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SEP 7 2010

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U.S. Nuclear Regulatory Commission
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Hope Creek Generating Station
Facility Operating License No. NPF-57
NRC Docket No. 50-354

Subject: Supplement to the Hope Creek Generating Station License Renewal Application to include Low Voltage Power Cables in the scope of the Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements (E-3) Program

Reference: August 16, 2010 Teleconference with NRC Staff Regarding Inclusion of Low Voltage Power Cables in the scope of the Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program

As a result of discussions held between representatives of PSEG Nuclear and NRC staff in the referenced teleconference, PSEG Nuclear is supplementing its License Renewal Application (LRA) to include Low Voltage Power Cables in the scope of its Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program. The LRA changes associated with this supplement are provided in the Enclosure to this letter. The changes are explained, and where appropriate to facilitate understanding, portions of the LRA are repeated with the changes highlighted by strikethroughs for deleted text and bolded italics for inserted text.

This submittal has been discussed with the NRC License Renewal Project Manager for the Hope Creek License Renewal project.

Commitment number 37 of the License Renewal Commitment List is modified as shown on page 7 of the Enclosure. There are no other new or revised regulatory commitments contained in this letter.

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

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

Executed on 9/7/10

Sincerely,

Robert C. Braun
Senior Vice President, Operations
PSEG Nuclear LLC

Enclosure: Changes to the Hope Creek Generating Station License Renewal Application Associated with the Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements (E-3) Program

cc: Regional Administrator – USNRC Region I
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Enclosure

Changes to the Hope Creek Generating Station License Renewal Application Associated with the Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements (E-3) Program

Introduction

This enclosure contains an update to the information provided in the Hope Creek Generating Station License Renewal Application (LRA) related to the Hope Creek Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program. The LRA is being updated as a result of discussion held with NRC NRR Staff. Included in this update are changes to LRA Appendix A and Appendix B. The changes and the affected sections and pages of the LRA are described below.

Change Summary:

The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program scope is changed to include low voltage power cables (480 volts or greater) that are exposed to significant moisture. In addition, the criterion for significant voltage has been clarified because all inaccessible power cables (480V, 4,160V and 13,800V) exposed to significant moisture at Hope Creek are included in this program. No inaccessible power cable exposed to significant moisture was excluded from the program due to the "significant voltage" criterion. Finally, the operating experience has been updated to include the fact that there have been no underground or inaccessible low voltage cable failures at Hope Creek.

For clarity, the entire revised LRA Appendix A, Section A.2.1.37 (page A-30); Section A.5, License Renewal Commitment List Item No. 37 (page A-68); and LRA Appendix B, Section B.2.1.37 (pages B-167 through B-170) are provided with deleted text highlighted by strikethroughs and inserted text highlighted by bold italics as shown below.

Hope Creek Appendix A

A.2.1.37 Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements

The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program is a new program that will be used to manage the aging effects and mechanisms of non-EQ, in scope inaccessible ~~medium voltage~~ ***power*** cables ***(480 volts, 4,160 volts and 13,800 volts)***. These cables may at times be exposed to significant moisture simultaneously with significant voltage. Significant moisture is defined as periodic exposures that last more than a few days (e.g., cable in standing water). Periodic exposures that last less than a few days (e.g., normal rain and drain) are not significant. Significant voltage exposure is defined as being subject to system voltage for more than twenty-five percent of the time. ***Note that no inaccessible power cable exposed to significant moisture was excluded from the program due to the "significant voltage" criterion.*** The Hope Creek cables in the scope of this aging management program will be tested using a proven test for detecting deterioration of the insulation system due to wetting, that is state-of-the-art at the time the test is performed. The cables will be tested at least once every 10 years, and the first tests will be completed prior to the period of the extended operation.

Manholes and cable vaults associated with the cables included in this aging management program will be inspected for water collection (with water removal as necessary). Prior to the period of extended operation, the frequency of inspections for accumulated water will be established based on inspection results to keep the cables infrequently submerged. The objective of the inspections, as a preventive action, is to keep the cables infrequently submerged, thereby minimizing their exposure to significant moisture. This approach to determining inspection frequency recognizes that a recurring inspection, set at the optimum frequency, would result in the cables being submerged only as a result of event driven, rain and drain, type occurrences. ***Station procedures will direct the assessment of the cable condition as a result of rain or other event driven occurrences***. As a limit on the amount of time between inspections, the maximum time between inspections will be no more than 2 years.

