2
 - b. Table 3.3.2-4
 - c. Table 3.3.2-26
 - d. Table 3.4.2-2
 - e. Table 3.4.2-7

These changes are shown in Enclosure C.

Enclosure C Updates to affected LRA sections

The following LGS LRA sections are changed by this response:

Table 3.3.2-2 (pages 3.3-91 and 3.3-93)
Table 3.3.2-4 (pages 3.3-104, 3.3-105, and 3.3-108)
Table 3.3.2-26 (pages 3.3-243 and 3.3-244)
Table 3.4.2-2 (page 3.4-34)
Table 3.4.2-7 (pages 3.3-57 and 3.3-59)

Appendix A.2.1.12
Appendix A.2.1.18
Appendix A.2.1.19
Appendix A.2.1.20
Appendix A.2.1.25
Appendix A.2.1.26
Appendix A.2.1.27

Appendix B.2.1.12
Appendix B.2.1.18
Appendix B.2.1.19
Appendix B.2.1.20
Appendix B.2.1.25
Appendix B.2.1.26
Appendix B.2.1.27

Notes:

- To facilitate understanding, portions of the original LRA have been repeated in this Enclosure, with revisions indicated.
- Existing LRA text is shown in normal font. Changes are highlighted with ***bold italics*** for inserted text and ~~strikethroughs~~ for deleted text.

As a result of the review of Exelon letter dated 3/12/2014, the following LRA Tables are revised as shown below:

Revision to LRA Table 3.3.2-2 (pages 3.3-91 and 3.3-93)

Closed Cooling Water System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Item	Table 1 Item	Notes
Piping, piping components, and piping elements	Leakage Boundary	Carbon Steel	Air - Indoor, Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.25)	VII.I.A-77	3.3.1-78	A
			Air/Gas - Wetted (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.2523)	VII.C2.A-405	3.3.1-132	A
			Air/Gas - Wetted (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.1.26)	VII.G.A-23	3.3.1-89	A
			Closed Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water Systems (B.2.1.13)	VII.C2.AP-189	3.3.1-46	C
Valve Body	Leakage Boundary	Carbon Steel	Air - Indoor, Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.25)	VII.I.A-77	3.3.1-78	A
			Air/Gas - Wetted (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.2523)	VII.C2.A-405	3.3.1-132	A
			Closed Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water Systems (B.2.1.13)	VII.C2.AP-189	3.3.1-46	C

Revision to LRA Table 3.3.2-4 (pages 3.3-104 and 3.3-105)

Control Enclosure Ventilation System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Item	Table 1 Item	Notes
Piping, piping components, and piping elements	Leakage Boundary	Carbon Steel	Air - Indoor, Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.25)	VII.D.A-80	3.3.1-78	A
			Air/Gas - Wetted (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.2523)	VII.F1.A-405	3.3.1-132	A
			Air/Gas - Wetted (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.1.26)	VII.F1.A-08	3.3.1-90	C
			Closed Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water Systems (B.2.1.13)	VII.F1.AP-202	3.3.1-45	A
			Air - Indoor, Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.25)	VII.D.A-80	3.3.1-78	A
			Air/Gas - Dry (Internal)	None	None	VII.J.AP-6	3.3.1-121	A
	Pressure Boundary	Carbon Steel	Air/Gas - Wetted (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.2523)	VII.F1.A-405	3.3.1-132	A
			Closed Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water Systems (B.2.1.13)	VII.F1.AP-202	3.3.1-45	A

Revision to LRA Table 3.3.2-4, continued (page 3.3-108)

Control Enclosure Ventilation System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Item	Table 1 Item	Notes
Valve Body	Pressure Boundary	Carbon Steel	Air - Indoor, Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.25)	VII.D.A-80	3.3.1-78	A
			Air/Gas - Wetted (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1. 25 23)	VII.F.1.A-405	3.3.1-132	A
			Closed Cycle Cooling Water (Internal)	Loss of Material	Closed Treated Water Systems (B.2.1.13)	VII.F.1.AP-202	3.3.1-45	A

Revision to LRA Table 3.3.2-26 (page 3.3-243)

Water Treatment and Distribution System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Item	Table 1 Item	Notes		
Piping, piping components, and piping elements	Leakage Boundary	Carbon Steel	Air - Indoor, Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.25)	VII.I.A-77	3.3.1-78	A		
				Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.25 23)	VII.E3.A-405	3.3.1-132	A		
			Loss of Material	Raw Water (Internal)	Open-Cycle Cooling Water System (B.2.1.12)	V.D2.EP-90	3.2.1-23	C		
			Loss of Material	Treated Water (Internal)	One-Time Inspection (B.2.1.22)	VII.E3.AP-106	3.3.1-21	A		
		Stainless Steel			Air - Indoor, Uncontrolled (External)	None	None	VII.J.AP-17	3.3.1-120	A
						Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.25 23)	VII.E3.A-405	3.3.1-132	A, 1
					Loss of Material	Treated Water (Internal)	One-Time Inspection (B.2.1.22)	VII.A4.AP-110	3.3.1-25	A
					Loss of Material		Water Chemistry (B.2.1.2)	VII.A4.AP-110	3.3.1-25	A
							Water Chemistry (B.2.1.2)	VII.A4.AP-110	3.3.1-25	A
							Water Chemistry (B.2.1.2)	VII.A4.AP-110	3.3.1-25	A

Revision to LRA Table 3.3.2-26, continued (page 3.3-244)

Water Treatment and Distribution System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Item	Table 1 Item	Notes		
Valve Body	Leakage Boundary	Carbon Steel	Air - Indoor, Uncontrolled (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.25)	VII.I.A-77	3.3.1-78	A		
					External Surfaces Monitoring of Mechanical Components (B.2.1.25 23)	VII.E3.A-405	3.3.1-132	A		
			Raw Water (Internal)	Loss of Material	Open-Cycle Cooling Water System (B.2.1.12)	V.D2.EP-90	3.2.1-23	C		
					Treated Water (Internal)	Loss of Material	One-Time Inspection (B.2.1.22)	VII.E3.AP-106	3.3.1-21	A
							Water Chemistry (B.2.1.2)	VII.E3.AP-106	3.3.1-21	A

Plant Specific Notes:

1. Insulation for stainless steel components meets the requirements in NRC Regulator Guide 1.36, and therefore the levels of leachable contaminants are controlled so that stress corrosion cracking is not promoted. Therefore, loss of material is the only applicable aging effect for this material and environment.

Revision to LRA Table 3.4.2-2 (page 3.4-34)

Condensate System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Item	Table 1 Item	Notes
Piping, piping components, and piping elements	Leakage Boundary	Stainless Steel	Air - Indoor, Uncontrolled (External)	None	None	VIII.I.SP-12	3.4.1-58	A
			Air/Gas - Wetted (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.2523)	VIII.E.S-402	3.4.1-63	A, 1
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B.2.1.22)	VIII.E.SP-87	3.4.1-16	A
					Water Chemistry (B.2.1.2)	VIII.E.SP-87	3.4.1-16	A
Valve Body	Leakage Boundary	Stainless Steel	Air - Indoor, Uncontrolled (External)	None	None	VIII.I.SP-12	3.4.1-58	A
			Air/Gas - Wetted (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.2523)	VIII.E.S-402	3.4.1-63	A, 1
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B.2.1.22)	VIII.E.SP-87	3.4.1-16	A
					Water Chemistry (B.2.1.2)	VIII.E.SP-87	3.4.1-16	A

Revision to LRA Table 3.4.2-7 (pages 3.3-57 and 3.3-59)

Main Turbine

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Item	Table 1 Item	Notes
Piping, piping components, and piping elements	Leakage Boundary	Stainless Steel	Air - Indoor, Uncontrolled (External)	None	None	VIII.I.SP-12	3.4.1-58	A
			Air/Gas - Wetted (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.2523)	VIII.A.S-402	3.4.1-63	A, 2
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis (B.2.1.27)	VIII.A.SP-95	3.4.1-44	A
			Treated Water (Internal)	Loss of Material	One-Time Inspection (B.2.1.22)	VIII.A.SP-95	3.4.1-44	A
				Loss of Material	One-Time Inspection (B.2.1.22)	VIII.C.SP-87	3.4.1-16	A
			Treated Water > 140°F (Internal)	Cracking	Water Chemistry (B.2.1.2)	VIII.C.SP-87	3.4.1-16	A
				Loss of Material	One-Time Inspection (B.2.1.22)	VIII.C.SP-88	3.4.1-11	A
			Air - Indoor, Uncontrolled (External)	Loss of Material	Water Chemistry (B.2.1.2)	VIII.C.SP-88	3.4.1-11	A
				Loss of Material	One-Time Inspection (B.2.1.22)	VIII.C.SP-87	3.4.1-16	A
			Air/Gas - Wetted (External)	Loss of Material	Water Chemistry (B.2.1.2)	VIII.C.SP-87	3.4.1-16	A
Loss of Material	One-Time Inspection (B.2.1.22)	VIII.C.SP-87		3.4.1-16	A			
Valve Body	Leakage Boundary	Stainless Steel	Air - Indoor, Uncontrolled (External)	None	None	VIII.I.SP-12	3.4.1-58	A
			Air/Gas - Wetted (External)	Loss of Material	External Surfaces Monitoring of Mechanical Components (B.2.1.2523)	VIII.A.S-402	3.4.1-63	A, 2
			Lubricating Oil (Internal)	Loss of Material	Lubricating Oil Analysis (B.2.1.27)	VIII.A.SP-95	3.4.1-44	A
				Loss of Material	One-Time Inspection (B.2.1.22)	VIII.A.SP-95	3.4.1-44	A

Plant Specific Notes:

2. Insulation for stainless steel components meets the requirements in NRC Regulator Guide 1.36, and therefore the levels of leachable contaminants are controlled so that stress corrosion cracking is not promoted. Therefore, loss of material is the only applicable aging effect for this material and environment.

