NRR-DMPSPEm Resource

From: Kim, James
Sent: Thursday, September 6, 2018 9:56 AM
To: Duke, Paul R.; Thomas, Brian J.
Cc: Marabella, Lee A.
Subject: Hope Creek - Final RAI RE: Inverter AOT Extension
Attachments: Hope Creek Inverter AOT - Final RAI.docx

By letter dated April 13, 2018 (Agencywide Documents Access management System (ADAMS) Accession No. ML18103A218), Public Service Enterprise Group Nuclear LLC (PSEG, the licensee), requested an amendment to the Renewed Facility Operating License NPF-57 for Hope Creek Generating Station (HCGS) Unit 1. The proposed license amendment request (LAR) would revise the Technical Specifications (TS) 3.8.3.1, "Distribution – Operating," to increase the allowed outage time (AOT) for restoring inoperable alternate current (AC) inverter(s) to operable status from 24 hours to 7 days.

The NRC staff has determined that the additional information is required for the staff to complete its review. On August 21, 2018, the NRC staff sent PSEG the draft Request for Additional Information (RAI). This RAI relates to the licensee's request to increase AOT for restoring inoperable AC inverter(s).

On September 5, 2018, the NRC staff and the licensee held a conference call to clarify the request. A publicly available version of this final RAI (attached) will be placed in the NRC's ADAMS. Subsequently, the licensee agreed to respond to this request by October 12, 2018.

Jim Kim
Project Manager – Hope Creek Generating Station
NRR/DORL/LPL1
301-415-4125

Hearing Identifier: NRR_DMPS
Email Number: 552

Mail Envelope Properties (James.Kim@nrc.gov20180906095500)

Subject: Hope Creek - Final RAI RE: Inverter AOT Extension
Sent Date: 9/6/2018 9:55:39 AM
Received Date: 9/6/2018 9:55:00 AM
From: Kim, James

Created By: James.Kim@nrc.gov

Recipients:
"Marabella, Lee A." <Lee.Marabella@pseg.com>
Tracking Status: None
"Duke, Paul R." <Paul.Duke@pseg.com>
Tracking Status: None
"Thomas, Brian J." <Brian.Thomas@pseg.com>
Tracking Status: None

Post Office:

Files	Size	Date & Time
MESSAGE	1261	9/6/2018 9:55:00 AM
Hope Creek Inverter AOT - Final RAI.docx	30042	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

REQUEST FOR ADDITIONAL INFORMATION
HOPE CREEK GENERATING STATION UNIT 1
LICENSE AMENDMENT REQUEST TO REVISE TECHNICAL SPECIFICATIONS 3.8.3.1
REGARDING ALTERNATING CURRENT INVERTERS
DOCKET NO. 50-354
(CAC/EPID:000976/L-2018-LLA-0140)

By letter dated April 13, 2018 (Agencywide Documents Access management System (ADAMS) Accession No. ML18103A218), Public Service Enterprise Group Nuclear LLC (PSEG, the licensee), requested an amendment to the Renewed Facility Operating License NPF-57 for Hope Creek Generating Station (HCGS) Unit 1. The proposed license amendment request (LAR) would revise the Technical Specifications (TS) 3.8.3.1, "Distribution – Operating," to increase the allowed outage time (AOT) for restoring inoperable alternate current (AC) inverter(s) to operable status from 24 hours to 7 days.

The Electrical Engineering Operating Branch (EEOB) staff has determined that the following additional information is needed to complete the review of the HCGS LAR.

Regulatory Requirements:

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.36, "Technical Specifications," requires, in part, that the operating license of a nuclear production facility include TS. 10 CFR 50.36 (c)(2) requires that the TS include limiting conditions for operation (LCOs) which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met.

The EEOB staff also considered the following guidance document to evaluate the LAR:

Branch Technical Position (BTP) 8-8, "Onsite (Emergency Diesel Generators) and Offsite Power Sources Allowed Outage Time Extensions," was developed by the NRC staff to provide guidance for reviewing LARs for AOT extensions for the onsite and offsite electrical power sources to perform online maintenance of the power sources.

EEOB RAI - 1

In the LAR, the licensee proposed to extend the AOT for restoring inoperable inverter (s) in one channel to operable status from 24 hours to 7 days, which is a 6-day extension. The licensee stated that the current 24-hour AOT can be insufficient in certain instances to support on-line troubleshooting, corrective maintenance, and post-maintenance testing in response to emergent issues. The licensee further states:

> [if] the emergent issue had required complex troubleshooting or more extensive post-maintenance testing, or if backup, burnt in replacement components were not available on site, the process of returning the inverter to operable status could have taken more than 24 hours. The recommended burn-in period for replacement circuit cards is 50 hours.

In addition, the licensee stated that HCGS performs preventive maintenance on the safety related UPS units during each refueling outage and has no current plans to perform routine

preventive maintenance on a scheduled basis at power. The licensee provided operating experience instances for inoperable inverters.

The NRC staff's guidance in BTP 8-8 for reviewing LARs for AOT extensions for electrical power sources states that "the licensee must provide justification for the duration of the requested AOT (actual hours plus margin) based on plant-specific past operating experience." The NRC staff notes that the inoperable inverters were returned to operable status within the existing 24-hour AOT in each of the HCGS operating experience instances, and the licensee did not provide a technical justification for the proposed extended AOT. Therefore, the NRC staff requests the following information:

Provide a discussion that details a technical justification for the proposed inverter AOT extension based on the HCGS plant-specific past operating experience and vendor recommendations for performing maintenance on the inverters.

EEOB RAI 2

LAR Section 2.1, "System Design and Operation," states:

> The Class 1E AC power system is designed to provide reliable source of power to all Class 1E loads in the plant. The system is divided into 4 channels (A, B, C, D). These loads are essential for safe and orderly shutdown of the plant, maintaining the plant in a safe condition, and mitigating the consequences of an accident. The loads are divided into 4 groups such that any combination of 3 out of the 4 groups has the ability to supply the minimum required safety loads to perform the above functions. The channels do not have load sharing ability. Each of these channels has two associated Class 1E 120 V [volts] AC uninterruptable power supply (UPS) units. […]
>
> Each UPS is comprised of a static rectifier, a static inverter, a static switch assembly, and a regulated power supply.

The licensee provided a summary of the effects of an inverter failure on the plant safety systems, controls, and indications for each 120 V AC distribution panel fed by its associated inverter. The failure of each of the two inverters in a channel has different impacts on the plant.

The NRC staff's guidance in BTP 8-8 for reviewing LARs for AOT extensions for electrical power sources recommends the provision of a supplemental power source capable of performing the function of the inoperable equipment during the extended AOT. The NRC staff notes that the licensee did not discuss the provision of a supplemental power source during the extended AOT. To allow the NRC staff to evaluate the technical adequacy of the extended AOT for inoperable inverters, provide the following information:

In case another inverter would fail in a redundant channel during the proposed extended AOT for restoring inoperable inverters in one channel to operable status, provide a discussion that describes:

a- The plant response and the effects on the plant safety-related systems required to mitigate a design basis event (DBE) and their safety functions.

b- The use of a supplemental 120 V AC power source such as a spare inverter or a UPS, the compensatory measures, equipment alignment, and the procedures in place to address the potential consequences to the plant in the event of a DBE or an anticipated operational occurrence if there would be a potential loss of safety functions or reduction in defense in depth of affected safety systems. If there is not a need to use a supplemental 120 V AC power source, please provide a justification.