**From:** Gregory Cranston
**To:** Ashley, D.
**Date:** Fri, Sep 23, 2005 11:18 AM
**Subject:** Oyster Creek Question for AMP Audit

Attached are the latest list of questions for the Oyster Creek AMP audit.

**CC:** Hsu, Kaihwa; john.hufnagel@exeloncorp.com; Kuo, Pao-Tsin; Lofaro, Robert J; Morante@bnl.gov; Tran, Linh; Wang, Weidong; Zimmerman, Jacob

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**From:** Gregory Cranston

**Created By:** GVC@nrc.gov

**Recipients**
bnl.gov
lofaro CC (Robert J Lofaro)
morante CC (Morante@bnl.gov)

exeloncorp.com
john.hufnagel CC (john.hufnagel@exeloncorp

nrc.gov
OWGWPO01.HQGWDO01
DJA1 (D. Ashley)

nrc.gov
OWGWPO02.HQGWDO01
KRH2 CC (Kaihwa Hsu)

nrc.gov
TWGWPO02.HQGWDO01
LNT CC (Linh Tran)

nrc.gov
owf4_po.OWFN_DO
PTK CC (Pao-Tsin Kuo)

nrc.gov
owf5_po.OWFN_DO
JIZ CC (Jacob Zimmerman)

nrc.gov
twf5_po.TWFN_DO
WXW1 CC (Weidong Wang)

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# OYSTER CREEK PRE AMP AND AMR AUDIT AND REVIEW QUESTIONS
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| No. | QUESTION OR INFORMATION NEEDED | ORIGINATOR |
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| AMP-1 | To assist the staff in conducting this review in an efficient manner, the applicant is requested to compile and present the following detailed information:<br>(A) Past Activities –<br>(1) Identification of all locations (including the wetwell, if applicable) where wall thickness reduction was originally discovered.<br>(2) The nominal design thickness and the initial measured remaining wall thickness / % wall loss for each location.<br>(3) The results of the root-cause analysis for each location.<br>(4) The remedial action taken to arrest corrosion for each location.<br>(5) Inspections performed at that time to ensure that the full extent of wall loss had been identified.<br>(6) The technical basis for concluding that the degraded OC Mark I containment still meets its licensing basis, including any re-calculation of minimum required wall thickness for all regions of the drywell (and wetwell, if applicable).<br>(7) For each location, the chronology and quantitative results of all subsequent measurements of remaining wall thickness after remedial action was taken. Include an assessment of observed trends.<br>(8) The chronology and quantitative results of inspections performed to ensure that wall loss is not occurring at locations other than those originally identified.<br>(B) Current Activities (thru end of current license term) --<br>(9) The inspection and maintenance programs that are currently relied upon to ensure the structural integrity of the OC containment. Include a description of the specific activities performed (inspection locations, inspection methods, evaluation methods, acceptance criteria) and the inspection/maintenance schedule.<br>(C) Future Activities (20 year license renewal period) –<br>(10) The inspection and maintenance programs that will be relied upon during the 20 year license renewal period to ensure the structural integrity of the OC containment. Include a description of the specific activities performed (inspection locations, inspection methods, evaluation methods, acceptance criteria) and the inspection/maintenance schedule.<br>(11) The correlation between (10) above and specific Aging Management Programs (AMPs) that are credited in the OC License Renewal Application.<br>(12) A description of any enhancements to or relaxations of the current inspection and maintenance programs (9) that will be incorporated in the future inspection and maintenance programs (10). | Morante |
| AMP-2 | LRA AMP B.1.15 Boraflex Rack Management Program<br>In the Exception Section, OCGS stated that:<br>"Blackness test is not performed. The test is replaced with boron areal density measurements using the BADGER device, which gives a better indication of Boraflex effectiveness to perform its intended function."<br>Please provide a refererence showing why areal density measurement is equal to or better than Blackness tests. | Wang |

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| AMP-3 | LRA AMP B.1.26 Buried Piping Inspection<br>In the Exception Section, OCGS stated that:<br>"NUREG-1801, Section X1.M.34 Buried Piping and Tanks Inspection AMP only includes buried carbon steel piping, however Oyster Creek has other material in their buried piping program that will be managed as part of this AMP...."<br>Questing one: What other materials are included in this AMP.<br>Question two: This statement sounds like an enhancement. Please indicate why it is an exception. | Wang |
| AMP-4 | Masonry Walls<br>The program description for AMP B.1.30 in the OC LRA indicates that the scope of this program includes all masonry walls that perform an intended function in accordance with 10 CFR 54.4. The applicant is requested to provide the following information related to the scope of this program:<br>(1) Identify whether any additional masonry walls have been added to the scope of the current OC program as a result of the LR scoping and screening process, particularly in light of the requirement to consider regulated events in the LR assessment.<br>(2) If additional masonry walls have been added to the scope, explain how the requirements of I. E. Bulletin 80-11 have been applied to these walls, and describe any physical modifications that have/will be implemented to establish the evaluation bases.<br>(3) If additional masonry walls have been added to the scope, explain why this is not considered an enhancement to the current OC program. | Morante |
| AMP-5 | Masonry Walls<br>The applicant is requested to identify the document(s) that includes the evaluation of the OC program against the program elements of GALL XI.S5, and to make it available in both electronic and hard-copy formats for the on-site AMP audit. | Morante |
| AMP-6 | Coatings<br>From the description of AMP B.1.33 in the OC LRA, it is not completely clear whether Service Level 2 coatings in the sand bed region are the only coatings credited for corrosion protection of metal surfaces. The applicant is requested to clarify whether any Service Level 1 coatings inside the primary containment and any Service Level 2 coatings in areas other than the sand bed region are also credited for corrosion protection. | Morante |
| AMP-7 | Coatings<br>From the description of AMP B.1.33 in the OC LRA, it appears that this AMP is primarily credited for preventive maintenance of Service Level 1 coatings inside the primary containment, in order to minimize coating failures that could adversely affect the operation of post-accident fluid systems and thereby impair safe shutdown. While not committed to RG 1.54, OC is currently committed to a modified version of this RG, as described in its response to GL 98-04, and as detailed in Exelon QATR NO-AA-10. The applicant is requested to make these documents, and also the NRC letter closing out GL 98-04 for OC, available in hard-copy for the on-site AMP audit. | Morante |

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| AMP-8 | Coatings<br>The applicant is requested to identify the document(s) that includes the evaluation of the OC program against the program elements of GALL XI.S8, and to make it available in both electronic and hard-copy formats for the on-site AMP audit. | Morante |
| AMP-9 | Appendix J<br>The program description for AMP B.1.29 in the OC LRA refers to LLRT of containment isolation valves. The applicant is requested to confirm that LLRT of containment isolation valves is included in the scope of AMP B.1.29, and that this element of the program is credited for aging management of these valves during the extended period of operation. | Morante |
| AMP-10 | Appendix J<br>The applicant is requested to identify the document(s) that includes the evaluation of the OC program against the program elements of GALL XI.S4, and to make it available in both electronic and hard-copy formats for the on-site AMP audit. | Morante |
| AMP-11 | AMP B.1.1 ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD<br>(B.1.1-1) Please make available at the audit in both hardcopy and electronic format the document(s) that compare the ten elements in OCGS AMP B.1.1 to the ten elements in NUREG-1801 for AMP XI.M1. | Lofaro |
| AMP-12 | AMP B.1.1 ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD<br>(B.1.1-2) Please address each of the following questions regarding the current status of implementing procedures for this AMP:<br>(a) Please provide the status of the implementing procedures for each enhancement to the existing ASME Section XI ISI, Subsection IWB, IWC, and IWD program.<br>(b) Please provide the schedule for initiating each of the enhancements to the existing ASME Section XI ISI, Subsection IWB, IWC, and IWD program.<br>(c) Please provide a sample of an implementing procedure for one enhancement to the existing ASME Section XI ISI, Subsection IWB, IWC, and IWD program.<br>(d) Please provide the results of any enhanced inspections that have already been completed.<br>[NOTE: Considering the relatively short time period remaining before OCGS enters the license renewal period, the staff expects that considerable progress has already been made in developing and formally documenting the implementing procedures required for new AMPs, and for significant enhancements to existing AMPs.] | Lofaro |