As a result of the response to RAI 3.0.3.4-1 provided in Enclosure A of this letter, LRA Section A.2.1.12, Open-Cycle Cooling Water System is revised as follows:

A.2.1.12 Open-Cycle Cooling Water System

The Open-Cycle Cooling Water System (OCCWS) aging management program is an existing program that manages heat exchangers, piping, piping elements and piping components in safety-related and nonsafety-related raw water systems that are exposed to raw water and air/gas-wetted environments for loss of material, reduction of heat transfer, and hardening and loss of strength of elastomers. This is accomplished through tests and inspections per the guidelines of NRC Generic Letter 89-13. System and component testing, visual inspections, non-destructive examination (i. e. Radiographic Testing, Ultrasonic Testing and Eddy Current Testing), and chemical injection are conducted to ensure that aging effects are managed such that system and component intended functions and integrity are maintained.

The OCCWS includes those systems that transfer heat from safety-related structures, systems and components to the ultimate heat sink as defined in GL 89-13 as well as those raw water systems which are in scope for license renewal for spatial interaction but have no safety-related heat transfer function. Periodic heat transfer testing or inspection and cleaning of heat exchangers with a heat transfer intended function is performed in accordance with LGS commitments to GL 89-13 to verify heat transfer capabilities. Heat exchangers which have no safety-related heat transfer function are periodically inspected and cleaned.

Periodic volumetric inspections will be performed in the non-buried portions of the Safety Related Service Water System to provide a sufficient understanding of the buried service water piping conditions throughout the period of extended operation. The inspection locations are selected to ensure that conditions are similar (e. g. flow, temperature) to those in the buried portions of the Safety Related Service Water System piping.

The OCCWS aging management program also manages the loss of coating integrity in a raw water environment. Internal coatings in the service water side of the Main Control Room Chiller Condensers and Reactor Enclosure Cooling Water Heat Exchangers, and in circulating water system piping are visually inspected to ensure that loss of coating integrity is detected prior to ~~(1) loss of component intended function, including loss of function due to accelerated degradation caused by localized coating failures, and (2) degradation of downstream component performance due to flow blockage.~~ Individuals performing the inspection of coatings whose failure could result in accelerated degradation of material or degradation of downstream components due to flow blockage will be qualified to ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II, or, VT-3 to a minimum of Level II including documented orientation in performing coating surveillance. ~~In the event the initial inspection is not performed by an ANSI N45.2.6 inspector and the coating condition is considered suspect or requires coating repair then a qualified N45.2.6 inspector will perform a detailed inspection and oversee/inspect coatings recoats, touch-ups, or repair activities.~~ ***The inspections of the Main Control Room Chiller Condensers and circulating water system piping will be performed by inspectors qualified to***

international standards endorsed in RG 1.54, including, ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II. The inspection of coatings whose failure could result in accelerated degradation of material but not degradation of downstream components due to flow blockage will be performed using plant specific procedures by inspectors qualified through plant specific programs. **The inspections of the Reactor Enclosure Cooling Water Heat Exchangers will be performed by inspectors with a demonstrated working knowledge of EPRI Report 1019157, "Guideline on Nuclear Safety-Related Coatings."** Inspections are performed for signs of coating failures and precursors to coating failures including peeling, delamination, blistering, cracking, flaking, chipping, rusting, and mechanical damage. When acceptance criteria are not met, visual inspection is supplemented by additional testing such as DFT (Dry Film Thickness), adhesion, continuity, or other inspection technique as determined by the qualified inspector to accurately assess coating condition. **Adhesion testing will be performed using international standards endorsed in RG 1.54.** Evaluations are performed for inspection results that do not satisfy established acceptance criteria and the conditions are entered into the LGS 10 CFR 50 Appendix B corrective action program. The corrective action program ensures that conditions adverse to quality are promptly corrected. Corrective actions may include coating repair **or replacement** prior to the component being returned to service.

The Open-Cycle Cooling Water System aging management program will be enhanced to:

1. Perform internal inspection of buried Safety Related Service Water Piping when it is accessible during maintenance and repair activities
2. Perform periodic inspections for loss of material in the Nonsafety-Related Service Water System at a minimum of five locations on each unit once every refueling cycle.
3. Replace the supply and return piping for the Core Spray pump compartment unit coolers.
4. Replace degraded RHRSW piping in the pipe tunnel.
5. Perform periodic inspections for loss of material in the Safety Related Service Water System at a minimum of ten locations every two years.

The enhancements will be implemented prior to the period of extended operation.

As a result of the response to RAI 3.0.3.4-1 provided in Enclosure A of this letter, the Program Description section of LRA Section B.2.1.12, Open-Cycle Cooling Water System is revised as follows:

B.2.1.12 Open-Cycle Cooling Water System

Program Description

The Open-Cycle Cooling Water System (OCCWS) aging management program is an existing program that includes mitigative, preventive, performance monitoring, and condition monitoring activities to manage heat exchangers, piping, piping elements, and piping components in safety-related and nonsafety-related raw water systems that are exposed to a raw water or air/gas wetted environment for loss of material, reduction of heat transfer, and hardening and loss of strength of elastomers. The activities for this program are consistent with the LGS commitments to the requirements of GL 89-13 and provide for management of aging effects in raw water cooling systems through tests, inspections and component cleaning. System and component testing, visual inspections, non-destructive examination (i. e. Radiographic Testing, Ultrasonic Testing, and Eddy Current Testing), and biocide and chemical treatment are conducted to ensure that aging effects are managed such that system and component intended functions and integrity are maintained.

The OCCWS includes those systems that transfer heat from safety-related systems and components to the ultimate heat sink as defined in GL 89-13 as well as those raw water systems which are in scope for license renewal for spatial interaction but have no safety-related heat transfer function.

The guidelines of GL 89-13 are utilized for the surveillance and control of biofouling for the OCCWS. Procedures provide instructions and controls for chemical and biocide injection. Periodic inspections are performed for the presence of mollusks and biocide treatments are applied as necessary.

Periodic heat transfer testing or inspection and cleaning of heat exchangers with a heat transfer intended function is performed in accordance with LGS commitments to GL 89-13 to verify heat transfer capabilities. Periodic inspection and cleaning is performed on the heat exchangers without a heat transfer intended function.

Routine inspections and maintenance ensure that corrosion, erosion, sediment deposition and biofouling cannot degrade the performance of safety-related systems serviced by OCCWS. No credit is taken for protective coatings on safety-related components in the OCCWS. The In-service Inspection (ISI) program provides for periodic leakage detection of buried piping and components as well as inspection of aboveground piping and components.

Examination of polymeric materials in systems serviced by OCCWS will be consistent with examinations described in the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.1.26) program.

System walkdowns are performed periodically to assess the material condition of OCCWS piping and components. Compliance with the licensing basis is ensured by review of system design basis documents as well as periodic performance of focused area self-assessments and safety system functional inspections.

Periodic volumetric inspections will be performed in the non-buried portions of the Safety Related Service Water System to provide a sufficient understanding of the buried service water piping conditions throughout the period of extended operation. The inspection locations are selected to ensure that conditions are similar (e. g. flow, temperature) to those in the buried portions of the Safety Related Service Water System piping.

The OCCWS aging management program also manages the loss of coating integrity in a raw water environment. Internal coatings are visually inspected to ensure that loss of coating integrity is detected prior to ~~(1) loss of component intended function, including loss of function due to accelerated degradation caused by localized coating failures, and (2) degradation of downstream component performance due to flow blockage.~~ Baseline inspections will occur in the 10-year period prior to the period of extended operation and will include accessible internal surfaces of the service water side of the Main Control Room Chiller Condensers and Reactor Enclosure Cooling Water Heat Exchangers, and the entire inside surface of 73 one-foot axial length circumferential segments of coated circulating water system piping. ~~Individuals performing the inspection of coatings whose failure could result in accelerated degradation of material or degradation of downstream components due to flow blockage will be qualified to ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II, or, VT-3 to a minimum of Level II including documented orientation in performing coating surveillance. In the event the initial inspection is not performed by an ANSI N45.2.6 inspector and the coating condition is considered suspect or requires coating repair then a qualified N45.2.6 inspector will perform a detailed inspection and oversee/inspect coatings recoats, touch-ups, or repair activities.~~ **The inspections of the Main Control Room Chiller Condensers and circulating water system piping will be performed by inspectors qualified to international standards endorsed in RG 1.54, including, ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II.** ~~The inspection of coatings whose failure could result in accelerated degradation of material but not degradation of downstream components due to flow blockage will be performed using plant specific procedures by inspectors qualified through plant specific programs.~~ **The inspections of the Reactor Enclosure Cooling Water Heat Exchangers will be performed by inspectors with a demonstrated working knowledge of EPRI Report 1019157, "Guideline on Nuclear Safety-Related Coatings."** The as-found condition of the coating is documented in inspection reports or in completion remarks in the inspection work order. The results of previous inspections are used to determine changes in the condition of the coating over time. Trending of coating degradation is utilized to establish appropriate inspection frequencies. Inspections are performed for signs of coating failures and precursors to coating failures including peeling, delamination, blistering, cracking, flaking, chipping, rusting, and mechanical damage. When acceptance criteria are not met, visual inspection is supplemented by additional testing such as DFT (Dry Film Thickness), adhesion, continuity, or other inspection technique as determined by the

qualified inspector to accurately assess coating condition. **Adhesion testing will be performed using international standards endorsed in RG 1.54.** Evaluations are performed for inspection results that do not satisfy established acceptance criteria and the conditions are entered into the LGS 10 CFR 50 Appendix B corrective action program. The corrective action program ensures that conditions adverse to quality are promptly corrected. Corrective actions may include coating repair **or replacement** prior to the component being returned to service.

Enhancements to the program, including internal inspections of buried pipe and periodic inspection of the Nonsafety-Related Service Water System piping will be implemented prior to entering the period of extended operation.

