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LR-N11-0164
U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Hope Creek Generating Station
Facility Operating License No. NPF-57
NRC Docket No. 50-354

Subject: Response to NRC Draft Request for Additional Information B.2.1.28-4 related to the ASME Section XI Subsection IWE Aging Management Program associated with the Hope Creek Generating Station License Renewal Application

Reference: E-mail from Arthur Cunanan, USNRC, to John Hufnagel, Representative for PSEG Nuclear, LLC, dated May 13, 2011, "Hope Creek Revised Draft RAI"

In the referenced e-mail, the NRC staff requested additional information related to the ASME Section XI Subsection IWE Aging Management Program associated with the Hope Creek Generating Station License Renewal Application (LRA). Enclosure A to this letter contains the NRC draft request for additional information and the PSEG Nuclear response.

Enclosure B provides an update to Hope Creek LRA Appendix A, Section A.2.1.28, LRA Appendix B, Section B.2.1.28, and the affected portions of the License Renewal Commitment List (LRA Appendix A, Section A.5, Item # 28), as a result of this submittal. There are no other new or revised regulatory commitments associated with this letter.

If you have any questions, please contact Mr. Ali Fakhar, PSEG Manager - License Renewal, at 856-339-1646.

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

Executed on 5-19-11

Sincerely,

Paul J. Davison

Paul J. Davison
Vice President, Operations Support
PSEG Nuclear LLC

Enclosures: A. Response to Request for Additional Information
B. Updates to Affected Sections of the Hope Creek License Renewal Application

cc: William M. Dean, Regional Administrator – USNRC Region I
B. Brady, Senior Project Manager, License Renewal – USNRC
Arthur Cunanan, Project Manager, License Renewal - USNRC
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P. Duca, Hope Creek Commitment Tracking Coordinator

Enclosure A

Response to NRC Draft Request for Additional Information related to the ASME Section XI Subsection IWE Aging Management Program associated with the Hope Creek Generating Station License Renewal Application

Draft RAI B.2.1.28-4

Draft RAI B.2.1.28-4

Background:

In its response to RAI B.2.28-3 dated January 19, 2011, the applicant stated that, through boroscope inspection of each the four drywell air gap drains, it discovered that covers were in place in each drain line that "may limit or prevent proper drainage of the drywell air gap." As a result of this finding, the applicant indicated that it planned to further investigate one of the drain lines to better understand the configuration in order to properly clear the four drain line openings. The applicant further indicated that this plan would allow it to "restore the functionality of the four air gap drains prior to flood-up of the reactor cavity during the next refueling outage in Spring 2012."

Issue:

During a May 9, 2011, conference call, the applicant informed the staff that its further investigation of one of the drywell air gap drain lines indicated that the location of the blockage (where the cover was installed) did not coincide with drain line's entrance into the air gap. Furthermore, it was unable to identify, through boroscope inspection from the air gap side, an opening that coincided with the drain line. Therefore, the applicant was not able to confirm the actual configuration from the drain line blockage to the air gap. Due to the level of exposure involved in performing such inspections, the applicant has not been able to perform the same investigation for the remaining three drain lines for the air gap.

Request:

The applicant is requested to provide the following information:

1. Describe the details of the field investigation, and any uncertainties, regarding the condition of the containment shell steel and drain line as-built configuration as determined from boroscope and visual examination.
2. Describe the impact of this new finding about the drain line blockage location on its plans to establish clearing the four drains lines by spring of 2012.
3. Provide the necessary amendments or modifications to existing enhancements Nos. 3, 4, 6, 8, 9 and 10 of the existing ASME Section XI, Subsection IWE aging management program (AMP) as described in LRA Section B2.1.28.
4. Provide revisions to the applicant's commitment 28 to ensure that the provisions of the commitment are applicable for the current configuration of the drain lines so that the drywell can perform its intended design function and maintain its structural integrity through the period of extended operation.

PSEG Response:

1. The field investigations performed to date, including visual inspection of external surfaces of the drywell shell using a boroscope inserted into the drywell air gap through penetration sleeves in the concrete shield wall, have indicated the containment shell steel to be in good condition. The boroscope inspections have not identified corrosion of the containment shell steel exterior surface. The inorganic zinc coating on the drywell shell steel exterior surface appears to be intact and in good condition.