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| AMP-13 | AMP B.1.1 ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD<br>(B.1.1-3) The program description for OCGS AMP B.1.1 lists five aging effects for which this AMP will be credited to manage aging. However, the OCGS LRA also credits AMP B.1.1 for managing aging of CASS components subject to loss of fracture toughness due to thermal aging embrittlement (see Table 3.1.1, item 47), which is not included in this list. Please clarify why this aging effect is not included in the AMP listing and identify any other aging effects for which this AMP is credited in the LRA that are not included in the AMP listing. | Lofaro |
| AMP-14 | AMP B.1.1 ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD<br>(B.1.1-4) The program description for OCGS AMP B.1.1 states that the program is implemented through procedures that require examinations consistent with ASME Section XI. Please describe, or make available at the audit the OCGS document(s) that describe the qualifications and training requirements for personnel that perform inspections and examinations under the ASME ISI program. | Lofaro |
| AMP-15 | AMP B.1.1 ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD<br>(B.1.1-5) The discussion of exceptions to NUREG-1801 for OCGS AMP B.1.1 states that the Oyster Creek isolation condensers are ISI Class 2 on the tube side and ISI Class 3 on the shell side; therefore, Class 1 ISI requirements do not apply. However, Table 3.21. in the OCGS FSAR identifies the isolation condenser as Class 1. Please clarify this apparent discrepancy. Also, please make available at the audit the OCGS plant-specific document(s) that provide the technical basis for the current isolation condenser ISI classification, as well as the NRC acceptance of this classification as part of the current licensing basis. | Lofaro |
| AMP-16 | AMP B.1.1 ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD<br>(B.1.1-6) The discussion of enhancements for OCGS AMP B.1.1 refers to enhancement activities, which are in addition to the requirements of ASME Section XI, Subsections IWB, IWC, and IWD. Please clarify if these enhancement activities will be included as part of OCGS AMP B.1.1, ASME Section XI ISI program, or if they will be included in a separate aging management program. | Lofaro |
| AMP-17 | AMP B.1.1 ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD<br>(B.1.1-7) The discussion of operating experience for OCGS AMP B.1.1 states that indications of age-related degradation have been successfully identified prior to the loss of the intended functions of the components. Please provide an evaluation, or make available at the audit the document(s) that evaluate past operating experience at OCGS with regard to the failure of components subject to inspection under the ASME Section XI ISI IWB, IWC, and IWD program. Specifically, please provide a comparison of the number of incidents in which age-related degradation was detected prior to the loss of the intended function(s) of the component to the number of incidents in which failures occurred due to age-related degradation without prior detection of the age-related degradation through ISI. | Lofaro |

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| AMP-18 | AMP B.1.1 ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD<br>(B.1.1-8) The discussion of operating experience for OCGS AMP B.1.1 states that periodic self-assessments of the ISI programs have been performed to identify the areas that need improvement to maintain program quality. Please make available at the audit the document(s) that provide the results of these self-assessments, including identification of the areas that were found to need improvement and the corrective actions taken. | Lofaro |
| AMP-19 | AMP B.1.16 Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems<br>(B.1.16-1) Please make available at the audit in both hardcopy and electronic format the document(s) that compare the ten elements in OCGS AMP B.1.16 to the ten elements in NUREG-1801 for AMP XI.M23. | Lofaro |
| AMP-20 | AMP B.1.16 Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems<br>(B.1.16-2) Considering the relatively short time period remaining before OCGS enters the license renewal period, the staff expects that considerable progress has already been made in developing and formally documenting the implernenting procedures required for new AMPs, and for significant enhancements to existing AMPs. In light of this, please address each of the following questions regarding the current status of implementing procedures for this AMP:<br>(a) Please provide the status of the implementing procedures for each enhancement to the existing Inspection of Overhead Handling Systems program.<br>(b) Please provide the schedule for initiating each of the enhancements to the existing Inspection of Overhead Handling Systems program.<br>(c) Please provide a sample of an implementing procedure for one enhancement to the existing Inspection of Overhead Handling Systems program.<br>(d) Please provide the results of any enhanced inspections that have already been completed. | Lofaro |
| AMP-21 | AMP B.1.16 Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems<br>(B.1.16-3) The operating experience discussion in OCGS AMP B.1.18 states that the plant operating and maintenance experience review identified no incidents of failure of passive cranes and hoists structural components due to age related degradation. Please make available at the audit the plant-specific document(s) that support this finding. | Lofaro |
| AMP-22 | AMP B.1.18 BWR Reactor Water Cleanup System<br>(B.1.18-1) Please make available at the audit in both hardcopy and electronic format the document(s) that compare the ten elements in OCGS AMP B.1.18 to the ten elements in NUREG-1801 for AMP XI.M25. | Lofaro |

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| AMP-23 | AMP B.1.18 BWR Reactor Water Cleanup System<br>(B.1.18-2) The program description for OCGS AMP B.1.18 states that this program describes the requirements for augmented ISI for SCC or IGSCC on stainless steel RWCU system piping welds outboard of the second containment isolation valves. Section 2.3.3.32 of the OCGS LRA states that the license renewal boundary includes the non safety-related portion of the RWCU system outboard of the primary containment isolation valves. Please confirm that OCGS AMP B.1.18 is credited for managing aging only for the non safety-related portion of the RWCU system outboard of the containment isolation valves. Also, please clarify which AMP will be used to manage aging for the safety-related portion of the RWCU system inboard of the containment isolation valves. | Lofaro |
| AMP-24 | AMP B.1.18 BWR Reactor Water Cleanup System<br>(B.1.18-3) The program description for OCGS AMP B.1.18 states that there was a complete lack of cracking found during any of the RWCU piping weld inspections under Generic Letter 88-01. Please make available at the audit the plant-specific documentation that supports this finding. | Lofaro |
| AMP-25 | AMP B.1.18 BWR Reactor Water Cleanup System<br>(B.1.18-4) The operating experience discussion for OCGS AMP B.1.18 states that mitigative actions have been implemented to reduce the susceptibility of the RWCU system to IGSCC, including hydrogen water chemistry and noble metals chemical addition. Please indicate when these mitigative actions were initiated at OCGS. | Lofaro |
| AMP-26 | AMP B.1.22 Fuel Oil Chemistry<br>(B.1.22-1) Please make available at the audit in both hardcopy and electronic format the document(s) that compare the ten elements in OCGS AMP B.1.22 to the ten elements in NUREG-1801 for AMP XI.M30. | Lofaro |
| AMP-27 | AMP B.1.22 Fuel Oil Chemistry<br>(B.1.22-2) Considering the relatively short time period remaining before OCGS enters the license renewal period, the staff expects that considerable progress has already been made in developing and formally documenting the implementing procedures required for new AMPs, and for significant enhancements to existing AMPs. In light of this, please address each of the following questions regarding the current status of implementing procedures for this AMP:<br>(a) Please provide the status of the implementing procedures for each enhancement to the existing Fuel Oil chemistry program.<br>(b) Please provide the schedule for initiating each of the enhancements to the existing Fuel Oil Chemistry program.<br>(c) Please provide a sample of an implementing procedure for one enhancement to the existing Fuel Oil Chemistry program.<br>(d) Please provide the results of any enhanced inspections that have already been completed. | Lofaro |

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| AMP-28 | AMP B.1.22 Fuel Oil Chemistry<br>(B.1.22-3) The program description for OCGS AMP B.1.22 states that fuel oil will be routinely sampled and analyzed for particulate and for the presence of water and sediment. Please provide, or make available at the audit the document(s) that provide the frequency of these activities, along with the technical basis used to establish the frequency. Also, please make available at the audit copies of ASTM Standard D 2276-00 Method A and ASTM Standard D 2709-96. | Lofaro |
| AMP-29 | AMP B.1.22 Fuel Oil Chemistry<br>(B.1.22-4) The program description for OCGS AMP B.1.22 states that fuel oil tanks are periodically drained of accumulated water and sediment, and will be periodically drained, cleaned, and internally inspected. Please provide, or make available at the audit the document(s) that provide the frequency of these activities, the technical basis used to establish the frequency, and the identification of each tank to which the activities apply. Also, please make available at the audit a copy of the latest OCGS implementing procedure used for draining, cleaning, and inspecting the EDG Fuel Storage tank, along with results from previous inspections of the tank. | Lofaro |
| AMP-30 | AMP B.1.22 Fuel Oil Chemistry<br>(B.1.22-5) The program description for OCGS AMP B.1.22 does not discuss the use of protective coatings on the fuel oil tanks. Please clarify whether protective coatings are used on any of the fuel oil tanks. | Lofaro |
| AMP-31 | AMP B.1.22 Fuel Oil Chemistry<br>(B.1.22-6) The first exception to NUREG-1801 in OCGS AMP B.1.22 states that the EDG Fuel Storage Tank is routinely sampled and analyzed. Please provide, or make available at the audit the document(s) that provide the frequency of these activities, along with the technical basis used to establish the frequency. | Lofaro |
| AMP-32 | AMP B.1.22 Fuel Oil Chemistry<br>(B.1.22-7) The first exception to NUREG-1801 in OCGS AMP B.1.22 states that the EDG Day Tanks experience a high turnover rate of fuel, and that stratification of the fuel is not likely to occur due to this high turnover rate. Please provide an explanation, or make available at the audit the document(s) that explain the turnover rate of the EDG Day Tanks, along with the technical basis for concluding that stratification of the fuel in these tanks will not occur. Also, please make available at the audit the P&IDs and elevation drawings showing the various EDG and main fuel oil tanks, and their interconnecting piping. | Lofaro |
| AMP-33 | AMP B.1.22 Fuel Oil Chemistry<br>(B.1.22-8) The second exception to NUREG-1801 in OCGS AMP B.1.22 states that sampling of the EDG Fuel Storage Tank is not directly comparable to ASTM D 4057-95. Please provide a comparison, or make available at the audit the document(s) that compares the OCGS sampling procedure to ASTM D 4057-95 and identifies areas where they are not comparable. Also, please make available at the audit a copy of the OCGS implementing procedure for sampling the EDG Fuel Storage Tank, along with a copy of ASTM D 4057-95. | Lofaro |