As a result of RAI 3.0.3.4-1 and RAI 3.0.3.3.1-1, the Fire Water System program, Appendix A.2.1.18 is revised as shown below:

A.2.1.18 Fire Water System

The Fire Water System aging management program is an existing program that provides for system pressure monitoring, fire system header flushing and flow testing, pump performance testing, hydrant flushing, and visual inspection activities. System flow tests measure hydraulic resistance and compare results with previous testing as a means of evaluating the internal piping conditions. The program manages loss of material due to corrosion, including MIC, fouling, flow blockage because of fouling, and loss of coating integrity. Major component types include piping, piping components and piping elements, tanks, pump casings, and valve bodies. Monitoring system piping flow characteristics ensures that signs of loss of material will be detected in a timely manner. Monitoring system piping flow characteristics and opportunistic internal inspections of the cement lined fire main ensure that signs of loss of coating integrity will be detected in a timely manner. Within 10 years prior to the PEO, five inspections of the cement lined fire main will be performed. Pump performance tests, hydrant flushing and system inspections are based on guidance from the applicable National Fire Protection Association (NFPA) standards. The fire water system is normally maintained at required operating pressure and is monitored such that loss of system pressure is immediately detected and corrective actions initiated. Fire system main header flow tests, sprinkler system inspections, visual yard hydrant inspections, hydrostatic tests, gasket inspections, volumetric inspections, and fire hydrant flow tests and pump capacity tests are performed periodically to assure that aging effects are managed such that the system intended functions are maintained.

The Fire Water System aging management program will be enhanced to:

1. Replace sprinkler heads or perform 50-year sprinkler head testing using the guidance of NFPA 25 “Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems” (2011 Edition), Section 5.3.1.1.1. This testing will be performed prior to the 50-year in-service date and every 10 years thereafter.
2. Inspect selected portions of the water based fire protection system piping located aboveground and exposed to the fire water internal environment by non-intrusive volumetric examinations. These inspections shall be performed prior to the period of extended operation and will be performed every 10 years thereafter.
3. Inspect and clean line strainers for deluge systems after each actuation. Strainers for deluge systems subject to periodic full flow testing will be inspected and cleaned on a frequency consistent with the deluge system test frequency.
4. Inspect and clean the foam system water supply strainer after each system actuation and no less than once per refueling interval.

5. Perform external visual inspection of deluge piping and nozzles for the HVAC charcoal filters for signs of leakage, corrosion, physical damage, and correct orientation once per refueling interval.
6. Perform flow tests for the hydraulically most remote hose stations once every five years, scheduling the testing so that some of the tests are performed in each year of the five year interval.
7. Perform a main drain test annually for the fire water piping in each of the following locations: Unit 1 Reactor Enclosure, Unit 2 Reactor Enclosure, Unit 1 Turbine Enclosure, Unit 2 Turbine Enclosure, Control Enclosure, and Radwaste Enclosure. Flow blockage or abnormal discharge identified during flow testing or any change in pressure during the test greater than ten percent at a specific location is entered into the corrective action program for evaluation.
8. Perform charcoal filter deluge valve exercise testing and air flow testing at least once per refueling interval and perform air flow testing for the deluge systems for the hydrogen seal oil units and lube oil reservoirs every two years.
9. Perform the following for Fire Water System sprinkler and deluge systems:
 - Perform visual internal inspections, consistent with NFPA 25, for corrosion and obstructions to flow on at least five wet pipe sprinkler systems every five years.
 - Collect and evaluate solids discharged from wet pipe sprinkler system flow testing. Flow testing through the inspector's test valve will be performed on an interval no greater than 18 months for each wet pipe system.
 - Perform visual internal inspections for corrosion and obstructions to flow for dry pipe preaction sprinkler systems of surfaces made accessible when preaction and water deluge valves are serviced on an interval no greater than a refueling interval.
 - Perform visual internal inspections for corrosion and obstructions to flow for deluge systems of surfaces made accessible when deluge valves are serviced on at least ten deluge systems on an interval no greater than three years. **To provide reasonable assurance of the presence of sufficient coating, two of the ten inspections will be associated with the galvanized transformer deluge system piping.**
 - Perform a visual internal inspection for corrosion and obstructions to flow for any wet pipe, dry pipe preaction, or deluge system after any system actuation prior to return to service.
 - Perform an obstruction evaluation for conditions that indicate degraded flow.
 - Perform followup volumetric inspections for pipe wall thickness if internal visual inspections detect surface irregularities that could be indicative of wall loss below nominal wall thickness.

- Sprinkler and deluge systems that are normally dry but may be wetted as the result of testing or actuations will have augmented tests and inspections on piping segments that cannot be drained or piping segments that allow water to collect. These augmented inspections will be performed in each five year interval beginning five years prior to the period of extended operation and consist of either a flow test or flush sufficient to detect potential flow blockage or a visual inspection of 100 percent of the internal surface of piping segments that cannot be drained or piping segments that allow water to collect. In addition, in each five year interval of the period of extended operation, 20 percent of the length of piping segments that cannot be drained or piping segments that allow water to collect is subject to volumetric wall thickness inspections.
10. Perform wall thickness measurements using UT or other suitable techniques at five selected locations every year to identify loss of material in the carbon steel backup fire water piping. ***When these examinations identify pipe degradation, additional examinations will be performed in accordance with the following criteria:***
- ***At least four additional locations will be examined if wall loss is greater than 50 percent of nominal wall thickness,***
 - ***Two additional locations will be examined if wall loss is 30 percent to 50 percent of nominal wall thickness and the calculated remaining life is less than two years,***
 - ***No additional examinations will be performed if wall loss is less than 30 percent of nominal wall thickness.***

These inspections will be performed until the piping degradation no longer meets the criteria for recurring internal corrosion.

Enhancements will be implemented prior to the period of extended operation, with the testing and inspections performed in accordance with the schedule described above.

As a result of RAI 3.0.3.4-1 and RAI 3.0.3.3.1-1, the Fire Water System program, Appendix B.2.1.18 is revised as shown below:

B.2.1.18 Fire Water System

Program Description

The Fire Water System program is an existing program that manages identified aging effects for the water-based fire protection system and associated components, through the use of periodic inspections, monitoring, and performance testing. The program provides for preventive measures and inspection activities to detect loss of material prior to loss of intended functions. System functional tests, flow tests, flushes and inspections are performed in accordance with the applicable guidance from National Fire Protection Association (NFPA) codes and standards. The program applies to water-based fire protection systems that consist of sprinklers, nozzles, valves, hydrants, hose stations, standpipes, water storage tanks, and aboveground and underground piping and components. The environments managed by the program for fire components are air-outdoor and raw water. Fire system main header flow tests, sprinkler system inspections, visual yard hydrant inspections, fire hydrant hose inspections, hydrostatic tests, gasket inspections, volumetric inspections, and fire hydrant flow tests and pump capacity tests are performed periodically assure that aging effects are managed such that the system intended functions are maintained. Monitoring system piping flow characteristics and opportunistic internal inspections of the cement lined fire main ensure that signs of loss of coating integrity will be detected in a timely manner. Within 10 years prior to the PEO, five inspections of the cement lined fire main will be performed. 50-year sprinkler head testing will be conducted using the guidance provided in NFPA 25. Performance of the initial 50-year tests will be determined based on the date of the sprinkler system installation. Subsequent inspections will be performed every 10 years after the initial 50-year testing.

Selected portions of the fire protection system piping located aboveground and exposed to water will be inspected by non-intrusive volumetric examinations, to ensure that aging effects are managed and that wall thickness is within acceptable limits. The initial wall thickness inspections will be performed before the end of the current operating term and thereafter at a frequency of at least once every 10 years during the period of extended operation. These inspections will be capable of evaluating (1) wall thickness to ensure against catastrophic failure and (2) the inner diameter of the piping as it applies to the flow requirements of the fire protection system.

The backup fire water storage tank internal and external surfaces are inspected and volumetric examinations of the tank bottom are performed as described in the Aboveground Metallic Tanks (B.2.1.19) program. External surfaces of buried fire main

pipings are evaluated as described in the Buried and Underground Piping and Tanks (B.2.1.29) program.

The fire water system is maintained at the required normal operating pressure and monitored such that a loss of system pressure is immediately detected and corrective actions initiated. The program ensures that testing and inspection activities have been performed and the results have been documented and reviewed by the Fire Protection system manager for analysis and trending.

The system flow testing, visual inspections and volumetric inspections assure that aging effects are managed such that the system intended functions are maintained.

NUREG-1801 Consistency

The Fire Water System aging management program will be consistent with the ten elements of aging management program XI.M27, "Fire Water System," specified in NUREG-1801.

Exceptions to NUREG-1801

None.

Enhancements

Prior to the period of extended operation, the following enhancements will be implemented in the following program elements:

1. Replace sprinkler heads or perform 50-year sprinkler head testing using the guidance of NFPA 25 "Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems" (2011 Edition), Section 5.3.1.1.1. This testing will be performed by the 50-year in-service date and every 10 years thereafter. **Program Elements Affected: Parameters Monitored/Inspected (Element 3), Detection of Aging Effects (Element 4).**
2. Inspect selected portions of the water based fire protection system piping located aboveground and exposed to the fire water internal environment by non-intrusive volumetric examinations. These inspections shall be performed prior to the period of extended operation and will be performed every 10 years thereafter. **Program Elements Affected: Preventative Actions (Element 2), Parameters Monitored/Inspected (Element 3), Detection of Aging Effects (Element 4), Monitoring and Trending (Element 5), Acceptance Criteria (Element 6).**

3. Inspect and clean line strainers for deluge systems after each actuation. Strainers for deluge systems subject to periodic full flow testing will be inspected and cleaned on a frequency consistent with the deluge system test frequency. **Program Elements Affected: Preventative Actions (Element 2), Parameters Monitored/Inspected (Element 3), Detection of Aging Effects (Element 4)**
4. Inspect and clean the foam system water supply strainer after each actuation and no less than once per refueling interval. **Program Elements Affected: Preventative Actions (Element 2), Parameters Monitored/Inspected (Element 3), Detection of Aging Effects (Element 4)**
5. Perform external visual inspection of deluge piping and nozzles for the HVAC charcoal filters for signs of leakage, corrosion, physical damage and correct orientation once per refueling interval. **Program Elements Affected: Parameters Monitored/Inspected (Element 3), Detection of Aging Effects (Element 4)**
6. Perform flow tests for the hydraulically most remote hose stations once every five years, scheduling the testing so that some of the tests are performed in each year of the five year interval. **Program Elements Affected: Parameters Monitored/Inspected (Element 3), Detection of Aging Effects (Element 4), Monitoring and Trending (Element 5)**
7. Perform a main drain test annually for the fire water piping in each of the following locations: Unit 1 Reactor Enclosure, Unit 2 Reactor Enclosure, Unit 1 Turbine Enclosure, Unit 2 Turbine Enclosure, Control Enclosure, and Radwaste Enclosure. Flow blockage or abnormal discharge identified during flow testing or any change in pressure during the test greater than ten percent at a specific location is entered into the corrective action program for evaluation. **Program Elements Affected: Parameters Monitored/Inspected (Element 3), Detection of Aging Effects (Element 4), Monitoring and Trending (Element 5).**
8. Perform charcoal filter deluge valve exercise testing and air flow testing at least once per refueling interval and perform air flow testing for the deluge systems for the hydrogen seal oil units and lube oil reservoirs every two years. **Program Elements Affected: Parameters Monitored/Inspected (Element 3), Detection of Aging Effects (Element 4)**
9. Perform the following for Fire Water System sprinkler and deluge systems:
 - Perform visual internal inspections, consistent with NFPA 25, for corrosion and obstructions to flow on at least five wet pipe sprinkler systems every five years.