   The drywell air gap drain line as-built configuration is not in accordance with the existing design configuration, and the non-conforming condition has been entered into the corrective action process. Field investigation of the as-built configuration performed to date has confirmed that all four of the air gap drain lines are blocked and incapable of providing a drain path for water that could potentially accumulate inside the air gap space. The air gap drain line located at azimuth 0° was investigated further by erecting a temporary platform and cutting the drain line pipe at a location near where the pipe becomes embedded in the concrete wall, allowing better access to the suspected location of the blockage. A pole was inserted into the cut drain line pipe, and it was determined that the pipe was obstructed at a point that is approximately the midpoint between the outer surface of the concrete wall in the torus room, and the inner surface of the concrete wall located inside the air gap space.

   The as-built configuration of this drain was further investigated by lowering a boroscope into the air gap through a penetration located above the area where the entrance to the air gap drain is shown on the design drawing. The boroscope inspection did not indicate the existence of an air gap drain opening or evidence of a drain cover. The boroscope inspection was repeated by lowering the boroscope through a different penetration in the same area and again the inspection could not locate the air gap drain opening or evidence of a drain cover. There was no indication of water accumulation at the bottom of the air gap. However, an accumulation of loose debris material at the bottom of the air gap was observed. The observation of foreign material, along with the inability to locate the expected drain line openings, was entered into the corrective action process.

   Although some uncertainty remains regarding the as-built configuration of the air gap drain lines, there are no indications of water accumulation inside the drywell air gap space and no indications of corrosion of the containment steel shell exterior surface.

2. This new finding about the drain line blockage location has impacted the initial plans to establish clearing the four drain lines by Spring of 2012. Due to the uncertainty described above and the engineering evaluations necessary to safely clear existing drains or design and install alternate drains, PSEG Nuclear will now establish drainage capability from the bottom of the drywell air gap no later than June 30, 2015.

3. ASME Section XI, Subsection IWE aging management program enhancement number 3 is intended to verify the functionality of the reactor cavity seal rupture drain lines and associated leakage monitoring instrumentation. This enhancement is not related to the four drain lines located at the bottom of the air gap, which have been found to be blocked. No changes to enhancement number 3 are necessary as a result of the identified blockage of the four drywell air gap drain lines. Note that the reactor cavity seal rupture drain lines have been verified to be clear and the associated leakage monitoring instrumentation has been tested and verified functional.

   ASME Section XI, Subsection IWE aging management program enhancement number 4 is intended to verify that the drains at the bottom of the drywell air gap are clear from blockage once during the period of extended operation, and one additional time during the first 10 years of the period of extended operation. This enhancement is modified to address the requirement to establish drainage capability from the bottom of the drywell air gap.

   ASME Section XI, Subsection IWE aging management program enhancement numbers 6 and 8 are intended to monitor for leakage that would expose the drywell shell in the air gap to water and potentially cause corrosion of the steel containment shell exterior surface. These enhancements are modified to address the requirement to perform boroscope inspections inside the air gap as a compensatory measure until drainage capability is established in all four of the air gap drain lines.

   ASME Section XI, Subsection IWE aging management program enhancement number 9 is intended to confirm that there is no significant corrosion of the steel containment shell exterior surface due to the periodic exposure to reactor cavity leakage. This enhancement is modified to perform additional UT measurements around the full 360 degree circumference of the drywell between elevations 86'-11" and 88'-0" as a compensatory measure until drainage capability is established in all four of the air gap drain lines. This enhancement is also modified to include additional UT measurements for three refueling outages after drainage capability is established in all four of the air gap drain lines.

   ASME Section XI, Subsection IWE aging management program enhancement number 10 will implement the Final Interim Staff Guidance LR-ISG-2006-01, if the existing reactor cavity water leakage cannot be repaired prior to the PEO. This enhancement is not related to the four drain lines located at the bottom of the air gap, which have been found to be blocked. No changes to enhancement number 10 are necessary as a result of the identified blockage, as the drainage capability of the four drywell air gap drain lines will be restored on or before June 30, 2015.