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| AMP-34 | AMP B.1.22 Fuel Oil Chemistry<br>(B.1.22-9) The Operating Experience discussion in OCGS AMP B.1.22 states that high concentrations of water and sediment have been found in the fuel oil tanks in the past. Also, corrective actions were taken and improved test methods were implemented as a result of these findings. Please make available at the audit the plant-specific documentation describing this past operating experience together with the OCGS evaluation of these findings. Also, please explain, or make available at the audit the document(s) that explain the corrective actions taken, as well as the improved test methods that were implemented. | Lofaro |
| AMP-35 | AMP B.1.24 One-Time Inspection<br>(B.1.24-1) Please make available at the audit in both hardcopy and electronic format the document(s) that compare the ten elements in OCGS AMP B.1.24 to the ten elements in NUREG-1801 for AMP XI.M32. | Lofaro |
| AMP-36 | AMP B.1.24 One-Time Inspection<br>(B.1.24-2) Considering the relatively short time period remaining before OCGS enters the license renewal period, the staff expects that considerable progress has already been made in developing and formally documenting the implementing procedures required for new AMPs, and for significant enhancements to existing AMPs. In light of this, please address each of the following questions regarding the current status of implementing procedures for this AMP:<br>(a) Please provide the status of the implementing procedure for each one-time inspection credited in the OCGS LRA.<br>(b) Please provide the schedule for performing each of the one-time inspections credited in the LRA.<br>(c) Please provide a sample of a one-time inspection implementing procedure.<br>(d) Please provide the results of any one-time inspections that have already been completed. | Lofaro |
| AMP-37 | AMP B.1.24 One-Time Inspection<br>(B.1.24-3) The program description for OCGS AMP B.1.24 lists seven intended uses of this program. However, the OCGS LRA includes the following intended uses for this AMP that are not included in this list:<br>• Verify the effectiveness of the Selective Leaching of Materials program, AMP B.1.25 (see Table 3.3.1, item 43)<br>• Verify the effectiveness of the 10 CFR Part 50, Appendix J program, AMP B.1.29 (see Section 3.3.2.2.7, item 3)<br>• Verify the effectiveness of the Generator Stator Water Chemistry Activities program, AMP B.2.3 (see Section 3.3.2.2.7, item 3 and 3.3.2.2.10, item 2)<br>Please clarify why the intended uses listed above are not listed in the program description for OCSG AMP B.1.24. Also, please identify any other intended uses that are not listed. | Lofaro |

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| AMP-38 | AMP B.1.24 One-Time Inspection<br><br>(B.1.24-4) The program description for OCGS AMP B.1.24 states that one intended use of this AMP is to confirm crack initiation and growth is not occurring in Class 1 piping less than four-inch nominal pipe size. The September 2005 version of GALL includes a new one-time inspection program that specifically addresses inspection of small-bore piping; XI.M35, "One-Time Inspection of ASME Code Class 1.Small Bore Piping." Please provide an evaluation, or have available at the audit the document(s) that evaluate the OCGS AMP B.1.24 against the GALL AMP XI.M35 to demonstrate that the OCGS AMP is consistent with the recommendations in GALL AMP XI.M35. | Lofaro |
| AMP-39 | AMP B.1.24 One-Time Inspection<br><br>(B.1.24-5) The program description for OCGS AMP B.1.24 states that the new program elements include (a) determination of the sample size based on an assessment of materials of fabrication, environment, plausible aging effects, and operating experience; (b) identification of the inspection locations in the system or component based on the aging effect; (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect for which the component is examined; and (d) evaluation of the need for follow-up examinations to monitor the progression of aging if age related degradation is found that could jeopardize an intended function before the end of the period of extended operation.<br>(a) Please provide a description, or make available at the audit the document(s) that describe the process to be used for performing the activities delineated in each of these elements, including sources of information to be used and the criteria upon which decisions will be made.<br>(b) With regard to identifying the inspection locations, please provide a description, or make available at the audit the document(s) that describe the process to be used in identifying the more susceptible materials and the potentially more aggressive environments for the various types of systems in which this AMP will be applied, including sources of information to be used and the decision making criteria.<br>(c) With regard to determination of the examination technique, please provide a description, or make available at the audit the document(s) that describe the process to be used in determining which type of examination will be used, including sources of information to be used and the decision-making criteria.<br>(d) Please describe the qualifications and training requirements to be implemented for personnel performing the one-time inspections. | Lofaro |
| AMP-40 | AMP B.1.24 One-Time Inspection<br><br>(B.1.24-6) The conclusion section for OCGS AMP B.1.24 states in the last sentence "...there would be no need to manage an aging related degradation for the period of extended operation." However, as noted in program description, one of the intended uses of this AMP is to verify the effectiveness of other AMPs that are being credited to manage specific aging effects. Please clarify the intent of the last sentence in the conclusion. | Lofaro |

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| AMP-41 | B.1.2 WATER CHEMISTRY<br><br>(B.1.2-1) Please make available at the audit in both hardcopy and electronic format the document(s) that compare the ten elements in OCGS AMP B.1.2 to the ten elements in NUREG-1801 for AMP XI.M2. | Subudhi |
| AMP-42 | B.1.2 WATER CHEMISTRY<br>(B.1.2-2) Under Exceptions, the applicant states that the OCGS Water Chemistry Program for monitoring and controlling the water chemistry of the reactor and other treated water is based on BWRVIP-130: "BWR Vessel and Internals Project BWR Water Chemistry Guidelines," (2004), which is EPRI TR-103515-R3. The September '05 GALL update recommends BWRVIP-29 (1996), which is TR-103515-R1, or later revisions. While the staff has not formally reviewed and accepted any later revision of this document, the staff's SER for the Dresden/Quad Cities LRA (NUREG-1769) has previously accepted BWRVIP-79 (2000), which is TR-103515-R2.<br><br>In transitioning from BWRVIP-79 to BWRVIP-130, OCGS has reviewed BWRVIP-130, and has determined that the most significant change is that a recent policy of the U.S. nuclear industry commits each nuclear utility to adopt the responsibilities and processes on the management of materials aging issues described in NEI 03-08: Guideline for the Management of Materials Issues." Section 1 of BWRVIP-130 specifies which portions of the document are "Mandatory," "Needed," or "Good Practices," using the classification described in NEI 03-08. A new section (section 7) has been added and contains goals for water chemistry optimization. These are "good practice" recommended targets that plants may use in optimizing water chemistry in order to balance the conflicting requirements of materials, fuel and radiation control. Oyster Creek has not committed to obtaining these targets; and has concluded that all other changes between BWRVIP-79 and BWRVIP-130 do not change the original intent of revision 2 implementation.<br><br>To assist the staff in determining the adequacy of the applicant's Water Chemistry Program, the applicant is requested to<br>a. Provide an electronic and hard copy of BWRVIP-130 during the audit.<br>b. Provide an electronic and hard copy of NEI 03-08 during the audit.<br>c. Identify the specific differences between BWRVIP-79 and BWRVIP-130.<br>d. Provide the technical basis for the disposition of each difference. Include the "good practice" BWRVIP-130 recommendations for optimizing the water chemistry.<br>e. Describe the current status of the OCGS Water Chemistry Program with respect to Hydrogen Water Chemistry (HWC), Noble Metal Chemical Application (NMCA), and Zinc Injection. Identify when these programs started and their impact on the operation of plant systems and the degradation of component materials. | Subudhi |