- Collect and evaluate solids discharged from wet pipe sprinkler system flow testing. Flow testing through the inspector's test valve will be performed on an interval no greater than 18 months for each wet pipe system.
- Perform visual internal inspections for corrosion and obstructions to flow for dry pipe preaction sprinkler systems of surfaces made accessible when preaction and water deluge valves are serviced on an interval no greater than a refueling interval.
- Perform visual internal inspections for corrosion and obstructions to flow for deluge systems of surfaces made accessible when deluge valves are serviced on at least ten deluge systems on an interval no greater than three years. ***To provide reasonable assurance of the presence of sufficient coating, two of the ten inspections will be associated with the galvanized transformer deluge system piping.***
- Perform a visual internal inspection for corrosion and obstructions to flow for any wet pipe, dry pipe preaction, or deluge system after any system actuation prior to return to service.
- Perform an obstruction evaluation for conditions that indicate degraded flow.
- Perform followup volumetric inspections for pipe wall thickness if internal visual inspections detect surface irregularities that could be indicative of wall loss below nominal wall thickness.
- Sprinkler and deluge systems that are normally dry but may be wetted as the result of testing or actuations will have augmented tests and inspections on piping segments that cannot be drained or piping segments that allow water to collect. These augmented inspections will be performed in each five year interval beginning five years prior to the period of extended operation and consist of either a flow test or flush sufficient to detect potential flow blockage or a visual inspection of 100 percent of the internal surface of piping segments that cannot be drained or piping segments that allow water to collect. In addition, in each five year interval of the period of extended operation, 20 percent of the length of piping segments that cannot be drained or piping segments that allow water to collect is subject to volumetric wall thickness inspections.

Program Elements Affected: Preventative Actions (Element 2), Parameters Monitored/Inspected (Element 3), Detection of Aging Effects (Element 4)

10. Perform wall thickness measurements using UT or other suitable techniques at five selected locations every year to identify loss of material in the carbon steel backup fire water piping. ***When these examinations identify pipe degradation, additional examinations will be performed in accordance with the following criteria:***

- ***At least four additional locations will be examined if wall loss is greater than 50 percent of nominal wall thickness,***
- ***Two additional locations will be examined if wall loss is 30 percent to 50 percent of nominal wall thickness and the calculated remaining life is less than two years,***
- ***No additional examinations will be performed if wall loss is less than 30 percent of nominal wall thickness.***

These inspections will be performed until the piping degradation no longer meets the criteria for recurring internal corrosion. **Program Elements Affected: Parameters Monitored/Inspected (Element 3), Detection of Aging Effects (Element 4)**

As a result of RAI 3.0.3.3.3-1 and 3.0.3.3.3-2, the LGS Aboveground Metallic Tanks program, Appendix A.2.1.19 is revised as shown below:

A.2.1.19 Aboveground Metallic Tanks

The Aboveground Metallic Tanks aging management program is an existing program that manages the loss of material aging effect of the Backup Water Storage Tank. Paint is a corrosion preventive measure, and periodic visual inspections will monitor degradation of the paint and any resulting metal degradation of metallic tanks.

The Aboveground Metallic Tanks aging management program will be enhanced to:

1. Include UT measurements of the bottom of the Backup Water Storage Tank. Tank bottom UT inspections will be performed within five years prior to entering the period of extended operation and every five years thereafter. If no tank bottom plate material loss is identified after the first two inspections, the remaining inspections will be performed whenever the tank is drained during the period of extended operation.
2. Provide visual inspections of the Backup Water Storage Tank external surfaces and include, on a sampling basis, removal of insulation to permit inspection of the tank surface. An inspection performed prior to entering the period of extended operation will include a minimum of 25 locations to demonstrate that the tank painted surface is not degraded under the insulation. Subsequent tank external surface visual inspection will be conducted on a two-year frequency and include a minimum of four locations. **Annual visual inspections will be performed of the tank insulation surface for degradation. Rips, tears and gaps in the insulation skin will be repaired. Evidence of water intrusion beneath the insulation will be evaluated in accordance with the LGS corrective action program.**
3. Perform visual inspections of the Backup Water Storage Tank wetted and nonwetted internal surfaces. Tank internal inspections will be performed within five years prior to entering the period of extended operation and every five years thereafter. **The tank bottom will be inspected for evidence of voids beneath the floor in accordance with NFPA 25, Section 9.2.6.5.** Where pitting and general corrosion to below the nominal wall thickness occurs or any coating failure occurs in which bare metal is exposed, additional inspections and tests shall be performed **in accordance with NFPA 25, Section 9.2.7.** These tests include adhesion testing of the coating in the vicinity of the coating failure, **dry film thickness measurements, spot wet sponge testing,** and nondestructive examination to determine remaining wall thickness where bare metal has been exposed. **Tank bottom weld seams in the area of degraded coating will be leak tested in accordance with NFPA 25, Section 9.2.7, by vacuum-box testing or magnetic particle (MT) examination.** In addition, adhesion testing shall be performed in the vicinity of blisters even though bare metal may not be exposed.

These enhancements will be implemented prior to the period of extended operation.

As a result of RAI 3.0.3.3.3-1 and 3.0.3.3.3-2, the LGS Aboveground Metallic Tanks program, Appendix B.2.1.19 of the LRA, is revised as shown below:

B.2.1.19 Aboveground Metallic Tanks

Enhancements

Prior to the period of extended operation, the following enhancements will be implemented in the following program elements:

1. Include UT measurements of the bottom of the Backup Water Storage Tank. Tank bottom UT inspections will be performed within five years prior to entering the period of extended operation and every five years thereafter. If no tank bottom plate material loss is identified after the first two inspections, the remaining inspections will be performed whenever the tank is drained during the period of extended operation. **Program Elements Affected: Scope of Program (Element 1), Detection of Aging Effects (Element 4), Monitoring and Trending (Element 5), Acceptance Criteria (Element 6).**
2. Provide visual inspections of the Backup Water Storage Tank external surfaces and include, on a sampling basis, removal of insulation to permit inspection of the tank surface. An inspection performed prior to entering the period of extended operation will include a minimum of 25 locations to demonstrate that the tank painted surface is not degraded under the insulation. Subsequent tank external surface visual inspection will be performed on a two-year frequency and include a minimum of four locations. ***Annual visual inspections will be performed of the tank insulation surface for degradation. Rips, tears and gaps in the insulation skin will be repaired. Evidence of water intrusion beneath the insulation will be evaluated in accordance with the LGS corrective action program.*** **Program Elements Affected: Scope of Program (Element 1), Preventive Actions (Element 2), Detection of Aging Effects (Element 4), Monitoring and Trending (Element 5), Acceptance Criteria (Element 6).**
3. Perform visual inspections of the Backup Water Storage Tank wetted and nonwetted internal surfaces. Tank internal inspections will be performed within five years prior to entering the period of extended operation and every five years thereafter. ***The tank bottom will be inspected for evidence of voids beneath the floor in accordance with NFPA 25, Section 9.2.6.5.*** Where pitting and general corrosion to below the nominal wall thickness occurs or any coating failure occurs in which bare metal is exposed, additional inspections and tests shall be performed ***in accordance with NFPA 25, Section 9.2.7.*** These tests include adhesion testing of the coating in the vicinity of the coating failure, ***dry film thickness measurements, spot wet sponge testing,*** and nondestructive examination to determine remaining wall thickness where bare metal has been exposed. ***Tank bottom weld seams in the area of degraded coating will be leak tested in accordance with NFPA 25, Section 9.2.7, by vacuum-box testing or magnetic particle***

(MT) examination. In addition, adhesion testing shall be performed in the vicinity of blisters even though bare metal may not be exposed. **Program Elements Affected: Scope of Program (Element 1), Detection of Aging Effects (element 4), Monitoring and Trending (Element 5), Acceptance Criteria (Element 6)**

As a result of the response to RAI 3.0.3.4-1 provided in Enclosure A of this letter, LRA Section A.2.1.20, Fuel Oil Chemistry is revised as follows:

A.2.1.20 Fuel Oil Chemistry

The Fuel Oil Chemistry aging management program is an existing mitigation and condition monitoring program that includes activities which provide assurance that contaminants are maintained at acceptable levels in fuel oil for systems and components within the scope of license renewal. The Fuel Oil Chemistry program manages loss of material in piping, piping elements, piping components and tanks in a fuel oil environment. The fuel oil tanks within the scope of license renewal are maintained by monitoring and controlling fuel oil contaminants in accordance with the Technical Specifications, Technical Requirements Manual, and ASTM guidelines. Fuel oil sampling and analysis is performed in accordance with approved procedures for new fuel oil and stored fuel oil. Fuel oil tanks are periodically drained of accumulated water and sediment, cleaned, and internally inspected. These activities effectively manage the effects of aging by maintaining potentially harmful contaminants at low concentrations.