   ASME Section XI, Subsection IWE aging management program enhancement number 7 is intended to monitor penetration sleeve J13 for leakage that could expose the drywell shell in the air gap to water and potentially cause corrosion of the steel containment shell

exterior surface. This enhancement is modified to include a walkdown of the torus room to detect any leakage from other drywell penetration sleeves.

The revised enhancements described above require changes to LRA Section A.2.1.28, LRA Section B.2.1.28 and the LRA Section A.5 License Renewal Commitment List, Commitment Number 28, as shown in Enclosure B.

4. The revisions to commitment 28 are necessary to ensure that the provisions of the commitment are applicable to the current configuration of the drain lines to ensure that the drywell can perform its intended design function and maintain its structural integrity through the period of extended operation. Commitment 28 is revised to include the modified enhancements to the ASME Section XI, Subsection IWE aging management program described in the response to question 3, above. The revised LRA Section A.5 License Renewal Commitment List, Commitment number 28, is shown in Enclosure B.

Enclosure B

Update to Affected Sections of the Hope Creek License Renewal Application Including the License Renewal Commitment List

This Appendix contains revisions to affected sections of the Hope Creek LRA as a result of this response to NRC Draft RAI B.2.1.28-4. Pre-existing text has been repeated here to provide context for the changes. Pre-existing text, from the LRA or previous RAI packages, is formatted in normal font; new text is bold and italicized; deleted text is shown with strike-through font. For updates to Appendix A, Section A.5, the License Renewal Commitment List, the specific RAIs that have led to commitment revisions are listed in the "SOURCE" column of the table.

A.2.1.28 ASME Section XI, Subsection IWE

The ASME Section XI, Subsection IWE aging management program is an existing program based on ASME Code and complies with the provisions of 10 CFR 50.55a. The program consists of periodic inspection of the primary containment surfaces and components, including its integral attachments, penetration sleeves, pressure retaining bolting, personnel airlock and equipment hatches, and other pressure retaining components for loss of material, loss of preload, and fretting or lockup.

Examination methods include visual and volumetric testing as required by ASME Section XI, Subsection IWE. Observed conditions that have the potential for impacting an intended function are evaluated for acceptability in accordance with ASME requirements or corrected in accordance with corrective action process.

The program will be enhanced to include:

1. Install an internal moisture barrier at the junction of the drywell concrete floor and the steel drywell shell prior to the period of extended operation.

2. Revise the Hope Creek ASME Section XI, Subsection IWE implementing documents to require inspection of the moisture barrier for loss of sealing in accordance with IWE 2500, after it is installed. The original design for Hope Creek did not require an internal moisture barrier at the junction of the drywell concrete floor and steel drywell shell.

3. Verify that the reactor cavity seal rupture drain lines are clear from blockage and that the monitoring instrumentation is functioning properly once prior to the period of extended operation, and one additional time during the first 10 years of the period of extended operation.

4. ***Establish drainage capability from the bottom of the drywell air gap on or before June 30, 2015. The drywell air gap will be divided into four approximately equal quadrants. Drainage consists of one drain in each quadrant for a total of four drains. Each drain will be open at the bottom of the drywell air gap and be capable of draining water from the air gap.***

   Verify that drains at the bottom of the drywell air gap are clear from blockage once prior to the period of extended operation, and one additional time during the first 10 years of the period of extended operation.

5. Investigate the source of any leakage detected by the reactor cavity seal rupture drain line instrumentation and assess its impact on the drywell shell.

6. ***After drainage has been established from the bottom of the air gap from all four drains,*** ~~M~~*m*onitor the drains at the bottom of the drywell air gap daily for leakage in the event leakage is detected by the reactor cavity seal rupture drain line instrumentation.