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| AMP-43 | B.1.2 WATER CHEMISTRY<br>(B.1.2-3) BWRVIP-62, "Technical Basis for Inspection Relief for BWR Internal Components with Hydrogen Injection," and BWRVIP-75, "Technical Basis for Revisions to Generic Letter 88-01 Inspection Schedules" identify circumstances and conditions for which relief may be granted by the staff. The applicant is requested to describe all relief that has been granted by the staff for OCGS, based on these documents. | Subudhi |
| AMP-44 | B.1.2 WATER CHEMISTRY<br>(B.1.2-4) Under Exceptions, the applicant states that the Oyster Creek program does not monitor for hydrogen peroxide because the rapid decomposition of hydrogen peroxide makes reliable data exceptionally difficult to obtain, and BWRVIP-130 Section 6.3.3, "Water Chemistry Guidelines for Power Operation," does not address monitoring for hydrogen peroxide. Hydrogen addition to feedwater has been applied in order to mitigate occurrence of IGSCC of structural materials by suppressing the formation of hydrogen peroxide. The hydrogen addition has accomplished an Electrochemical Corrosion Potential (ECP) value less than -230mV, SHE (Standard Hydrogen Electrode). By maintaining a low ECP less than -230mV, SHE, the reactor water chemistry minimizes the effects from hydrogen peroxide, below the threshold that prompted the issue raised in NUREG 1801.<br>The staff notes that the ECP quantifies the oxidizing power of a solution in contact with a specific metal surface. The ECP of different reactor internals component materials is very sensitive to the concentration of oxygen, hydrogen, and hydrogen peroxide and therefore is different at different locations within the BWR reactor system. Section 5.3 of BWRVIP-79 discusses the potential locations suitable for measuring the ECP and Section 5.4 provides alternate ECP estimation techniques.<br>In order to assist the staff in its evaluation of the exception, the applicant is requested to<br>a. Clarify if the ECP is monitored at reactor locations shown in Fig. 5.5 of BWRVIP-79 for OCGS. Discuss the methods used and their frequency.<br>b. Without periodically monitoring or estimating the ECP at some potential locations, discuss how one could ensure that hydrogen addition alone will maintain the ECP level at less than -230mV, SHE within the reactor system. | Subudhi |

## OYSTER CREEK PRE AMP AND AMR AUDIT AND REVIEW QUESTIONS
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| AMP-45 | B.1.2 WATER CHEMISTRY<br>(B.1.2-5) GALL indicates that the dissolved oxygen should be monitored for the feedwater, condensate, and CRD water. This also includes the torus, condensate storage tank, and spent fuel pool water. Consistent with the guidance provided in BWRVIP-130, condensate storage tank, demineralized water storage tank water, spent fuel pool water and torus water are not sampled for dissolved oxygen at OCGS. The Oyster Creek chemistry procedures require monitoring of conductivity, chlorides, sulfates and total organic carbon (TOC) in accordance with limits set by BWRVIP-130 as an alternate method for ensuring component integrity.<br><br>The chlorides and sulfates levels determine the coolant conductivity while dissolved oxygen, hydrogen peroxide and hydrogen levels determine the coolant ECP. Please discuss how monitoring conductivity, chlorides, sulfates and total organic carbon (TOC) ensures the ECP levels in water associated with these primary and auxiliary systems and components, and explain how monitoring TOC level mitigates the aging effects due to the reactor component materials degradation. | Subudhi |
| AMP-46 | B.1.2 WATER CHEMISTRY<br>(B.1.2-6): GALL requires that the water quality (i.e., pH and conductivity) is maintained in accordance with the EPRI Guidelines by periodically sampling for concentration of chemical species. The applicant states that the BWRVIP-130, Section 8.2.1.11, indicates that pH measurement accuracy in most BWR streams is generally suspect because of the dependence of the instrument reading on ionic strength of the sample solution. In addition, the monitoring of pH is not discussed in BWRVIP-130, Appendix B for condensate storage tank, demineralized water storage tank, or torus water. Therefore, at OCGS pH is not monitored for torus water, however pH is monitored in the CST & DWST. Alternate methods are applied to monitor the water chemistry of the torus in lieu of direct pH measurements.<br><br>Please explain what other alternate methods are used to monitor the water quality of the torus, in lieu of direct pH measurements, and the technical basis for concluding that they are effective. | Subudhi |
| AMP-47 | B.1.2 WATER CHEMISTRY<br>(B.1.2-7) The flow accelerated corrosion (FAC) in carbon and low alloy steel components is affected by the alloy composition, the pH at operating conditions, dissolved oxygen concentration, fluid bulk velocity, component geometry and upstream influences, fluid temperature and steam quality. The oxygen affects the form and solubility of the oxide layer, the dissolution of which is inherent in FAC. Section 3.4 of BWRVIP-79 states that the rate of FAC increases dramatically if oxygen concentration is less than about 25 ppb. In the feedwater and condensate system sometimes oxygen is injected to achieve this oxygen level.<br><br>Please describe the OCGS procedures to maintain appropriate oxygen levels in water in various plant primary and secondary systems, including main steam, feedwater and condensate, to mitigate loss of material due to FAC (i.e., erosion/corrosion, steam cutting, etc.). | Subudhi |

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| AMP-48 | B.1.2 WATER CHEM STRY<br>(B.1.2-8) The BWRVIP-79 recommends in Section 4 that the reactor water iron level be monitored as a new diagnostic parameter and the feedwater copper level be monitored as one of the control parameter. Please confirm that OCGS water chemistry program includes monitoring of these parameters as stated in the BWRVIP-79 guidelines. | Subudhi |
| AMP-49 | B.1.2 WATER CHEM STRY<br>(B.1.2-9) Aging of Standby Liquid Control (SBLC) system components not in the reactor coolant pressure boundary section of SBLC system relies on monitoring and control of SBLC makeup water chemistry. The makeup water is monitored in lieu of the storage tank, because the sodium pentaborate that is maintained in the storage tank would mask most of the chemistry parameters monitored. The effectiveness of the water chemistry program will be verified by a one-time inspection of the SBLC system as discussed in the One-Time Inspection aging management program. Please confirm that the One-Time Inspection program would include the SBLC pump casing, and the associated tank discharge piping and valve bodies in addition to the SBLC tank. | Subudhi |
| AMP-50 | B.1.5 BWR FEEDWATER NOZZLE<br>(B.1.5-1) Please make available at the aud t in both hardcopy and electronic format the document(s) that compare the ten elements in OCGS AMP B.1.5 to the ten elements in NUREG-1801 for AMP XI.M5. | Subudhi |
| AMP-51 | B.1.5 BWR FEEDWATER NOZZLE<br>(B.1.5-2) Considering the relatively short time period remaining before OCGS enters the license renewal period, the staff expects that considerable progress has already been made in developing and formally documenting the implementing procedures required for new AMPs, and for significant enhancements to existing AMPs. In light of this, please address each of the following questions regarding the current status of implementing procedures for this AMP:<br>(a) Please provide the status of the implementing procedures for enhancements to the existing BWR Feedwater Nozzle program.<br>(b) Please provide the schedule for initiating enhancements to the existing BWR Feedwater Nozzle program.<br>(c) Please provide a sample of an implementing procedure for enhancements to the existing BWR Feedwater Nozzle program.<br>(d) Please provide the results of any enhanced inspections that have already been completed. | Subudhi |
| AMP-52 | B.1.5 BWR FEEDWATER NOZZLE<br>(B.1.5-3) Please make available at the audit a copy of NUREG-0619, "BWR Feedwate Nozzle and Control Rod Drive Return Line Nozzle Cracking," November 1980. | Subudhi |