The Fuel Oil Chemistry program also manages the loss of coating integrity in a fuel oil environment. Fuel oil tank internal coatings are visually inspected to ensure that loss of coating integrity is detected ~~prior to (1) loss of component intended function, including loss of function due to accelerated degradation caused by localized coating failures, and (2) degradation of downstream component performance due to flow blockage.~~ Individuals performing the inspections will be qualified to ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II, or, VT-3 to a minimum of Level II including documented orientation in performing coating surveillance. ~~In the event the initial inspection is not performed by an ANSI N45.2.6 inspector and the coating condition is considered suspect or requires coating repair then a qualified N45.2.6 inspector will perform a detailed inspection and oversee/inspect coatings recoats, touch-ups, or repair activities.~~ **The inspections will be performed by inspectors qualified to international standards endorsed in RG 1.54, including, ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II.** Inspections are performed for signs of coating failures and precursors to coating failures including peeling, delamination, blistering, cracking, flaking, chipping, rusting, and mechanical damage. When acceptance criteria are not met, visual inspection is supplemented by additional testing such as DFT (Dry Film Thickness), adhesion, continuity, or other inspection technique as determined by the qualified inspector to accurately assess coating condition. **Adhesion testing will be performed using international standards endorsed in RG 1.54.** Evaluations are performed for inspection results that do not satisfy established acceptance criteria and the conditions are entered into the LGS 10 CFR 50 Appendix B corrective action program. The corrective action program ensures that conditions adverse to quality are promptly corrected. Corrective actions may include coating repair **or replacement** prior to the component being returned to service.

The Fuel Oil Chemistry aging management program will be enhanced to:

1. Periodically drain water from the Fire Pump Engine Diesel Oil Day Tank and the Fire Pump Diesel Engine Fuel Tank.
2. Perform internal inspections of the Fire Pump Engine Diesel Oil Day Tank, the Fire Pump Diesel Engine Fuel Tank, and the Diesel Generator Day Tanks at least once during the 10-year period prior to the period of extended operation, and, at least once every 10 years during the period of extended operation. Each diesel fuel tank will be drained, cleaned and the internal surfaces either volumetrically or visually inspected. If evidence of degradation is observed during visual inspections, the diesel fuel tanks will require follow-up volumetric inspection.
3. Perform periodic analysis for total particulate concentration and microbiological organisms for the Fire Pump Engine Diesel Oil Day Tank and the Fire Pump Diesel Engine Fuel Tank.
4. Perform periodic analysis for water and sediment and microbiological organisms for the Diesel Generator Diesel Oil Storage Tanks.
5. Perform periodic analysis for water and sediment content, total particulate concentration, and the levels of microbiological organisms for the Diesel Generator Day Tanks.
6. Perform analysis of new fuel oil for water and sediment content, total particulate concentration and the levels of microbiological organisms for the Fire Pump Engine Diesel Oil Day Tank and the Fire Pump Diesel Engine Fuel Tank.
7. Perform analysis of new fuel oil for total particulate concentration and the levels of microbiological organisms for the Diesel Generator Diesel Oil Storage Tanks.

These enhancements will be implemented prior to the period of extended operation.

As a result of the response to RAI 3.0.3.4-1 provided in Enclosure A of this letter, the Program Description section of LRA Section B.2.1.20, Fuel Oil Chemistry is revised as follows:

B.2.1.20 Fuel Oil Chemistry

Program Description

The Fuel Oil Chemistry aging management program is an existing mitigation and condition monitoring program that includes activities which provide assurance that contaminants are maintained at acceptable levels in fuel oil for systems and components within the scope of license renewal. The Fuel Oil Chemistry program manages loss of material in piping, piping elements, piping components and tanks in a fuel oil environment. The fuel oil tanks within the scope of license renewal are maintained by monitoring and controlling fuel oil contaminants in accordance with the Technical Specifications, Technical Requirements Manual, and ASTM guidelines. Fuel oil sampling and analysis is performed in accordance with approved procedures for new fuel oil and stored fuel oil. Fuel oil tanks are periodically drained of accumulated water and sediment, cleaned, and internally inspected. These activities effectively manage the effects of aging by maintaining potentially harmful contaminants at low concentrations.

The Fuel Oil Chemistry program also manages the loss of coating integrity in a fuel oil environment. Fuel oil tank internal coatings are visually inspected to ensure that loss of coating integrity is detected prior to ~~(1) loss of component intended function, including loss of function due to accelerated degradation caused by localized coating failures, and (2) degradation of downstream component performance due to flow blockage.~~ Baseline inspections will occur in the 10-year period prior to the period of extended operation and will include accessible internal surfaces of the fuel oil tanks. ~~Individuals performing the inspections will be qualified to ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II, or, VT-3 to a minimum of Level II including documented orientation in performing coating surveillance. In the event the initial inspection is not performed by an ANSI N45.2.6 inspector and the coating condition is considered suspect or requires coating repair then a qualified N45.2.6 inspector will perform a detailed inspection and oversee/inspect coatings recoats, touch-ups, or repair activities.~~ **The inspections will be performed by inspectors qualified to international standards endorsed in RG 1.54, including, ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II.** The as-found condition of the coating is documented in inspection reports or in completion remarks in the inspection work order. The results of previous inspections are used to determine changes in the condition of the coating over time. Trending of coating degradation is utilized to establish appropriate inspection frequencies. Inspections are performed for signs of coating failures and precursors to coating failures including peeling, delamination, blistering, cracking, flaking, chipping, rusting, and mechanical damage. When acceptance criteria are not met, visual inspection is supplemented by additional testing such as DFT (Dry Film Thickness), adhesion, continuity, or other inspection technique as determined by the qualified inspector to accurately assess coating condition. **Adhesion testing will be performed using international standards endorsed in RG 1.54.** Evaluations are performed for inspection results that do not

satisfy established acceptance criteria and the conditions are entered into the LGS 10 CFR 50 Appendix B corrective action program. The corrective action program ensures that conditions adverse to quality are promptly corrected. Corrective actions may include coating repair **or replacement** prior to the component being returned to service.

As a result of the review of Exelon letter dated 3/12/2014, the External Surfaces Monitoring of Mechanical Components aging management program A.2.1.25 and B.2.1.25 are revised as shown below:

A.2.1.25 External Surfaces Monitoring of Mechanical Components

The External Surfaces Monitoring of Mechanical Components aging management program is a new condition monitoring program that directs visual inspections of external surfaces of components be performed during system inspections and walkdowns. The program consists of periodic visual inspection of metallic and elastomeric components such as piping, piping components, ducting, and other components within the scope of license renewal. The program manages aging effects of metallic and elastomeric materials through visual inspection of external surfaces for evidence of loss of material and cracking. Visual inspections are augmented by physical manipulation as necessary to detect hardening and loss of strength of elastomers.

Inspections are performed at a frequency not to exceed one refueling cycle. This frequency accommodates inspections of components that may be in locations that are normally only accessible during outages. Surfaces that are not readily visible during plant operations and refueling outages are inspected when they are made accessible and at such intervals that would ensure the components' intended functions are maintained.

A sample of outdoor component surfaces that are insulated and a sample of indoor insulated components exposed to condensation (due to the in-scope component being operated below the dew point), are periodically inspected, under the insulation, every 10 years during the period of extended operation. Inspections subsequent to the initial inspection will consist of examination of the exterior surface of the insulation for indications of damage to the jacketing or protective outer layer of the insulation if the initial inspection verifies no loss of material beyond that which could have been present during initial construction **and no evidence of cracking**. If the external visual inspections of the insulation reveal damage to the exterior surface of the insulation or if there is evidence of water intrusion through the insulation, then periodic inspections under insulation to detect corrosion under insulation will continue.

The external surfaces of components that are buried are inspected via the Buried and Underground Piping and Tanks (A.2.1.29) program. The external surface of the backup fire water storage tank is inspected via the Aboveground Metallic Tanks (A.2.1.19) program.

This new aging management program will be implemented prior to the period of extended operation.

B.2.1.25 External Surfaces Monitoring of Mechanical Components

Program Description

The External Surfaces Monitoring aging management program is a new program that directs visual inspections of external surfaces of components be performed during system inspections and walkdowns. The program consists of periodic visual inspection of metallic and elastomeric components such as piping, piping components, ducting, and other components within the scope of license renewal. The program manages aging effects through visual inspection of external surfaces for evidence of loss of material and cracking in air-indoor, air-outdoor, and air/gas wetted environments. Visual inspections are augmented by physical manipulation as necessary for evidence of hardening and loss of strength.

The External Surfaces Monitoring of Mechanical Components program includes visual inspection of the metallic jacketing on thermal insulation to ensure that the jacketing is performing its function to protect the insulation from damage, such as in-leakage of moisture, that could reduce the thermal resistance of the insulation.

The program includes periodic representative inspection of outdoor insulated components except tanks; and indoor insulated components and tanks where the process fluid temperature is below the dew point. The inspections require removal of insulation to detect loss of material due to corrosion under the insulation. These inspections will be conducted during each 10-year period of the period of extended operation. The representative sample includes 20 percent of the piping length or 20 percent of the surface area for components other than piping for each material type. Alternatively, 25 one-foot axial length sections of components may be inspected for each material type. Inspections are conducted for each external environment where condensation or moisture on the surfaces of the component could occur routinely or seasonally.

For indoor tanks, the representative inspection includes 20 percent of the surface area or 25 one-square-foot sections. The inspection areas will be distributed to include tank domes, sides, near bottoms, at points where structural supports or instrument nozzles penetrate the insulation and where water is most likely to collect.

If the initial representative inspection verifies no loss of material beyond that which could have been present during initial construction **and no evidence of cracking**, then subsequent inspections will consist of inspection of the external surface of the insulation for indications of damage or evidence of water intrusion through the insulation to the component surface. If insulation damage or evidence of water intrusion through the insulation is identified, then periodic inspection of the component surface under the insulation will continue.