The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program will be enhanced as follows:

1. ***Add low voltage power cables (480 volts or greater) to the scope of the program.***

This new program, ***including the enhancement,*** will be implemented prior to the period of extended operation. In addition, initial cable tests will be implemented prior to the period of extended operation and sufficient manhole/cable vault inspections will be performed prior to the period of

extended operation so that proper inspection frequencies are established to keep cables infrequently submerged during the period of extended operation.

Hope Creek Appendix B

B.2.1.37 Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements

Program Description

The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program is a new program that manages inaccessible ~~medium voltage~~ ***power*** cables ***(480 volts, 4,160 volts and 13,800 volts)*** that are exposed to significant moisture simultaneously with significant voltage.

Significant moisture is defined as periodic exposure to moisture that last more than a few days (e.g., cable in standing water). Periodic exposure to moisture that last less than a few days (i.e., normal rain and drain) is not significant. Significant voltage exposure is defined as being subjected to system voltage for more than twenty-five percent of the time. ***Note that no inaccessible power cable exposed to significant moisture was excluded from the program due to the "significant voltage" criterion.***

Development of this program will consider the technical information and guidance provided in NUREG/CR-5643, IEEE Standard P1205, SAND 96-0344, and EPRI TR-109619. In scope, non-EQ, inaccessible ~~medium voltage~~ ***power*** cables subject to significant moisture and voltage will be tested as part of this aging management program. These ~~medium voltage~~ ***power*** cables will be tested using a proven test for detecting deterioration of the insulation system due to wetting, such as power factor, partial discharge, or polarization index, as described in EPRI TR-103834-P1-2, or other testing that is state-of-the-art at the time the test is performed. Cable testing will be performed at least once every ten years. The first tests will be completed prior to the period of the extended operation.

Manholes and cable vaults associated with the cables included in this aging management program will be inspected for water collection (with water removal as necessary). In scope, non-EQ, inaccessible ***power*** cables subject to significant moisture and voltage will be evaluated, so that draining or other corrective actions can be taken. Prior to the period of extended operation, the frequency of manhole and cable vault inspections for accumulated water will be established based on inspection results to keep the cables infrequently submerged. This adjustment in inspection frequency recognizes that the objective of the inspections, as a preventive action, is to keep the cables infrequently submerged, thereby minimizing their exposure to significant moisture. This adjustment in inspection frequency also recognizes that a recurring inspection, set at the optimum frequency, would result in the cables

being submerged only as a result of event driven, rain and drain, type occurrences. ***Station procedures will direct the assessment of the cable condition as a result of rain or other event driven occurrences.*** The maximum time between inspections will be no more than two years. Sufficient manhole/cable vault inspections will be performed prior to the period of extended operation so that proper inspection frequencies are established to keep cables infrequently submerged during the period of extended operation.

NUREG-1801 Consistency

The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program is a new aging management program that is consistent with NUREG-1801 aging management program XI.E3, "Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements."

Exceptions to NUREG-1801

None.

Enhancements

~~None.~~

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

1. ***Add low voltage power cables (480 volts or greater) to the scope of the program. Program Elements Affected: Scope of Program (Element 1)***

Operating Experience

The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program is a new preventive and condition monitoring program that manages inaccessible ~~medium voltage~~ ***power*** cable exposed to significant moisture simultaneously with significant voltage. Demonstration that the effects of aging are effectively managed is achieved through objective evidence which shows that the localized damage and breakdown of insulation leading to electrical failure due to moisture intrusion and water trees are being adequately managed. The following examples of operating experience at Hope Creek provide objective evidence that the Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program will be effective in assuring that intended functions will be maintained consistent with the current licensing basis for the period of extended operation:

1. In response to NRC Generic Letter 2007-01, Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients, Hope Creek ~~was~~ reported ~~to have~~ no history of failures of inaccessible or underground medium ***or low (480V or greater)*** voltage ***power*** cables. A cable condition-monitoring program has not yet been implemented for medium ***or low*** voltage ***power*** cable. However, a representative sample of medium voltage cables have been routinely monitored since initial plant operations as part of existing maintenance procedures for periodically megger testing rotating electrical equipment. These tests include the power cables from the electrical switchgear to the equipment motor windings. Polarization Index (PI) testing for rotating equipment is performed with the power feeder cable connected. This example provides objective evidence that in-scope 4 kV cable insulation is in satisfactory condition, and detection methods exist such that if any aging effects of interest for this new program do occur, they would be detected prior to loss of intended function.