7. Monitor penetration sleeve J13 daily for water leakage when the reactor cavity is flooded up. ***In addition, perform a walkdown of the torus room to detect any leakage from other drywell penetrations. These actions shall continue*** until corrective actions are taken to prevent leakage through J13 ***or through the four air gap drains.***

8. ***Until drainage is established from all four drains, when the reactor cavity is flooded up, perform boroscope examination of the bottom of the drywell air gap through penetrations located at elevation 93' in four quadrants, 90 degrees apart. The personnel performing the boroscope examination shall be certified as VT-1 inspectors in accordance ASME Section XI, Subsection IWA-2300, requirements. The examiners will look for signs of water accumulation and drywell shell corrosion. Adverse conditions will be documented and addressed in the corrective action program.***

   After drainage has been established from the bottom of the air gap from all four drains, ~~M~~*m*onitor the lower drywell air gap drains daily for water leakage when the reactor cavity is flooded up.

9. ***Until drainage is established from all four drains,*** ~~P~~*p*erform UT thickness measurements ***each refuel outage*** from inside the drywell in the area of the drywell shell below the J13 penetration sleeve area to determine if there is a significant corrosion rate occurring in this area due to periodic exposure to reactor cavity leakage. ***In addition, UT measurements shall be performed each refuel outage around the full 360 degree circumference of the drywell between elevations 86'-11" and 88'-0" (underside of the torus down comer vent piping penetrations).*** Inspection and acceptance criteria will be in accordance with IWE-2000 and IWE-3000 respectively. ***The results of the UT measurements shall be used to establish a corrosion rate and demonstrate that the effects of aging will be adequately managed such that the drywell can perform its intended function until April 11, 2046. Evidence of drywell shell degradation will be documented and addressed in the corrective action program.***

   After drainage has been established from the bottom of the air gap from all four drains, UT thickness measurements will be taken each of the next three refueling outages at the same locations as those ***previously*** examined ***as described above.*** ~~in 2010.~~ These UT thickness measurements will be compared to the results of the ***previous*** ~~initial~~ UT inspections ~~performed during the October 2010 refueling outage~~ and, if corrosion is ongoing, a corrosion rate will be determined for the drywell shell. In the event a significant corrosion rate is detected, the condition will be entered in the corrective action process for evaluation and extent of condition determination.

10. The cause of the reactor cavity water leakage will be investigated and repaired, if practical, before PEO. If repairs cannot be made prior to the PEO, the program will be enhanced to incorporate the following aging

management activities, as recommended in the Final Interim Staff Guidance LR-ISG-2006-01.

a) Identify drywell surfaces requiring examination and implement augmented inspections for the period of extended operation in accordance with IWE-1240, as identified in Table IWE-2500-1, Examination Category E-C.

b) Demonstrate through the use of augmented inspections that corrosion is not occurring or that corrosion is progressing so slowly that the age-related degradation will not jeopardize the intended function of the drywell shell through the period of extended operation.

c) Develop a corrosion rate that can be inferred from past UT examinations. If degradation has occurred, evaluate the drywell shell using the developed corrosion rate to demonstrate that the drywell shell will have sufficient wall thickness to perform its intended function through the period of extended operation.

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

A.5 License Renewal Commitment List

NO.	PROGRAM OR TOPIC	COMMITMENT	UFSAR SUPPLEMENT LOCATION (LRA APP. A)	ENHANCEMENT OR IMPLEMENTATION SCHEDULE	SOURCE
28	ASME Section XI, Subsection IWE	ASME Section XI, Subsection IWE is an existing program that will be enhanced to include: 1. Install an internal moisture barrier at the junction of the drywell concrete floor and the steel drywell shell prior to the period of extended operation. 2. Require inspection of the moisture barrier for loss of sealing in accordance with IWE 2500 after it is installed. 3. Verify that the reactor cavity seal rupture drain lines are clear from blockage and that the monitoring instrumentation is functioning properly once prior to the period of extended operation, and one additional time during the first ten years of the period of extended operation. 4. ***Establish drainage capability from the bottom of the drywell air gap on or before June 30, 2015. The drywell air gap will be divided into four approximately equal quadrants. Drainage consists of one drain in each quadrant for a total of four drains. Each drain will be open at the bottom of the drywell air gap and be capable of draining water from the air gap.*** Verify that drains at the bottom of the drywell air gap are clear from blockage once prior to the period of extended operation, and one additional time during	A.2.1.28	Program to be enhanced prior to the period of extended operation. Inspection schedule identified in commitment.	Section B.2.1.28 Hope Creek Letter LR-N10-0190 RAI B.2.1.28-01 Hope Creek Letter LR-N10-0291 RAI B.2.1.28-01