The program does not require removal of tightly-adhering insulation that is impermeable to moisture unless there is evidence of damage to the moisture barrier. Instead, the program includes visual inspection of the entire accessible population of piping and components during each 10-year period of the period of extended operation.

Materials of construction inspected under this program include aluminum, carbon steel, copper alloy, ductile cast iron, elastomers, gray cast iron, and stainless steel. Examples of components this program inspects are piping and piping components, ducting, heat exchangers, tanks, pumps, expansion joints, and hoses. The inspection parameters for metallic components include material condition, which consists of evidence of rust, corrosion, overheating, blistering, cracking, and discoloration; evidence of insulation damage or wetting; degradation, blistering, and peeling of protective coatings; unusual leakage from piping, ducting, or component bolted joints. Coating degradation is used as an indicator of possible underlying degradation of the component. Inspection parameters for elastomeric components include hardening, discoloration, cracking, dimensional changes, and thermal exposure.

The External Surfaces Monitoring of Mechanical Components program is a visual condition monitoring program that does not include preventive or mitigating actions.

Inspections, with the exception of inspections performed to detect corrosion under insulation, are performed at a frequency not to exceed one refueling cycle. This frequency accommodates inspections of components that may be in locations that are normally only accessible during outages. Surfaces that are not readily visible during plant operations and refueling outages are inspected when they are made accessible and at such intervals that would ensure the components' intended functions are maintained. Inspections performed to detect corrosion under insulation will be conducted during each 10-year period of the period of extended operation.

Any visible evidence of degradation will be evaluated for acceptability of continued service. Acceptance criteria will be based upon component, material, and environment combinations. Deficiencies will be documented and evaluated under the Corrective Action Program.

The external surfaces of components that are buried are inspected via the Buried and Underground Piping and Tanks (B.2.1.29) program. The external surface of the backup fire water storage tank is inspected via the Aboveground Metallic Tanks (B.2.1.19) program. This program does not provide for managing aging of internal surfaces.

As a result of the review of RAI 3.0.3.4-1, Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components aging management program A.2.1.26 is revised as shown below:

A.2.1.26 Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components aging management program is a new condition monitoring program that directs visual inspections of internal surfaces of components be performed when they are made accessible during maintenance activities. The program consists of visual inspections of metallic and elastomeric components such as piping, piping elements and piping components, ducting components, tanks, heat exchangers, elastomers and other components within the scope of license renewal. This program will manage the aging effects of loss of material, loss of fracture toughness, reduction of heat transfer, and cracking for metallic components, and loss of material and hardening and loss of strength for elastomers. The program includes provisions for visual inspections of the internal surfaces of components not managed under other aging management programs, augmented by physical manipulation of flexible elastomers where appropriate.

This opportunistic approach is supplemented to ensure a representative sample of components within the scope of this program are inspected. At a minimum, in each 10-year period during the period of extended operation, a representative sample of 20 percent of the population (defined as components having the same combination of material, environment, and aging effect) or a maximum of 25 components per population is inspected. Where practical, the inspections focus on the bounding or lead components most susceptible to aging because of time in service, and severity of operating conditions. Opportunistic inspections continue in each 10-year period despite meeting the sampling minimum requirement. ***For the waste water environment, a maximum of 25 components per population will be inspected. To provide reasonable assurance of the presence of sufficient coating, 10 of the 25 internal inspections will be of the normal waste, oily waste, sanitary waste and storm drain galvanized piping, and 15 of the internal inspections will be of the radioactive floor and equipment drain carbon steel piping.***

As a result of the review of RAI 3.0.3.4-1, Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components aging management program B.2.1.26 is revised as shown below:

B.2.1.26 Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components

Program Description

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components aging management program is a new condition monitoring program that manages the aging of the internal surfaces of metallic and polymeric piping, piping elements and piping components, ducting components, tanks, heat exchangers, elastomers, and other components. This program will manage the aging effects of loss of material, loss of fracture toughness, reduction of heat transfer, and cracking for metallic components, and loss of material and hardening and loss of strength for elastomers, in air/gas wetted, closed cycle cooling water, diesel exhaust, fuel oil, lube oil, raw water, treated water, and waste water environments. The program includes provisions for visual inspections of the internal surfaces of components not managed under other aging management programs, augmented by physical manipulation of flexible elastomers where appropriate. Inspections will be performed when the internal surfaces are accessible during the performance of periodic surveillances, during maintenance activities, and during scheduled outages.

This opportunistic approach is supplemented to ensure a representative sample of components within the scope of this program are inspected. At a minimum, in each 10-year period during the period of extended operation, a representative sample of 20 percent of the population (defined as components having the same combination of material, environment, and aging effect) or a maximum of 25 components per population is inspected. Where practical, the inspections focus on the bounding or lead components most susceptible to aging because of time in service, and severity of operating conditions. Opportunistic inspections continue in each 10-year period despite meeting the sampling minimum requirement. ***For the waste water environment, a maximum of 25 components per population will be inspected. To provide reasonable assurance of the presence of sufficient coating, 10 of the 25 internal inspections will be of the normal waste, oily waste, sanitary waste and storm drain galvanized piping, and 15 of the internal inspections will be of the radioactive floor and equipment drain carbon steel piping.***

An inspection conducted of a component in a more severe environment may be credited as an inspection for a less severe environment where the material and aging effects are the same (e.g., a condensation environment is more severe than an air-indoor uncontrolled environment because the moisture in the former environment is more likely to result in loss of material than would be expected from the normally dry surfaces associated with the latter environment). Alternatively, similar environments (e.g., air-indoor uncontrolled and air/gas - dry environments) can be combined into a larger population provided that the inspections occur on components located in the more severe environment.

Identified deficiencies due to age related degradation are documented and evaluated under the Corrective Action Program. Acceptance criteria are established in the maintenance and surveillance procedures or are established during engineering evaluation of the degraded condition. If the inspection results are not acceptable, the condition is evaluated to determine whether the component intended function is affected, and a corrective action is implemented.

As a result of the response to RAI 3.0.3.4-1 provided in Enclosure A of this letter, LRA Section A.2.1.27, Lubricating Oil Analysis is revised as follows:

A.2.1.27 Lubricating Oil Analysis

The Lubricating Oil Analysis aging management program is an existing program that provides oil condition monitoring activities to manage the loss of material and the reduction of heat transfer in piping, piping components, piping elements, heat exchangers, and tanks within the scope of license renewal exposed to a lubricating oil environment. Sampling, analysis, and condition monitoring activities identify specific wear products and contamination and determine the physical properties of lubricating oil within operating machinery. These activities are used to verify that the wear product and contamination levels and the physical properties of lubricating oil are maintained within acceptable limits to ensure that intended functions are maintained.

The Lubricating Oil Analysis program also manages the loss of coating integrity in a lube oil environment. The RCIC turbine bearing pedestals and HPCI turbine bearing pedestals and oil reservoir internal coatings are visually inspected to ensure that loss of coating integrity is detected prior to ~~(1) loss of component intended function, including loss of function due to accelerated degradation caused by localized coating failures, and (2) degradation of downstream component performance due to flow blockage.~~ Individuals performing the inspections will be qualified to ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II, or, VT-3 to a minimum of Level II including documented orientation in performing coating surveillance. ~~In the event the initial inspection is not performed by an ANSI N45.2.6 inspector and the coating condition is considered suspect or requires coating repair then a qualified N45.2.6 inspector will perform a detailed inspection and oversee/inspect coatings recoats, touch-ups, or repair activities.~~ ***The inspections will be performed by inspectors qualified to international standards endorsed in RG 1.54, including, ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II.*** Inspections are performed for signs of coating failures and precursors to coating failures including peeling, delamination, blistering, cracking, flaking, chipping, rusting, and mechanical damage. When acceptance criteria are not met, visual inspection is supplemented by additional testing such as DFT (Dry Film Thickness), adhesion, continuity, or other inspection technique as determined by the qualified inspector to accurately assess coating condition. ***Adhesion testing will be performed using international standards endorsed in RG 1.54.*** Evaluations are performed for inspection results that do not satisfy established acceptance criteria and the conditions are entered into the LGS 10 CFR 50 Appendix B corrective action program. The corrective action program ensures that conditions adverse to quality are promptly corrected. ~~Corrective actions may include coating repair prior to the component being returned to service.~~

As a result of the response to RAI 3.0.3.4-1 provided in Enclosure A of this letter, the Program Description section of LRA Section B.2.1.27, Lube Oil Analysis is revised as follows:

B.2.1.27 Lube Oil Analysis

Program Description

The Lubricating Oil Analysis aging management program is an existing program that provides oil condition monitoring activities to manage loss of material and reduction of heat transfer in piping, piping components, piping elements, heat exchangers, and tanks within the scope of license renewal exposed to a lubricating oil environment. Sampling, analysis, and condition monitoring activities identify specific wear products and contamination and determine the physical properties of lubricating oil within operating machinery. These activities are used to verify that the wear product and contamination levels and the physical properties of the lubricating oil are maintained within acceptable limits to ensure that intended functions are maintained.

The program directs the condition monitoring activities (sampling, analyses, and trending), thereby preserving an environment that is not conducive to loss of material or reduction of heat transfer. The lubricating oil testing (sampling and analysis) and condition monitoring activities identify detrimental contaminants such as water, sediments, specific wear elements, and elements from an outside source. The contaminant levels (e.g., water and particulates) are trended in the program's database, and recommendations are made when adverse trends are observed, which could include in-leakage and corrosion product buildup.

The Lubricating Oil Analysis program is a condition monitoring program, the monitoring methods are effective in detecting the applicable aging effects and the frequency of monitoring is adequate to prevent significant degradation.