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| AMP-53 | B.1.5 BWR FEEDWATER NOZZLE<br>(B.1.5-4) Cracks were found in the FW nozzles and repaired during late 1970s. Please provide details about the size and location of these cracks and their repairs. | Subudhi |
| AMP-54 | B.1.5 BWR FEEDWATER NOZZLE<br>(B.1.5-5): Please provide the details of the recommendations in GE report NE-523-A71-0594 that OCGS is planning to implement prior to entering the period of extended operation. Please specify the revision to this document. Please make available at the audit a copy of the GE report and the staff SER on this document. | Subudhi |
| AMP-55 | B.1.5 BWR FEEDWATER NOZZLE<br>(B.1.5-6) Please discuss whether OCGS is planning to implement monitoring in the thermal sleeve bypass, to detect leakage due to degraded thermal sleeve seals and welds, during the period of extended operation. | Subudhi |
| AMP-56 | B.1.6 BWR CONTROL ROD DRIVE RETURN LINE NOZZLE<br>(B.1.6-1) Please make available at the audit in both hardcopy and electronic format the document(s) that compare the ten elements in OCGS AMP B.1.2 to the ten elements in NUREG-1801 for AMP XI.M2. | Subudhi |
| AMP-57 | B.1.6 BWR CONTROL ROD DRIVE RETURN LINE NOZZLE<br>(B.1.6-2): Please make available at the audit a copy of the OCGS relief request and associated staff SER, allowing UT testing in lieu of PT, that form the basis for the stated exception to GALL. | Subudhi |
| AMP-58 | B.1.6 BWR CONTROL ROD DRIVE RETURN LINE NOZZLE<br>(B.1.6-3): GALL specifies that any detected crack be ground out. The applicant identifies an exception to this. Oyster Creek procedures allow a crack that is found unacceptable under IWB-3400 and IWB-3500 to be evaluated under ASME XI, IWB-3600 or repaired by an NRC approved procedure. Please provide technical justification for this exception, and also provide details of the NRC approved repair procedure. | Subudhi |
| AMP-59 | B.1.6 BWR CONTROL ROD DRIVE RETURN LINE NOZZLE<br>(B.1.6-4): OCGS had cracks in these nozzles during 1979. To minimize thermal cycling and fatigue-induced cracking at these nozzles, OCGS has modified the thermal sleeve to divert the relatively cold CRD flow away from the nozzle. Please discuss the details of the nozzle cracking and the thermal sleeve modifications | Subudhi |
| AMP-60 | B.1.7 BWR STRESS CORROSION CRACKING<br>(B.1.7-1): Please make available at the audit in both hardcopy and electronic format the document(s) that compare the ten elements in OCGS AMP B.1.7 to the ten elements in NUREG-1801 for AMP XI.M7. | Subudhi |
| AMP-61 | B.1.7 BWR STRESS CORROSION CRACKING<br>(B.1.7-2): Please make available at the audit a copy of NUREG-0313, Rev. 2, "Technical Report on Material Selection and Processing Guidelines for BWR Coolant Pressure Boundary Piping," 1988. | Subudhi |
| AMP-62 | B.1.7 BWR STRESS CORROSION CRACKING<br>(B.1.7-3): Please discuss the details of weld repairs and material replacement of components at OCGS to implement the NUREG recommendations | Subudhi |
| AMP-63 | B.1.7 BWR STRESS CORROSION CRACKING<br>(B.1.7-4): Please discuss detected flaw indications and their evaluations/repairs after implementing the NUREG recommendations. | Subudhi |

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| AMP-64 | B.1.8 BWR PENETRATIONS<br>(B.1.8-1): Please make available at the audit in both hardcopy and electronic format the document(s) that compare the ten elements in OCGS AMP B.1.8 to the ten elements in NUREG-1801 for AMP XI.M8. | Subudhi |
| AMP-65 | B.1.8 BWR PENETRATIONS<br>(B.1.8-2): GALL recommends BWRVIP-53 and 57 for repair guidelines. Please confirm that OCGS procedures follow these guidelines along with the inspection and evaluation guidelines of BWRVIP-49 and 27. | Subudhi |
| AMP-66 | B.1.8 BWR PENETRATIONS<br>(B.1.8-3): GALL states that an applicant may use the guidelines of BWRVIP-62 for inspection relief for vessel internals with hydrogen water chemistry. Please discuss all relief requests granted by the staff, based on BWRVIP-62. | Subudhi |
| AMP-67 | B.1.8 BWR PENETRATIONS<br>(B.1.8-4): GALL states that the NDE techniques appropriate for inspection, including the uncertainties, are included in BWRVIP-03. Please discuss NDE techniques suggested in this BWRVIP document that are used in the OCGS inservice inspection program. | Subudhi |
| AMP-68 | B.1.8 BWR PENETRATIONS<br>(B.1.8-5): GALL recommends BWRVIP-14, 59, and 60 for crack growth evaluation guidelines for stainless steel, nickel alloys and low alloy steels, respectively. Please identify OCGS procedures that use these recommended guidelines, and make them available at the audit. | Subudhi |
| AMP-69 | (B.1.27-1):<br>The applicant is requested to identify the document(s) that includes the evaluation of OCGS AMP B.1.27 against the program elements of GALL XI.S1, and to make it available in both electronic and hard-copy formats for the on-site AMP audit. | Morante |

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| AMP-70 | (B.1.27-2):<br>In the OCGS AMP B.1.27 discussion of operating experience, the applicant discusses three (3) areas where containment degradation has been observed. These are the upper region of the drywell shell; the sand bed region at the bottom of the drywell; and the suppression chamber (Torus) and vent system.<br>Upper region of the drywell shell –<br>The applicant refers to the LRA Section 4.7.2 "Drywell Corrosion" TLAA evaluation for further discussion. In LRA Section 4.7.2, the disposition of this TLAA is in accordance with 10 CFR 54.21(c)(1)(iii), and the Oyster Creek ASME Section XI, Subsection IWE aging management program is credited to address the drywell corrosion TLAA.<br><br>In LRA Section 4.7.2, under "Analysis", the applicant states that<br><br>The Oyster Creek ASME Section XI, Subsection IWE aging management program (B.1.27) ensures that the reduction in vessel thickness will not adversely affect the ability of the drywell to perform its safety function. The ASME SectionXI, Subsection IWE aging management program:<br><br>Performs Periodic UT inspections at critical locations,<br><br>Performs calculations to track corrosion rates,<br><br>Projects vessel thickness based on conservatives corrosion rates, and<br><br>Demonstrates that the minimum required vessel thickness is maintained.<br><br>Inspections conducted since 1992 demonstrate that as a result of corrective actions the corrosion rates are very low or in some cases have been arrested. The drywell surfaces that were coated do not show signs of or deterioration. Drywell vessel wall thickness measurements indicate there is substantial margin to the minimum wall thickness, even when projected to the year 2029 using conservative estimates of the corrosion rates. Continued assessment of the observed drywell vessel thickness ensures that timely action can be taken to correct degradation that could lead to loss of the intended function. Additional information is provided in Reference 4.8.21.<br><br>Please provide the following information pertaining to the augmented scope of IWE, as described above:<br><br>(a) Please confirm that the stated activities are currently incorporated into and implemented as part of the existing IWE program. | Morante |

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| AMP-70 (cont'd) | (b) Please provide the IWE implementing procedures for these activities, preferably in both hard copy and electronic format.<br>(c) Please clarify the scope of these activities. Is the sand bed region, in addition to the upper region of the drywell shell, also included in the augmented scope? Are other locations regularly or randomly checked, to ensure that all degraded areas are known and monitored?<br>(d) Please provide the measured wall thickness history, the corrosion rate trending results, the projected remaining wall thickness at the end of the extended period of operation, and the CLB minimum required wall thickness for each location that is monitored.<br>(e) Please identify the current frequency of augmented UT inspections, corrosion rate calculations, and end-of-operating life thickness calculations.<br>(f) Please identify the planned frequency of augmented UT inspections, corrosion rate calculations, and end-of-operating life thickness calculations for the extended period of operation.<br>(g) Please provide a copy of LRA Reference 4.8.21 at the on-site AMP audit. | |
| AMP-71 | (B.1.27-3):<br>In the OCGS AMP B.1.27 discussion of operating experience, the applicant discusses three (3) areas where containment degradation has been observed. These are the upper region of the drywell shell; the sand bed region at the base of the drywell; and the suppression chamber (Torus) and vent system.<br>Sand bed region at the bottom of the drywell -<br>The applicant states that sand was removed and a protective coating was applied to the shell to mitigate further corrosion. The coating is monitored periodically under LRA AMP B.1.33 "Protective Coating Monitoring and Maintenance Program". The reader is directed to program B.1.33 for additional details. LRA B.1.33 identifies this coating to be within its scope; the discussion of operating experience in LRA B.1.33 is similar to the discussion of operating experience in LRA B.1.27.<br>Please provide the following information pertaining to aging management of the sand bed region:<br>(a) At the present time, is monitoring and maintenance of the coating in the sand bed region included in the scope of the current Protective Coating Monitoring and Maintenance Program or is it performed as part of the current IWE program?<br>(b) Please provide the implementing procedure for this activity, preferably in both hard copy and electronic format.<br>(c) Does LR aging management of the containment shell in the sand bed region include both the augmented IWE activities (as delineated in question B.1.27-2 above) and the coating monitoring and maintenance activities under B.1.33? If only B.1.33 is credited, please provide the technical basis for concluding that the augmented IWE activities are not necessary. | Morante |