NO.	PROGRAM OR TOPIC	COMMITMENT	UFSAR SUPPLEMENT LOCATION (LRA APP. A)	ENHANCEMENT OR IMPLEMENTATION SCHEDULE	SOURCE
		the first ten years of the period of extended operation. 5. Investigate the source of any leakage detected by the reactor cavity seal rupture drain line instrumentation and assess its impact on the drywell shell. ***6. After drainage has been established from the bottom of the air gap from all four drains,*** ~~M~~***m***onitor the drains at the bottom of the drywell air gap daily for leakage in the event leakage is detected by the reactor cavity seal rupture drain line instrumentation. 7. Monitor penetration sleeve J13 daily for water leakage when the reactor cavity is flooded up***. In addition, perform a walkdown of the torus room to detect any leakage from other drywell penetrations. These actions shall continue*** until corrective actions are taken to prevent leakage through J13 ***or through the four air gap drains.*** ***8. Until drainage is established from all four drains, when the reactor cavity is flooded up, perform boroscope examination of the bottom of the drywell air gap through penetrations located at elevation 93' in four quadrants, 90 degrees apart. The personnel performing the boroscope examination shall be certified as VT-1 inspectors in accordance ASME Section XI, Subsection IWA-2300, requirements. The examiners will look for signs of water accumulation and***			Hope Creek Letter LR-N11-0016 RAI B.2.1.28-3 ***Hope Creek Letter*** ***LR-N11-0164*** ***DRAI B.2.1.28-4***

NO.	PROGRAM OR TOPIC	COMMITMENT	UFSAR SUPPLEMENT LOCATION (LRA APP. A)	ENHANCEMENT OR IMPLEMENTATION SCHEDULE	SOURCE
		drywell shell corrosion. Adverse conditions will be documented and addressed in the corrective action program. ***After drainage has been established from the bottom of the air gap from all four drains,*** ~~M~~*m*onitor the lower drywell air gap drains daily for water leakage when the reactor cavity is flooded up. ***9. Until drainage is established from all four drains,*** ~~P~~*p*erform UT thickness measurements ***each refuel outage*** from inside the drywell in the area of the drywell shell below the J13 penetration sleeve area to determine if there is a significant corrosion rate occurring in this area due to periodic exposure to reactor cavity leakage. ***In addition, UT measurements shall be performed each refuel outage around the full 360 degree circumference of the drywell between elevations 86'-11" and 88'-0" (underside of the torus down comer vent piping penetrations).*** Inspection and acceptance criteria will be in accordance with IWE-2000 and IWE-3000 respectively. ***The results of the UT measurements shall be used to establish a corrosion rate and demonstrate that the effects of aging will be adequately managed such that the drywell can perform its intended function until April 11, 2046. Evidence of drywell shell degradation will be documented and addressed in the corrective action program.***			

NO.	PROGRAM OR TOPIC	COMMITMENT	UFSAR SUPPLEMENT LOCATION (LRA APP. A)	ENHANCEMENT OR IMPLEMENTATION SCHEDULE	SOURCE
		After drainage has been established from the bottom of the air gap from all four drains, UT thickness measurements will be taken each of the next three refueling outages at the same locations as those ***previously*** examined ***as described above.*** ~~in 2010~~ These UT thickness measurements will be compared to the results of the ***previous*** ~~initial~~ UT inspections ~~performed during the October 2010 refueling outage~~ and, if corrosion is ongoing, a corrosion rate will be determined for the dry well shell. In the event a significant corrosion rate is detected, the condition will be entered in the corrective action process for evaluation and extent of condition determination. 10. The cause of the reactor cavity water leakage will be investigated and repaired, if practical, before PEO. If repairs cannot be made prior to the PEO, the program will be enhanced to incorporate the following aging management activities, as recommended in the Final Interim Staff Guidance LR-ISG-2006-01. a. Identify drywell surfaces requiring examination and implement augmented inspections for the period of extended operation in accordance with IWE-1240, as identified in Table IWE-2500-1, Examination Category E-C. b. Demonstrate through the use of augmented inspections that corrosion is not occurring or that			