The Lube Oil Analysis program also manages the loss of coating integrity in a lube oil environment. The RCIC turbine bearing pedestals and HPCI turbine bearing pedestals and oil reservoir internal coatings are visually inspected to ensure that loss of coating integrity is detected ~~prior to (1) loss of component intended function, including loss of function due to accelerated degradation caused by localized coating failures, and (2) degradation of downstream component performance due to flow blockage.~~ Baseline inspections will occur in the 10-year period prior to the period of extended operation and will include accessible internal surfaces of the bearing pedestals and reservoir. ~~Individuals performing the inspections will be qualified to ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II, or, VT-3 to a minimum of Level II including documented orientation in performing coating surveillance. In the event the initial inspection is not performed by an ANSI N45.2.6 inspector and the coating condition is considered suspect or requires coating repair then a qualified N45.2.6 inspector will perform a detailed inspection and oversee/inspect coatings recoats, touch-ups, or repair activities.~~ **The inspections will be performed by inspectors qualified to international standards endorsed in RG 1.54, including, ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II.** The as-found condition of the coating is documented in inspection reports or in completion remarks in the inspection work order. The results of previous inspections are used to determine changes in the

condition of the coating over time. Trending of coating degradation is utilized to establish appropriate inspection frequencies. Inspections are performed for signs of coating failures and precursors to coating failures including peeling, delamination, blistering, cracking, flaking, chipping, rusting, and mechanical damage. When acceptance criteria are not met, visual inspection is supplemented by additional testing such as DFT (Dry Film Thickness), adhesion, continuity, or other inspection technique as determined by the qualified inspector to accurately assess coating condition.

Adhesion testing will be performed using international standards endorsed in RG 1.54. Evaluations are performed for inspection results that do not satisfy established acceptance criteria and the conditions are entered into the LGS 10 CFR 50 Appendix B corrective action program. The corrective action program ensures that conditions adverse to quality are promptly corrected. ~~Corrective actions may include coating repair prior to the component being returned to service.~~

Enclosure D

LGS License Renewal Commitment List Changes

This Enclosure includes an update to the LGS LRA Appendix A, Section A.5 License Renewal Commitment List, as a result of the Exelon response to RAIs:

RAI 3.0.3.3.1-1

RAI 3.0.3.3.3-1

RAI 3.0.3.3.3-2

RAI 3.0.3.4-1

- Note: For clarity, portions of the original LRA License Renewal Commitment List text are repeated in this Enclosure. Changes are highlighted with ***bold italics*** for inserted text and ~~strikethroughs~~ for deleted text.

As a result of the response to RAIs 3.0.3.3.1-1, 3.0.3.3.3-2 and 3.0.3.4-1 provided in Enclosure A of this letter, Table A.5, Commitments 12, 18, 19, 20, 26 and 27 are revised as follows:

A.5 License Renewal Commitment List

NO.	PROGRAM OR TOPIC	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE
12	Open-Cycle Cooling Water System	<p>Open-Cycle Cooling Water System is an existing program that will be enhanced to:</p> <ol style="list-style-type: none"> 1. Perform internal inspection of buried Safety Related Service Water Piping when it is accessible during maintenance and repair activities. 2. Perform periodic inspections for loss of material in the Nonsafety-Related Service Water System at a minimum of five locations on each unit once every refueling cycle. 3. Replace the supply and return piping for the Core Spray pump compartment unit coolers. 4. Replace degraded RHRSW piping in the pipe tunnel. 5. Perform periodic inspections for loss of material in the Safety Related Service Water System at a minimum of ten locations every two years. <p>The Open-Cycle Cooling Water System aging management program also manages the loss of coating integrity in the service water side of the Main Control Room Chiller Condensers and Reactor Enclosure Cooling Water Heat Exchangers, and, in circulating water system piping.</p>	<p>Program to be enhanced prior to the period of extended operation.</p> <p>Inspection schedule identified in commitment.</p>	<p>Section A.2.1.12</p> <p>LGS Letter dated 2/15/12 RAI B.2.1.12-1 RAI B.2.1.12-2</p> <p>LGS letter dated 6/22/12 RAI B.2.1.12-3</p> <p>LGS Letter dated 3/14/14 RAI 3.0.3-1</p> <p>LGS letter dated 05/21/14 RAI 3.0.3.4-1</p>

NO.	PROGRAM OR TOPIC	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE
		<ul style="list-style-type: none"> • As described below, baseline inspections will occur in the 10-year period prior to the period of extended operation. <i>The maximum interval of subsequent coating inspections will comply with Table 4a of GALL Report AMP XI.M42 in draft LR-ISG-2013-01 dated January 6, 2014 (ADAMS Accession No. ML13262A442).</i> The frequency of subsequent inspections will be established based on the baseline inspections. • The inspection of the Main Control Room Chiller Condensers will be performed by inspectors qualified to ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II, or, VT-3 to a minimum of Level II including documented orientation in performing coating surveillance. In the event the initial inspection is not performed by an ANSI N45.2.6 inspector and the coating condition is considered suspect or requires coating repair then a qualified N45.2.6 inspector will perform a detailed inspection and oversee/inspect coatings recoats, touch-ups, or repair activities. • The inspection of the Reactor Enclosure Cooling Water Heat Exchangers will be performed by inspectors <i>with a demonstrated working knowledge of EPRI Report 1019157, "Guideline on Nuclear Safety-Related Coatings."</i> qualified through plant specific programs. • The inspection of 73 one-foot axial length circumferential segments of coated circulating water system piping will be performed by inspectors qualified to ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II, or, VT-3 to a minimum of Level II including documented orientation in performing coating surveillance. In the event the initial inspection is not performed by an ANSI N45.2.6 inspector and the coating condition is considered suspect or requires coating repair then a qualified N45.2.6 inspector will perform a 		

NO.	PROGRAM OR TOPIC	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE
		<p>detailed inspection and oversee/inspect coatings-recoats; touch-ups, or repair activities.</p> <ul style="list-style-type: none"> • The acceptance criteria for coating degradation and the requirements for physical inspections when degradation is identified will be in accordance with Element 6 of GALL Report AMP XI.M42 in draft LR-ISG-2013-01 dated January 6, 2014. 		
18	Fire Water System	<p>Fire Water System is an existing program that will be enhanced to:</p> <ol style="list-style-type: none"> 1. Replace sprinkler heads or perform 50-year sprinkler head testing using the guidance of NFPA 25 "Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems" (2011 Edition), Section 5.3.1.1.1. This testing will be performed prior to the 50-year in-service date and every 10 years thereafter. 2. Inspect selected portions of the water based fire protection system piping located aboveground and exposed to the fire water internal environment by non-intrusive volumetric examinations. These inspections shall be performed prior to the period of extended operation and will be performed every 10 years thereafter. 3. Inspect and clean line strainers for deluge systems after each actuation. Strainers for deluge systems subject to full flow testing will be inspected and cleaned on a frequency consistent with the deluge test frequency. 4. Inspect and clean the foam system water supply strainer after each system actuation and no less than once per refueling 	<p>Program to be enhanced prior to the period of extended operation.</p> <p>Inspection schedule identified in commitment.</p>	<p>Section A.2.1.18</p> <p>LR-ISG-2012-02 review 03/11/2014</p> <p>LGS Letter dated 3/14/14 RAI 3.0.3-1</p> <p>LGS Letter dated 5/21/14 RAI 3.0.3.3.1-1 RAI 3.0.3.4-1</p>

NO.	PROGRAM OR TOPIC	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE
		<p>interval.</p> <ol style="list-style-type: none"> 5. Perform external visual inspection of deluge piping and nozzles for the HVAC charcoal filters for signs of leakage, corrosion, physical damage, and correct orientation once per refueling interval. 6. Perform flow tests for the hydraulically most remote hose stations once every five years, scheduling the testing so that some of the tests are performed in each year of the five year interval. 7. Perform a main drain test annually for the fire water piping in each of the following locations: Unit 1 Reactor Enclosure, Unit 2 Reactor Enclosure, Unit 1 Turbine Enclosure, Unit 2 Turbine Enclosure, Control Enclosure, and Radwaste Enclosure. Flow blockage or abnormal discharge identified during flow testing or any change in pressure during the test greater than ten percent at a specific location is entered into the corrective action program for evaluation. 8. Perform charcoal filter deluge valve exercise testing and air flow testing at least once per refueling interval and perform air flow testing for the deluge systems for the hydrogen seal oil units and lube oil reservoirs every two years. 9. Perform the following for Fire Water System sprinkler and deluge systems: <ul style="list-style-type: none"> • Perform visual internal inspections, consistent with NFPA 25, for corrosion and obstructions to flow on at 		

NO.	PROGRAM OR TOPIC	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE
		<p>least five wet pipe sprinkler systems every five years.</p> <ul style="list-style-type: none"> • Collect and evaluate solids discharged from wet pipe sprinkler system flow testing. Flow testing through the inspector's test valve will be performed on an interval no greater than 18 months for each wet pipe system. • Perform visual internal inspections for corrosion and obstructions to flow for dry pipe preaction sprinkler systems of surfaces made accessible when preaction and water deluge valves are serviced on an interval no greater than a refueling interval. • Perform visual internal inspections for corrosion and obstructions to flow for deluge systems of surfaces made accessible when deluge valves are serviced on at least ten deluge systems on an interval no greater than three years. To provide reasonable assurance of the presence of sufficient coating, two of the ten inspections will be associated with the galvanized transformer deluge system piping. • Perform a visual internal inspection for corrosion and obstructions to flow for any wet pipe, dry pipe preaction, or deluge system after any system actuation prior to return to service. • Perform an obstruction evaluation for conditions that indicate degraded flow. • Perform followup volumetric inspections for pipe wall thickness if internal visual inspections detect surface irregularities that could be indicative of wall loss below nominal wall thickness. • Sprinkler and deluge systems that are normally dry but may be wetted as the result of testing or 		

NO.	PROGRAM OR TOPIC	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE
		<p>actuators will have augmented tests and inspections on piping segments that cannot be drained or piping segments that allow water to collect. These augmented inspections will be performed in each five year interval beginning five years prior to the period of extended operation and consist of either a flow test or flush sufficient to detect potential flow blockage or a visual inspection of 100 percent of the internal surface of piping segments that cannot be drained or piping segments that allow water to collect. In addition, in each five year interval of the period of extended operation, 20 percent of the length of piping segments that cannot be drained or piping segments that allow water to collect is subject to volumetric wall thickness inspections.</p> <p>10. Perform wall thickness measurements using UT or other suitable techniques at five selected locations every year to identify loss of material in the carbon steel backup fire water piping. When these examinations identify pipe degradation, additional examinations will be performed in accordance with the following criteria:</p> <ul style="list-style-type: none"> • At least four additional locations will be examined if wall loss is greater than 50 percent of nominal wall thickness, • Two additional locations will be examined if wall loss is 30 percent to 50 percent of nominal wall thickness and the calculated remaining life is less than two years, • No additional examinations will be performed if wall loss is less than 30 percent of nominal wall 		

NO.	PROGRAM OR TOPIC	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE
		<p><i>thickness.</i></p> <p>These inspections will be performed until the piping degradation no longer meets the criteria for recurring internal corrosion.</p> <p>The Fire Water System aging management program also manages the loss of coating integrity in the buried cement lined fire main header.</p> <ul style="list-style-type: none"> • System flow testing activities measure system hydraulic resistance as a means of evaluating the internal piping condition. • Opportunistic internal inspections evaluate the condition of the cement lined fire main header. • Within 10 years prior to the PEO, five internal visual inspections of the cement lining in the fire main header will be performed. 		