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| AMP-72 | (B.1.27-4):<br><br>In the OCGS AMP B.1.27 discussion of operating experience, the applicant discusses three (3) areas where containment degradation has been observed. These are the upper region of the drywell shell; the sand bed region at the base of the drywell; and the suppression chamber (Torus) and vent system.<br>Suppression chamber (Torus) and vent system –<br>The applicant states that the coating is inspected every outage and repaired, as required, to protect the torus shell and the vent system from corrosion, and refers the reader to program B.1.33 for additional details. Under operating experience in LRA B.1.33, the applicant states that<br><br>Torus and vent header vapor space Service Level I coating inspections performed in 2002 found the coating in these areas to be in good condition. Inspection of the immersed coating in the Torus identified blistering. The blistering occurred primarily in the shell invert but was also noted on the upper shell near the water line. The majority of the blisters remained intact and continued to protect the base metal. However, several blistered areas included pitting damage where the blisters were fractured. A qualitative assessment of the identified pits was performed and concluded that the measured pit depths were significantly less than the established acceptance criteria. The fractured blisters were repaired to reestablish the protective coating barrier.<br><br>Please provide the following information pertaining to past operating experience and LR aging management for the suppression chamber (Torus) and vent system:<br><br>(a) Please provide the plant documentation that describes the blistering and pitting, the qualitative assessment performed, the established acceptance criteria, and the corrective action taken, preferably in both hard copy and electronic format.<br><br>(b) Was ASME Section XI, Subsection IWE applied, to develop the acceptance criteria?<br><br>(c) Was the inspection that discovered the blistering and cracking conducted under IWE, a coatings monitoring and maintenance program, or another program? If another program, please identify the program.<br><br>(d) Are both the IWE and Coatings AMPs credited to manage loss of material due to corrosion for the suppression chamber (Torus) and vent system, for the extended period of operation? If not, please provide the technical basis for concluding that both AMPs do not need to be credited. | Morante |

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| AMP-73 | (B.1.32-1):<br>The applicant is requested to identify the document(s) that includes the evaluation of the OC program against the program elements of GALL XI.S7, and to make it available in both electronic and hard-copy formats for the on-site AMP audit. | Morante |
| AMP-74 | (B.1.32-2):<br>Considering the relatively short time period remaining before OCGS enters the license renewal period, the staff expects that considerable progress has already been made in developing and formally documenting the implementing procedures required for new AMPs, and for significant enhancements to existing AMPs. In light of this, please address each of the following questions regarding the current status of implementing procedures for this AMP:<br>(a) Please provide the status of the implementing procedures for each enhancement to the existing RG 1.127, Inspection of Water-Control Structures program.<br>(b) Please provide the schedule for initiating each of the enhancements to the existing RG 1.127, Inspection of Water-Control Structures program.<br>(c) Please provide a sample of an implementing procedure for one enhancement to the existing RG 1.127, Inspection of Water-Control Structures program.<br>(d) Please provide the results of any enhanced inspections that have already been completed. | Morante |
| AMP-75 | (B.1.32-3):<br>LRA Appendix B, Section B.0.5 identifies AMP B.1.32 as an existing program. The "Program Description" states that this AMP is part of the Structures Monitoring Program, and further states "The program will be used to manage....." The scope of the six enhancements listed for AMP B.1.32 encompass many of the elements that normally would be part of an existing inspection program for water-control structures. Consequently, the applicant is requested to<br><br>(a) specifically describe the scope of the currently existing program, including the structures and components in the scope of the existing program; the aging effects that are monitored; the inspection methods employed; and the inspection frequency; and<br><br>(b) specifically describe the scope of AMP B.1.32, including the structures and components in the scope of AMP B.1.32; the aging effects that are monitored; the inspection methods employed; and the inspection frequency. | Morante |

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| AMP-76 | (B.1.32-4):<br><br>The first enhancement to B.1.32 identifies that the program will provide for monitoring of trash racks. In LRA Table 3.5.2.1.11, the Structures Monitoring Program is credited for aging management of trash racks. Please explain this apparent discrepancy. | Morante |
| AMP-77 | (B.1.32-5):<br><br>The "Program Description" for AMP B.1.32 states "Inspection frequency is every four (4) years; except for submerged portions of the structures, which will be inspected when the structures are dewatered, or on a frequency not to exceed 10 years. GALL AMP XI.S7 identifies an inspection frequency of 5 years. Please explain why the 10 year inspection frequency is NOT identified as an exception to the GALL AMP. Please also provide the technical basis for concluding that a 10 year inspection frequency is sufficient for submerged portions of structures. | Morante |
| AMP-78 | (B.1.32-6):<br><br>Per the "Operating Experience" discussion for B.1.32, OCGS has experienced (1) degradation of the Intake Structure concrete that required repair in the 1980s; (2) cracking and spalling of Intake Structure and Dilution Structure concrete identified in 2002; and (3) degradation of the intake canal identified in 2001. The 2 recent findings were dispositioned as acceptable, because the intended functions had not been impacted. For all three occurrences, please provide the plant documentation that describes the degradation, the assessment performed, the acceptance criteria applied, future monitoring recommendations, and any corrective action taken. | Morante |

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| AMP-79 | LRA AMP B.1.13 Open Cycle Cooling Water (OCCW)<br>Note: It is preferred that requested documents be provided in both hard copy and "searchable" (e.g.,<br><br>searchable Adobe pdf, Word, or Word Perfect) electronic file formats<br><br>1. Please provide plant-specific system training documents (e.g., system training manuals) for each system that credits the OCCW Aging Management Program<br><br>2. Please make available at the audit, in both hard copy and electronic format, the document(s) that compare the ten elements in OCCW AMP B.1.13 to the ten elements in AMP XI.M20 of NUREG-1801.<br><br>3. Please address each of the following questions regarding the current status of implementing procedures for this AMP:<br><br>(a) Please provide the status of the implementing procedures for each enhancement to the existing program<br><br>(b) Please provide the schedule for initiating each of the enhancements to the existing program<br><br>(c) Please provide a sample of an implementing procedure for one enhancement to the existing program<br><br>(d) Please provide the results of any enhanced inspections that have already been completed. | Sullivan |

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| AMP-79 (cont'd) | 4. The License Renewal Open Cycle Cooling Water System Program and the plant specific Generic Letter 89-13 Program are related, but different, programs. The scope of the GL 89-13 Program is typically based on plant-specific licensing commitments to GL 89-13. The License Renewal Open Cycle Cooling Water System Program has a broader scope than the GL 89-13 program, since it includes non safety-related components meeting the requirements of 10 CFR 54.4(a)(2). For example, the OCCW AMP typically includes non safety-related piping that is outside the scope of the GL 89-13 program. With regard to the above:<br>• Please provide your response and licensing basis commitments to Generic Letter 89-13.<br>• Please describe the difference in scope between the Oyster Creek Generic Letter 89-13 Program and the License Renewal Open Cycle Cooling Water System Aging Management Program (AMP).<br>• Please provide procedures / program documents that have been developed to extend the implementation of GL 89-13 recommendations to systems and components within the scope of the OCCW AMP.<br>• Please provide documentation that demonstrates compliance of the OCCW AMP to the Oyster Creek response to GL 89-13. | |

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| AMP-79 (cont'd) | 5. Please provide the results of the operating history review performed to demonstrate the effectiveness of the OCCW system program in identifying and mitigating leaks, as well as preventing equipment failures related to fouling and flow blockage.<br><br>6. LRA AMP B.1.13 states that the aboveground inspection locations are representative of the same internal coatings, environments and aging effects present in the buried sections of the ESW and SW system piping. Please provide the technical basis for this determination.<br><br>7. In its discussion of operating experience, AMP B.1.13 states that in 2004, 50% of the buried ESW piping and 10% of the buried SW piping was replaced with new pipe and an improved coating system. In addition, a plan is in place to replace the other 50% of the buried ESW piping prior to 2007. Please provide additional information that describes the circumstances and conditions that led to these modifications, and the technical rationale for determining the extent of buried piping replacements for each system (e.g., 100% of buried ESW piping vs.10% of buried SW piping).<br><br>8. Please provide Topical Report 140 - "ESW and Service Water System Plan".<br><br>9. As discussed above, the scope of the GALL OCCW AMP includes non safety-related piping that is typically outside the scope of a GL 89-13 program. From a review of the operating history discussion presented in AMP B.1.13, it is not clear if the operability assessment performed in 2003 bounded the scope of the GALL AMP. Please clarify.<br><br>10. LRA AMP B.1.13 states that the OCCW AMP is consistent with GALL (NUREG-1801) without exceptions. GALL Element 5 for this AMP states that program testing and inspections are performed annually and during refueling outages. The inspection intervals specified in LRA AMP B.1.13 differ from those specified in NUREG-1801. This appears to be an exception to GALL. Please clarify. | |