NO.	PROGRAM OR TOPIC	COMMITMENT	UFSAR SUPPLEMENT LOCATION (LRA APP. A)	ENHANCEMENT OR IMPLEMENTATION SCHEDULE	SOURCE
		corrosion is progressing so slowly that the age-related degradation will not jeopardize the intended function of the drywell shell through the period of extended operation. c. Develop a corrosion rate that can be inferred from past UT examinations. If degradation has occurred, evaluate the drywell shell using the developed corrosion rate to demonstrate that the drywell shell will have sufficient wall thickness to perform its intended function through the period of extended operation.			

B.2.1.28 ASME SECTION XI, SUBSECTION IWE

Program Description

The ASME Section XI, Subsection IWE aging management program is an existing condition monitoring program that provides for inspection of primary containment components including steel containment shells and their integral attachments, containment hatches and airlocks, penetration sleeves, pressure retaining bolting, and other pressure retaining components for loss of material and fretting or lockup in an indoor air or treated water environment. The scope of the Hope Creek ASME Section XI, Subsection IWE aging management program is consistent with the scope identified in Subsection IWE-1000 and includes the Class MC pressure retaining components and their integral attachments including wetted surfaces of submerged areas of the pressure suppression chamber and vent system, containment pressure-retaining bolting, and metal containment surface areas, including welds and base metal. Containment seals and gaskets are not included in the scope of this program; instead they are in the scope of the 10 CFR Part 50 Appendix J aging management program. Hope Creek utilizes a steel containment; therefore there are no Class CC containment components or their integral attachments inspected in accordance with Subsection IWL.

The containment original design did not require an internal moisture barrier at the junction of the drywell concrete floor and the steel drywell shell. However, Hope Creek has elected to install a moisture barrier and will include its examination in the scope of the program in accordance with the IWE 2500 requirements. Installation of the moisture barrier is planned prior to the period of extended operation.

The program is implemented through procedures that implement ASME Section XI, Subsection IWE requirements for detecting loss of material, loss of preload and fretting or lockup. The primary containment environments addressed are: air-indoor and treated water.

The program utilizes inspections that detect degradation before loss of intended function. No preventive attributes are associated with these activities. The program implements the requirements of IWE by providing visual examinations (General Visual and VT-3) and augmented inspections (VT-1) for evidence of aging effects that could affect structural integrity or leak tightness of the primary containment. Areas subject to augmented inspection are subject to visual inspection (VT-1) and volumetric (ultrasonic) examination techniques as required by engineering. The program addresses the E-A and E-C examination categories described in Table IWE-2500-1 and as approved per 10 CFR 50.55a. The ASME 2001 Code and 2003 Addenda do not contain categories E-B, E-D, E-F, E-G and E-P. The program specifies examinations of accessible surfaces to detect the aging effects of loss of material and loss of preload as addressed in IWE-3500. The frequency and scope of examinations specified is in accordance with 10 CFR 50.55a and ASME Section XI, Subsection IWE-2400.

The Hope Creek aging management program complies with Subsection IWE of ASME Section XI, 2001 Edition including 2003 Addenda, for steel containment (Class MC) pressure retaining components and their integral attachments, in accordance with the provisions of 10 CFR 50.55a. The requirements of IWE-2430 were removed from this Code year and are not applicable to Hope Creek. The monitoring methods have been demonstrated effective in detecting the applicable aging effects and the frequency of monitoring is adequate to prevent significant aging.

The Hope Creek ASME Section XI, Subsection IWE Program is enhanced to incorporate applicable aging management activities, recommended in the Final Interim Staff Guidance LR-ISG-2006-01, needed to address the potential loss of material due to corrosion in inaccessible areas of the containment drywell.

The Hope Creek ASME Section XI, Subsection IWE aging management program provides for periodic inspections for the presence of age related degradation on all accessible surfaces of the containment on a scheduled basis. When examination results require an evaluation or the component is repaired and is found to be acceptable for continued service, the areas containing such flaws, degradation, or repair are reexamined during the next inspection period, in accordance with Examination Category E-C.