2. In August 2007 the cable vaults for class 1E motor feeds and controls for service water were observed to be potentially flooded in the vicinity of the Manhole 102 yard area. The vaults were observed at the time to be under standing water from recent heavy rain. Each vault contains four power cables, one medium voltage 5 kV cable (Okonite with EPR insulation and Hypalon jacket) and three other 480-volt cables. The power cable in question is designed for direct burial. A corrective action process notification was initiated to address the impact on the cable vaults. The Hope Creek yard area in the vicinity of the cable vaults was re-graded to minimize rainwater (and brackish service water yard dumps) from pooling on top of the vaults, creating a swale from the vault area to the storm drain south of the vault. Corrective actions included a technical evaluation. Two cable vaults have been inspected. The cables were found submerged in water. The water was pumped out of the cable vault. The cable vault structure was found to be in good material condition. The remaining cable vaults are scheduled for inspection. This example provides objective evidence that corrective actions are taken to in response to industry operating experience and to minimize the water intrusion into the cable vaults.

3. A self-assessment was conducted in February 2008 evaluating critical medium voltage underground cable in response to industry generic operating experience. The assessment addressed testing practices, spare cable contingencies and potential vulnerabilities. The report concluded that existing underground medium voltage cable insulation (EPR) is considered to be the best material for this application. Best industry practices were evaluated for cable monitoring and testing, and follow-up actions were created to develop the test program and institute preventive maintenance activities for this shielded cable. This example provides objective evidence that industry operating experience will be used to improve the program such that if any aging effects of interest do occur, they would be detected prior to loss of intended function.

4. ***Hope Creek has no history of failures of inaccessible or underground low voltage (480V) power cables. In addition, individual inaccessible low voltage power cables have been routinely monitored (every 6 refueling outages) since initial plant operations as part of existing maintenance procedures for periodically inspecting, cleaning, and testing the 480V Service Water Intake Structure Motor Control Centers (SWIS MCC). Megger testing for the SWIS MCC bus bars is performed with the incoming power feeder cable connected. The incoming power feeder cable is from the 480V substation located in the Reactor Building. The results of the megger tests show that the incoming feeder cables are in good condition. This example provides objective evidence that in-scope 480V cable insulation is in satisfactory condition, and detection methods exist and the test frequency are adequate such that if any aging effects of interest for this new program do occur, they would be detected prior to loss of intended function.***

Problems identified would not cause significant impact to the safe operation of the plant, and adequate corrective actions were taken to prevent recurrence. There is sufficient confidence that the implementation of the Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program will effectively identify degradation prior to failure. Appropriate guidance for re-evaluation, repair, or replacement is provided for locations where degradation is found. Assessments of the Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program are performed to identify the areas that need improvement to maintain the quality performance of the program.

Conclusion

The new Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program will provide reasonable assurance that the inaccessible ~~medium voltage~~ ***power*** cables exposed to significant moisture ~~and significant voltage~~ will be adequately managed so that the intended functions of these cables will be maintained consistent with the current licensing basis during the period of extended operation.

A.5 - LICENSE RENEWAL COMMITMENT LIST

Hope Creek LRA Table A.5 License Renewal Commitment List Item No. 37 is revised as shown below as a result of this RAI response. Any other actions described in this submittal represent intended or planned actions. They are described for the NRC's information and are not regulatory commitments.

NO.	PROGRAM OR TOPIC	COMMITMENT	UFSAR SUPPLEMENT LOCATION (LRA APP. A)	ENHANCEMENT OR IMPLEMENTATION SCHEDULE	SOURCE
37	Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements is a new program that will be used to manage the aging effects and mechanisms of non-EQ, in scope inaccessible ~~medium voltage~~ ***power*** cables ***(480V, 4,160V, 13,800V)***. Manholes and cable vaults associated with the cables included in this aging management program will be inspected for water collection (with water removal as necessary) with the objective of keeping the cables infrequently submerged, thereby minimizing their exposure to significant moisture. Prior to the period of extended operation, the frequency of inspections for accumulated water will be established based on inspection results to keep the cables infrequently submerged. The maximum time between inspections will be no longer than two years. ***The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program will be enhanced as follows:*** ***1. Add low voltage power cables (480 volts or greater) to the scope of the program.***	A.2.1.37	***Enhanced*** program and initial cable tests to be implemented prior to the period of extended operation. Sufficient manhole/cable vault inspections to be performed prior to the period of extended operation so that proper inspection frequencies are established to keep cables infrequently submerged during the period of extended operation.	Section B.2.1.37 Hope Creek Letter LR-N10-0190 RAI B.2.1.37-01 Hope Creek Letter LR-N10-0190 RAI B.2.1.37-02 ***Hope Creek Letter LR-N10-0325 LRA Supplement***