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| AMP-80 | LRA AMP B.1.14 Closed Cycle Cooling Water (CCCW)<br>Note: It is preferred that requested documents be provided in both hard copy and "searchable" (e.g., searchable Adobe pdf, Word, or Word Perfect) electronic file formats.<br><br>1. Please provide plant-specific system training documents (e.g., system training manuals) for each system that credits the CCCW Aging Management Program<br>2. Please make available at the audit, in both hard copy and electronic format, the document(s) that compare the ten elements in CCCW AMP B.1.14 to the ten elements in AMP XI.M21 of NUREG-1801.<br>3. For the Closed-cycle Cooling Water System (CCCW), NUREG 1801 refers to EPRI TR-107396 "Closed Cooling Water Chemistry Guidelines." Per LRA AMP B.1.14, an exception is necessary because Oyster Creek implements the guidance provided in EPRI 1007820 "Closed Cooling Water Chemistry Guideline", Revision 1. LRA AMP B.1.14 states that the only difference between the two guidelines is that the new revision provides more prescriptive guidance and has a more conservative monitoring approach. Please provide the results of the evaluation performed to support this conclusion.<br><br>4. Please describe evaluations (e.g. physical inspection, chemical analysis) that have been performed to identify existing or potential corrosion-related problems within the systems that credit the CCCW AMP. | Sullivan |

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| AMP-81 | LRA AMP B.1.17 Compressed Air Monitoring (CAM)<br><br>Note: It is preferred that requested documents be provided in both hard copy and "searchable" (e.g., searchable Adobe pdf, Word, or Word Perfect) electronic file formats.<br><br>1. Please provide plant-specific system training documents (e.g., system training manuals) for each system that credits the CAM Aging Management Program<br><br>2. Please make available at the audit, in both hard copy and electronic format, the document(s) that compare the ten elements in CAM AMP B.1.17 to the ten elements in AMP XI.M24 of NUREG-1801.<br><br>3. Please provide your response and licensing basis commitments to Generic Letter 88-14, "Instrument Air Supply Problems. | Sullivan |

The following are additional questions. They are not in Table format because attempting to put them in the table caused information to be truncated.

**QUESTION AMP- 82 (SULLIVAN)**

**LRA AMP B.1.19 Fire Protection (FP)**

**Note:** It is preferred that requested documents be provided in both hard copy and "searchable" (e.g., searchable Adobe pdf, Word, or Word Perfect) electronic file formats.

1. Please provide plant-specific system training documents (e.g., system training manuals) for each system that credits the Fire Protection Aging Management Program

2. Please make available at the audit, in both hardcopy and electronic format, the document(s) that compare the ten elements in FP AMP B.1.19 to the ten elements in AMP XI.M26 of NUREG-1801.

3. Considering the relatively short time period remaining before OCGS enters the license renewal period, the staff expects that

considerable progress has already been made in developing and formally documenting the implementing procedures required for new AMPs, and for significant enhancements to existing AMPs. In light of this, please address each of the following questions regarding the current status of implementing procedures for this AMP:

(a) Please provide the status of the implementing procedures for each enhancement to the existing program

(b) Please provide the schedule for initiating each of the enhancements to the existing program

(c) Please provide a sample of an implementing procedure for one enhancement to the existing program

(d) Please provide the results of any enhanced inspections that have already been completed.

4. With regard to AMP B.1.19, "Fire Protection"

- Please describe the "recurring task work order inspection process" and how it is implemented at Oyster Creek.
    - Please provide the technical basis for the "recurring task work order inspection process".
    - Please provide a table/list that identifies components that are inspected under an established procedure, and components that are inspected under the "recurring task work order inspection process".
    - Please identify the frequency of inspection for each system / component within the scope of the Fire Protection AMP.

5. Please provide the Fire Protection Licensing Basis for Oyster Creek (License Condition, Safety Evaluation Reports, etc.), the Fire Hazards Analysis (FHA) and Appendix R /Post-fire Safe Shutdown Analysis (if not incorporated into the FHA).

6. AMP B.1.19, "Fire Protection," states that appropriate mitigating actions have been taken to correct degraded fire doors. With regard to the identification and resolution of degraded fire doors, please provide plant-specific data (e.g., Condition Reports / Action Requests / Work Requests and close-out documents) that have been generated in the past five years (since 9/1/2000). In addition, please specify the inspection interval and the technical basis (engineering evaluation) developed to support the established interval.

7. Silicone foam fire barrier penetration seals are used at Oyster Creek. As described in several generic communications issued by the staff (i.e., IN 88-56, IN 94-28, and IN 97-70), silicone foam fire barrier penetration seals have experienced a number of failures (splits, shrinkage, voids, lack of fill). Please provide the OC evaluation of the referenced Information Notices.

8. AMP B.1.19, "Fire Protection," states that fire barrier penetration seals are visually inspected for signs of degradation,

through periodic inspections that are implemented through recurring task work orders and station procedures. GALL Element 4 specifies that 10% of each type of penetration seal must be visually inspected by qualified fire protection inspectors. Identify the specific types of penetrations seals installed at OC and demonstrate that 10% of each type of seal is visually inspected by qualified individuals each refueling cycle. In addition, describe the qualifications and training requirements for personnel that perform the inspections. Please describe how this inspection method achieves consistency with NUREG-1801 (GALL) Element 3, which requires that a visual inspection of approximately 10% of each type of penetration seal be performed at least once every refueling outage.

9. As noted in the exception to AMP B.1.19, the Oyster Creek halon and carbon dioxide fire suppression systems each undergo a system operability and flow test every 18 months, which is not consistent with the GALL Element 4 criteria of every six months. The acceptability of this exception appears to be based on the following activities:

    - Verification of the halon system storage tank weight, level and pressure every 6 months.
    - The carbon dioxide system surveillance verifies the tank charge once per week, and valve alignment once per month.

    As discussed in ISG-04, activities such as these assure the operational readiness of the Halon and CO2 systems but do not support aging management. It is not clear how activities that do not support aging management can, by themselves, be used to justify the exception to the GALL AMP criteria. Please clarify and provide additional technical justification in support of this exception.

10. LRA Section 2.1.3.4 *"Systems and Structures Credited for Regulated Events"* states that all systems, structures and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48) were included in the scope of license renewal in accordance with 10 CFR 54.4(a)(3) requirements.

    Components that are relied on to achieve and maintain cold shutdown conditions in the event of fire perform a function that demonstrates compliance with the fire protection rule (10 CFR 50.48). These components are stored on-site (typically in a warehouse).

    Does the Oyster Creek Appendix R Fire Hazards Analysis / Safe Shutdown Analysis credit the installation of replacement parts to achieve and maintain cold shutdown conditions? If so, are the spare parts included in the scope of license renewal? If the spare parts are not included in the scope of license renewal, please describe how the effects of aging will be managed during the period of extended operation.

11. Please provide the Fire Protection Technical Position Paper referenced in Section 2.1.3 of the LRA.

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12. The LRA states that the Oyster Creek experience with fire barrier penetration seals is consistent with the industry experience. Provide the Oyster Creek operating experience data and the results of your comparison of this data to industry operating experience.

13. Please provide the Oyster Creek evaluation of NRC Information Notice 92-28, "Inadequate Fire Suppression System Testing."

QUESTION AMP- 83 (SULLIVAN)

**LRA AMP B.1.20 Fire Water System (FW)**

**Note:** It is preferred that requested documents be provided in both hard copy and "searchable" (e.g., searchable Adobe pdf, Word, or Word Perfect) electronic file formats.

1. Please provide plant-specific system training documents (e.g., system training manuals) for each system that credits the Fire Water Aging Management Program
2. Please make available at the audit, in both hard copy and electronic format, the document(s) that compare the ten elements in FW AMP B.1.20 to the ten elements in AMP XI.M27 of NUREG-1801.
3. Considering the relatively short time period remaining before OCGS enter the license renewal period, the staff expects that considerable progress has already been made in developing and formally documenting the implementing procedures required for new AMPs, and for significant enhancements to existing AMPs. In light of this, please address each of the following questions regarding the current status of implementing procedures for this AMP:

   (a) Please provide the status of the implementing procedures for each enhancement to the existing program

   (b) Please provide the schedule for initiating each of the enhancements to the existing program

   (c) Please provide a sample of an implementing procedure for one enhancement to the existing program

   (d) Please provide the results of any enhanced inspections that have already been completed.
4. Please identify the plant commitments pertaining to NFPA codes and standards.