The acceptance criteria for the ASME Section XI, Subsection IWE aging management program are in accordance with the requirements of the 2001 Edition with 2003 Addenda of the ASME Code, Subsections IWE-3000 and IWE-3500. In this code year, Table IWE-3410-1 was replaced with a reference to Subsection IWE-3500.

The Hope Creek ASME Section XI, Subsection IWE aging management program implementing procedures and references contain the acceptance criteria for containment surface examinations. Category E-A examinations are conducted by a Certified VT-3 examiner or engineer; and Category E-C examinations are conducted by a Certified VT-1 examiner or engineer. Indications are evaluated and compared to acceptance standards in implementing procedures. The IWE Responsible Individual is responsible for evaluation of examination results. Unacceptable conditions are recorded and documented in accordance with the corrective action process and supplemental examinations are performed in accordance with IWE-3200. Conditions which do not meet the acceptance criteria are accepted by an engineering evaluation or corrected by repair or replacement in accordance with IWE-3122.

Repairs and reexaminations, when required, are performed in accordance with IWA-4000 as required by IWE-3124 and the components are repaired or replaced to the extent necessary to meet the acceptance standards of IWE-3500. Component reexaminations are conducted in accordance with the requirements of IWA-2200 and the results are recorded to demonstrate that the repair meets the owner defined acceptance standards per IWE-3500.

The program will be enhanced, as noted below, to provide reasonable assurance that the ASME Section XI, Subsection IWE program aging effects will be adequately managed during the period of extended operation.

NUREG-1801 Consistency

The ASME Section XI, Subsection IWE aging management program is consistent with the ten elements of aging management program XI.S1, "ASME Section XI, Subsection IWE," 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. Install an internal moisture barrier at the junction of the drywell concrete floor and the steel drywell shell prior to the period of extended operation. **Program Elements Affected: Scope of Program (Element 1)**

2. Revise the Hope Creek ASME Section XI, Subsection IWE implementing documents to require inspection of the moisture barrier for loss of sealing in accordance with IWE 2500 after it is installed. The original design for Hope Creek did not require an internal moisture barrier at the junction of the drywell concrete floor and steel drywell shell. **Program Elements Affected: Scope of Program (Element 1)**

3. Verify that the reactor cavity seal rupture drain lines are clear from blockage and that the monitoring instrumentation is functioning properly once prior to the period of extended operation, and one additional time during the first 10 years of the period of extended operation. **Program Elements Affected: Scope of Program (Element 1)**

4. ***Establish drainage capability from the bottom of the drywell air gap on or before June 30, 2015. The drywell air gap will be divided into four approximately equal quadrants. Drainage consists of one drain in each quadrant for a total of four drains. Each drain will be open at the bottom of the drywell air gap and be capable of draining water from the air gap.***

   Verify that drains at the bottom of the drywell air gap are clear from blockage once prior to the period of extended operation, and one additional time during the first 10 years of the period of extended operation. **Program Elements Affected: Scope of Program (Element 1)**

5. Investigate the source of any leakage detected by the reactor cavity seal rupture drain line instrumentation and assess its impact on the drywell shell. **Program Elements Affected: Scope of Program (Element 1)**

6. ***After drainage has been established from the bottom of the air gap from all four drains,*** ~~M~~*m*onitor the drains at the bottom of the drywell air gap daily for leakage in the event leakage is detected by the reactor cavity seal rupture drain line instrumentation. **Program Elements Affected: Scope of Program (Element 1)**

7. Monitor penetration sleeve J13 daily for water leakage when the reactor cavity is flooded up. ***In addition, perform a walkdown of the torus room to detect any leakage from other drywell penetrations. These actions shall continue*** until corrective actions are taken to prevent leakage through J13 ***or through the four air gap drains.*** **Program Elements Affected: Scope of Program (Element 1)**