NO.	PROGRAM OR TOPIC	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE
19	Aboveground Metallic Tanks	<p>Aboveground Metallic Tanks is an existing program that will be enhanced to:</p> <ol style="list-style-type: none"> 1. Include UT measurements of the bottom of the Backup Water Storage Tank. Tank bottom UT inspections will be performed - within five years prior to entering the period of extended operation and every five years thereafter. If no tank bottom plate material loss is identified after the first two inspections, the remaining inspections will be performed whenever the tank is drained during the period of extended operation. 2. Provide visual inspections of the Backup Water Storage Tank external surfaces and include, on a sampling basis, removal of insulation to permit inspection of the tank surface. An inspection performed prior to entering the period of extended operation will include a minimum of 25 locations to demonstrate that the tank painted surface is not degraded under the insulation. Subsequent tank external surface visual inspection will be conducted on a two year frequency and include a minimum of four locations. Annual visual inspections will be performed of the tank insulation surface for degradation. Rips, tears, and gaps in the insulation skin will be repaired. Evidence of water intrusion beneath the insulation will be evaluated in accordance with the LGS corrective action program. 3. Perform visual inspections of the Backup Water Storage Tank wetted and nonwetted internal surfaces. Tank internal 	<p>Program to be enhanced prior to the period of extended operation.</p> <p>Inspection schedule identified in commitment.</p>	<p>Section A.2.1.19</p> <p>LGS Letter dated 2/15/12 RAI B.2.1.19-1 RAI B.2.1.19-2</p> <p>LR-ISG-2012-02 Review dated 03/11/2014</p> <p>LGS Letter dated 5/21/14 RAI 3.0.3.3.3-1 RAI 3.0.3.3.3-2</p>

NO.	PROGRAM OR TOPIC	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE
20	Fuel Oil Chemistry	<p>inspections will be performed within five years prior to entering the period of extended operation and every five years thereafter. The tank bottom will be inspected for evidence of voids beneath the floor in accordance with NFPA 25, Section 9.2.6.5. Where pitting and general corrosion to below the nominal wall thickness occurs or any coating failure occurs in which bare metal is exposed, additional inspections and tests shall be performed in accordance with NFPA 25, Section 9.2.7. These tests include adhesion testing of the coating in the vicinity of the coating failure, dry film thickness measurements, spot wet sponge testing, and nondestructive examination to determine remaining wall thickness where bare metal has been exposed. Tank bottom weld seams in the area of degraded coating will be leak tested in accordance with NFPA 25, Section 9.2.7, by vacuum-box testing or magnetic particle (MT) examination. In addition, adhesion testing shall be performed in the vicinity of blisters even though bare metal may not be exposed.</p>		
	Fuel Oil Chemistry	<p>Fuel Oil Chemistry is an existing program that will be enhanced to:</p> <ol style="list-style-type: none"> 1. Periodically drain water from the Fire Pump Engine Diesel Oil Day Tank and the Fire Pump Diesel Engine Fuel Tank. 2. Perform internal inspections of the Fire Pump Engine Diesel Oil Day Tank, the Fire Pump Diesel Engine Fuel Tank, and the Diesel Generator Day Tanks, at least once during the 10-year period prior to the period of extended operation and at least once every 10 years during the period of extended operation. Each diesel fuel tank will be drained, cleaned and 	<p>Program to be enhanced prior to the period of extended operation. Inspection schedule identified in commitment.</p>	<p>Section A.2.1.20 LGS Letter dated 3/13/14 RAI 3.0.3-1 LGS letter dated 05/21/14 RAI 3.0.3.4-1</p>

NO.	PROGRAM OR TOPIC	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE
		<p>the internal surfaces either volumetrically or visually inspected. If evidence of degradation is observed during visual inspections, the diesel fuel tanks will require follow-up volumetric inspection.</p> <ol style="list-style-type: none"> 3. Perform periodic analysis for total particulate concentration and microbiological organisms for the Fire Pump Engine Diesel Oil Day Tank and the Fire Pump Diesel Engine Fuel Tank. 4. Perform periodic analysis for water and sediment and microbiological organisms for the Diesel Generator Diesel Oil Storage Tanks. 5. Perform periodic analysis for water and sediment content, total particulate concentration, and the levels of microbiological organisms for the Diesel Generator Day Tanks. 6. Perform analysis of new fuel oil for water and sediment content, total particulate concentration and the levels of microbiological organisms for the Fire Pump Engine Diesel Oil Day Tank and the Fire Pump Diesel Engine Fuel Tank. 7. Perform analysis of new fuel oil for total particulate concentration and the levels of microbiological organisms for the Diesel Generator Diesel Oil Storage Tanks. <p>The Fuel Oil Chemistry aging management program also manages the loss of coating integrity in the eight main fuel oil</p>		

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26	Inspection of Internal Surfaces in Miscellaneous	<p>storage tanks.</p> <ul style="list-style-type: none"> • <i>Each fuel oil tank will be internally inspected at least once during the 10-year period prior to the period of extended operation and at least once every 10 years during the period of extended operation.</i> As described below, baseline inspections will occur in the 10-year period prior to the period of extended operation. The frequency of subsequent inspections will be established based on the baseline inspections. • The inspection of the eight main fuel oil storage tanks will be performed by inspectors qualified to ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II, or, VI-3 to a minimum of Level II including documented orientation in performing coating surveillance. In the event the initial inspection is not performed by an ANSI N45.2.6 inspector and the coating condition is considered suspect or requires coating repair then a qualified N45.2.6 inspector will perform a detailed inspection and oversee/inspect coatings recoats, touch-ups, or repair activities. • <i>The acceptance criteria for coating degradation and the requirements for physical inspections when degradation is identified will be in accordance with Element 6 of GALL Report AMP XI.M42 in draft LR-ISG-2013-01 dated January 6, 2014.</i> 	Program to be implemented prior to the period of extended operation.	Section A.2.1.26

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	Piping and Ducting Components	<p>inspections are augmented by physical manipulation as necessary to detect hardening and loss of strength of elastomers.</p> <p>This opportunistic approach is supplemented to ensure a representative sample of components within the scope of this program are inspected. At a minimum, in each 10-year period during the period of extended operation, a representative sample of 20 percent of the population (defined as components having the same combination of material, environment, and aging effect) or a maximum of 25 components per population is inspected. Where practical, the inspections focus on the bounding or lead components most susceptible to aging because of time in service, and severity of operating conditions. Opportunistic inspections continue in each 10-year period despite meeting the sampling minimum requirement. For the waste water environment, a maximum of 25 components per population will be inspected. To provide reasonable assurance of the presence of sufficient coating, 10 of the 25 internal inspections will be of the normal waste, oily waste, sanitary waste and storm drain galvanized piping, and 15 of the internal inspections will be of the radioactive floor and equipment drain carbon steel piping.</p>		<p>LR-ISG-2012-02 review 03/11/2014</p> <p>LGS letter dated 05/21/14 RAI 3.0.3.4-1</p>
27	Lubricating Oil Analysis	<p>Existing program is credited.</p> <p>The Lube Oil Analysis aging management program also manages the loss of coating integrity in the RCIC turbine bearing pedestals</p>	Ongoing	<p>Section A.2.1.27</p> <p>LGS Letter</p>

NO.	PROGRAM OR TOPIC	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE
		<p>and HPCI turbine bearing pedestals and oil reservoir.</p> <ul style="list-style-type: none"> • As described below, baseline inspections will occur in the 10-year period prior to the period of extended operation. <i>The maximum interval of subsequent coating inspections will comply with Table 4a of GALL Report AMP XI.M42 in draft LR-ISG-2013-01 dated January 6, 2014 (ADAMS Accession No. ML13262A442).</i> The frequency of subsequent inspections will be established based on the baseline inspections: • The inspection of the RCIC turbine bearing pedestals and HPCI turbine bearing pedestals and oil reservoir will be performed by inspectors qualified to ASTM D 4537-91 and ANSI N45.2.6-1978 to a minimum of level II, or, VI-3 to a minimum of Level II including documented orientation in performing coating surveillance. In the event the initial inspection is not performed by an ANSI N45.2.6 inspector and the coating condition is considered suspect or requires coating repair then a qualified N45.2.6 inspector will perform a detailed inspection and oversee/inspect coatings recoats; touch-ups, or repair activities. • <i>The acceptance criteria for coating degradation and the requirements for physical inspections when degradation is identified will be in accordance with Element 6 of GALL Report AMP XI.M42 in draft LR-ISG-2013-01 dated January 6, 2014.</i> 		<p>dated 3/13/14 RAI 3.0.3-1 LGS letter dated 05/21/14 RAI 3.0.3.4-1</p>