5. This AMP states that the program will be enhanced to include periodic non-intrusive wall thickness measurements (volumetric inspections) of selected portions of the fire water system, to be performed at intervals not to exceed every 10 years. NUREG-1801 (Element 4) states that these inspections are to be performed before the end of the current operating term and at plant-specific intervals thereafter during the period of extended operation. Please provide the technical basis which supports: (a)

the 10 year inspection interval; (b) the determination of "selected portions" of the system that are to be subjected to volumetric inspections; and (c) extrapolation of above grade piping test results to below grade piping (if applicable). In addition, it is not clear if these inspections will be performed before the end of the current operating term as required by GALL. Please clarify.

Please provide data that shows the actual dates that sprinklers included within the scope of license renewal were installed.

**QUESTION AMP- 84 (MORANTE B.1.28-1):**

The applicant is requested to identify the document(s) that includes the evaluation of OCGS AMP B.1.28 against the program elements of GALL XI.S3, and to make it available in both electronic and hard-copy formats for the on-site AMP audit.

**QUESTION AMP- 85 (MORANTE B.1.28-2):**

Considering the relatively short time period remaining before OCGS enters the license renewal period, the staff expects that considerable progress has already been made in developing and formally documenting the implementing procedures required for new AMPs, and for significant enhancements to existing AMPs. In light of this, please address each of the following questions regarding the current status of implementing procedures for this AMP:

(a) Please provide the status of the implementing procedures for each enhancement to the existing ASME Section XI ISI, Subsection IWF program.

(b) Please provide the schedule for initiating each of the enhancements to the existing ASME Section XI ISI, Subsection IWF program.

(c) Please provide a sample of an implementing procedure for one enhancement to the existing ASME Section XI ISI, Subsection IWF program.

(d) Please provide the results of any enhanced inspections that have already been completed.

**QUESTION AMP- 86 (MORANTE B.1.28-3):**

OCGS AMP B.1.28 identifies an enhancement to include additional MC supports. Please provide the following information related to this enhancement:

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(a) Identify the MC supports that are currently included in the existing IWF inspection program.

(b) Identify the MC supports that will be added to the scope of the IWF inspection program for the license renewal period.

(c) Specify the current inspection program and describe the current inspection details for the MC supports that are identified in (b) above.

(d) Confirm that, after enhancement, all MC supports will be included in the scope of the IWF inspection program for the license renewal period.

**QUESTION AMP- 87 (MORANTE B.1.28-4):**

OCGS AMP B.1.28 identifies an enhancement to inspect underwater supports for loss of material due to corrosion and loss of mechanical function. Please provide the following information related to this enhancement:

(a) Identify the specific underwater supports that will be added to the scope of the IWF inspection program for the license renewal period, including the system name and ASME Code Class.

(b) Specify the current inspection program and describe the current inspection details for the underwater supports that are identified in (a) above.

(c) Confirm that, after enhancement, all ASME Code Class underwater supports will be included in the scope of the IWF inspection program for the license renewal period.

**QUESTION AMP- 88 (MORANTEB.1.28-5):**

In the OCGS AMP B.1.28 discussion of operating experience, the applicant refers to the results of the most recent IWF inspections (1st inspection period of the 4th inspection interval), and states "There were challenges identified during this inspection. Scope expansion was required due to unacceptable as-found conditions on rod hangers. The identified conditions were evaluated or repaired, as required, and determined acceptable for return to service."

Please provide the following information related to this recent operating experience:

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(a) Identify the system(s), ASME Code Class, the initial sample size, and the percentage found to be unacceptable.

(b) Identify whether loss of material due to corrosion, loss of mechanical function, or both aging effects were observed. Did the as-found unacceptable conditions compromise any intended functions?

(c) Identify the final sample size, after scope expansion, and the percentage found to be unacceptable.

(d) Identify the number of supports returned to service based solely on evaluation and the number of supports returned to service after repair.

(e) Describe the root cause evaluation and the corrective actions taken to prevent recurrence.

(f) Identify augmented inspections scheduled for the next inspection period.

NOTE: Water-control structures are covered by questions pertaining to OCGS AMP B.1.32. The following questions pertain to all other in-scope structures and components.

**QUESTION AMP- 89 (MORANTE B.1.31-1):**

The applicant is requested to identify the document(s) that includes the evaluation of the OC program against the program elements of GALL XI.S6, and to make it available in both electronic and hard-copy formats for the on-site AMP audit.

**QUESTION AMP- 90 (MORANTE B.1.31-2):**

Considering the relatively short time period remaining before OCGS enters the license renewal period, the staff expects that considerable progress has already been made in developing and formally documenting the implementing procedures required for new AMPs, and for significant enhancements to existing AMPs. In light of this, please address each of the following questions regarding the current status of implementing procedures for this AMP:

(a) Please provide the status of the implementing procedures for each enhancement to the existing Structures Monitoring Program.

(b) Please provide the schedule for initiating each of the enhancements to the existing Structures Monitoring Program.

(c) Please provide a sample of an implementing procedure for one enhancement to the existing Structures Monitoring Program.

(d) Please provide the results of any enhanced inspections that have already been completed.

**QUESTION AMP- 91 (MORANTE B.1.31-3):**

The scope of the enhancements listed for AMP B.1.31 are quite significant, and encompass several elements that would be expected to be part of an existing Structures Monitoring Program. Notable examples are the inclusion of anchors and embedments, and component supports outside the scope of IWF, and the addition of loss of material due to corrosion of steel components to the current inspection criteria. Consequently, the applicant is requested to

(a) specifically describe the scope of the currently existing program, including the structures and components in the scope of the existing program; the aging effects that are monitored; the inspection methods employed; and the inspection frequency;

(b) specifically describe the scope of AMP B.1.31, including the structures and components in the scope of AMP B.1.31; the aging effects that are monitored; the inspection methods employed; and the inspection frequency; and

(c) for the structures and components that will be added to the Structures Monitoring Program scope for license renewal, describe the aging management activities that are currently being implemented.

**QUESTION AMP- 92 (MORANTE B.1.31-4):**

The AMR tables in LRA Section 3.5 credit the Structures Monitoring Program for aging management of conduits. Please confirm that conduits are included in the scope of this AMP.

**QUESTION AMP- 93 (MORANTE B.1.31-5):**

One enhancement to AMP B.1.31 is to conduct periodic sampling and testing of groundwater to confirm that the environment remains non-aggressive for buried reinforced concrete. Please provide the following information related to this enhancement:

(a) the dates and quantitative results of previous groundwater monitoring, upon which the conclusion of non-aggressiveness is based;

(b) the scheduled frequency of groundwater monitoring under AMP B.1.31.

**QUESTION AMP- 94 (MORANTE B.1.31-6):**

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*For reference purposes, please have copies of NUMARC 93-01Rev.2, ACI 349.3R-96, and ANSI/ASCE 11-90 available during the on-site audit.*

**QUESTION AMP- 95 (MORANTE B.1.31-7):**

*The enhancement to inspect the external surfaces of mechanical components for loss of material due to corrosion represents a very significant scope increase.* The AMR tables in LRA Sections 3.1, 3.2, 3.3, and 3.4 credit this enhancement over 400 times.

Please describe the details of the implementation of this enhancement, and please provide copies of any procedures that are already developed for this enhancement.

**QUESTION AMP- 96 (MORANTE B.1.31-8):**

In the discussion of operating experience, four noteworthy incidences of degradation are noted: cracking of the RB exterior walls; cracking of the drywell shield wall due to high temperature; cracking of the spent fuel storage pool concrete support beams; and degradation of the intake canal. Degradation of the intake canal is also addressed in LRA Section B.1.32, in the operating experience discussion for water-control structures.

For each of the first three incidences of degradation, please provide the plant documentation that describes the degradation, the assessment performed, the acceptance criteria applied, future monitoring recommendations, and any corrective action taken. Also describe the monitoring activities that are or will be conducted under the Structures Monitoring Program for each of the three regions.

| | | |
|---|---|---|
| AMP-97 | The drywell containment has experienced pre-mature corrosion. AmerGen submitted a white paper on the issue to the BNE. Please provide a copy of this White Paper. | (MORANTE) |
| AMP-98 | Underground piping has history of leaks. Underground piping is also difficult to inspect. Minimizing underground leaks not only protects the environment but limits the cleanup effort required during decommissioning. AmerGen submitted a white paper to the BNE on this issue. Please provide a copy of this White Paper. | (WANG) |
| AMP-99 | Underground cables have a history of failures. AmerGen submitted a white paper to the BNE on this issue. This issue is currently under review by the BNE. Please provide a copy of this White Paper. | (TRAN) |

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