8. ***Until drainage is established from all four drains, when the reactor cavity is flooded up, perform boroscope examination of the bottom of the drywell air gap through penetrations located at elevation 93' in four quadrants, 90 degrees apart. The personnel performing the boroscope examination shall be certified as VT-1 inspectors in accordance ASME Section XI, Subsection IWA-2300, requirements. The examiners will look for signs of water accumulation and drywell shell corrosion. Adverse conditions will be documented and addressed in the corrective action program.***

   After drainage has been established from the bottom of the air gap from all four drains, ~~M~~*m*onitor the lower drywell air gap drains daily for water leakage when the reactor cavity is flooded up. **Program Elements Affected: Scope of Program (Element 1)**

9. ***Until drainage is established from all four drains,*** ~~P~~*p*erform UT thickness measurements ***each refuel outage*** from inside the drywell in the area of the drywell shell below the J13 penetration sleeve area to determine if there is a significant corrosion rate occurring in this area due to periodic exposure to reactor cavity leakage. ***In addition, UT measurements shall be performed each refuel outage around the full 360 degree circumference of the drywell between elevations 86'-11" and 88'-0" (underside of the torus down comer vent piping penetrations).*** Inspection and acceptance criteria will be in accordance with IWE-2000 and IWE-3000 respectively. ***The results of the UT measurements shall be used to establish a corrosion rate and demonstrate that the effects of aging will be adequately managed such that the drywell can perform its intended function until April 11, 2046. Evidence of drywell shell degradation will be documented and addressed in the corrective action program.***

   After drainage has been established from the bottom of the air gap from all four drains, UT thickness measurements will be taken each of the next three refueling outages at the same locations as those ***previously*** examined ***as described above***. ~~in 2010~~ These UT thickness measurements will be compared to the results of the ***previous*** ~~initial~~ UT inspections ~~performed during the October 2010 refueling outage~~ and, if corrosion is ongoing, a corrosion rate will be determined for the drywell shell. In the event a significant corrosion rate is detected, the condition will be entered in the corrective action process for evaluation and extent of condition determination. **Program Elements Affected: Detection of Aging Effects (Element 4)**

10. The cause of the reactor cavity water leakage will be investigated and repaired, if practical, before PEO. If repairs cannot be made prior to the PEO, the

program will be enhanced to incorporate the following aging management activities, as recommended in the Final Interim Staff Guidance LR-ISG-2006-01. **Program Elements Affected: Detection of Aging Effects (Element 4), Monitoring and Trending (Element 5), Acceptance Criteria (Element 6), and Corrective Actions (Element 7)**

a. Identify drywell surfaces requiring examination and implement augmented inspections for the period of extended operation in accordance with IWE-1240, as identified in Table IWE-2500-1, Examination Category E-C. **Program Elements Affected: Detection of Aging Effects (Element 4), and Monitoring and Trending (Element 5)**

b. Demonstrate through the use of augmented inspections that corrosion is not occurring or that corrosion is progressing so slowly that the age-related degradation will not jeopardize the intended function of the drywell shell through the period of extended operation. **Program Elements Affected: Corrective Actions (Element 7)**

c. Develop a corrosion rate that can be inferred from past UT examinations. If degradation has occurred, evaluate the drywell shell using the developed corrosion rate to demonstrate that the drywell shell will have sufficient wall thickness to perform its intended function through the period of extended operation. **Program Elements Affected: Acceptance Criteria (Element 6) and Corrective Actions (Element 7)**

Hufnagel Jr, John G:(GenCo-Nuc)

From: Gallagher, Michael P. (VP Nuclear):(GenCo-Nuc)
Sent: Wednesday, May 18, 2011 6:39 PM
To: Hufnagel Jr, John G:(GenCo-Nuc)
Subject: Re: Hope Creek RAI B 2 1 28-4 Response KPM

I approve
Mike Gallagher

Sent from my BlackBerry Wireless Device

From: Hufnagel Jr, John G:(GenCo-Nuc)
To: Gallagher, Michael P. (VP Nuclear):(GenCo-Nuc)
Sent: Wed May 18 15:17:46 2011
Subject: Hope Creek RAI B 2 1 28-4 Response KPM

Mike,

Attached is the latest response package. We are on the hook to send this to NRC in draft form today - should I wait for your review to do that, or mark it DRAFT and send it now? Thanks, Mike.

- John.