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PSEG
Nuclear L.L.C.

Generic Letter 2004-02

LR-N08-0160
July 10, 2008

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

Salem Generating Station – Unit 1 and Unit 2
Facility Operating License Nos. DPR-70 and DPR-75
NRC Docket Nos. 50-272 and 50-311

Subject: Response to NRC Request for Information Regarding PSEG Request for Extension to Complete Generic Letter 2004-02 Testing

Reference: 1) Letter from Robert C. Braun (PSEG Nuclear LLC) to USNRC, June 26, 2008

This letter responds to the NRC draft request for additional information transmitted to PSEG on June 30, 2008, regarding PSEG's request in Reference 1 for an extension to complete testing associated with Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors," for Salem Nuclear Generating Station, Unit Nos. 1 and 2.

Attachment 1 to this letter provides the requested information.

Should you have any questions regarding this submittal, please contact Mr. Paul Duke at 856-339-1466.

Sincerely,

Jeffrie Keenan
Manager - Licensing

A116
NRR

Attachment
1. Response to Request for Additional Information

cc: S. Collins, Regional Administrator – NRC Region I
R. Ennis, Project Manager - USNRC
NRC Senior Resident Inspector - Salem
P. Mulligan, Manager IV, NJBNE

Attachment 1
LR-N08-0160

Response to NRC Request for Information Regarding PSEG Request for Extension to Complete Generic Letter 2004-02 Testing

Salem Generating Station – Unit 1 and Unit 2

NRC Docket No. 50-354

By letter dated June 26, 2008, PSEG Nuclear LLC (PSEG) requested an extension to complete corrective actions associated with Nuclear Regulatory Commission (NRC) Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors," for Salem Nuclear Generating Station (Salem), Unit Nos. 1 and 2. Specifically, PSEG requested an extension to December 31, 2008, for completion of the corrective actions and an additional 90 days to provide an updated GL 2004-02 submittal to the NRC (i.e., prior to March 31, 2009). In a conference call and in a followup transmittal to PSEG on June 30, 2008, the NRC staff requested additional information to support the extension request.

PSEG's responses are provided below.

1) Please provide details of contingency actions (analyses or modifications) that PSEG will take to ensure that testing completed in the requested extension window will ensure issues associated with GL 2004-02 are fully addressed and that actions required to place the plant within the conditions bounded by the testing will occur by a certain date given the test results. This may involve the need for an additional extension request. There should be confidence that all contingency actions, if needed, will be completed no later than the end of 2009.

   PSEG Response
   PSEG is planning to perform a series of bench top testing to show that the formation of chemical precipitates will not occur until after sub-cooling of the containment sump water. This condition will provide adequate NPSH margin for addressing chemical effects. This testing is currently scheduled to start during the first week of August 2008.

   Also, additional strainer head loss and chemical effects testing are scheduled to be performed at the CCI facility. The debris load on the strainers will be reduced from a conservative debris load used in the testing earlier this year. The planned testing in conjunction with the bench top testing is expected to demonstrate the capability of the Salem sump strainer design to mitigate the debris and chemical load from a design basis accident with the current configuration.

   To facilitate the planning of contingency actions, should the strainer testing not demonstrate satisfactory performance for Salem's current configuration, the test

will be structured to determine one or more debris load combinations that can be mitigated by the Salem sump strainers.

The contingency actions that PSEG is considering include analysis and/or modifications. Analytical contingencies would be the preferred approach and include further reduction of conservatism in the debris loading and transport calculations. Depending on the test results, the modifications could include one or more of the following: modification of insulation to reduce fiber load, reduce the amount of aluminum inside containment, and installing additional strainers.

The December 31, 2008, completion date in the referenced letter does not allow for a significant contingency and may need to be extended if a contingency is required. However, PSEG plans to continue testing until satisfactory test results are obtained to identify any required analytical and/or plant modifications.

The planned bench top testing results are anticipated to be available by end of October 2008. The required head loss and chemical testing is also anticipated to be completed by end of October 2008. Beyond this date the Salem Unit 2 and 1 refueling outages are scheduled during October 2009 and April 2010, respectively. Therefore, PSEG believes the testing plan and contingency options provide assurance that the GSI-191 and GL 2004-02 issues will be resolved for Salem Units 1 and 2 by April 2010.

2) Please provide the available net positive suction head margin for each unit for the limiting emergency core cooling system (ECCS) alignment (one or two pump operation), and the total head losses associated with the clean strainer and debris, based on testing and analysis that has been completed to date. The NRC staff understands that there may be two conditions, one for non-chemical debris with hotter sump fluid early in the event and one with chemical debris added and cooler sump fluid later in the event. In addition, the staff understands that the limiting ECCS alignment may change based on the total strainer head loss (i.e., the limiting ECCS alignment may be different between the chemically laden debris bed and non-chemically laden debris bed).

PSEG Response
The following information is based on the Units 1 and 2 testing performed at the CCI facility in June 2008.

1. Unit 1 non-chemical debris head loss values are based on a measured non-chemical head loss value of 32.5 mbar (1.09 ft WC) at 41.3°C (106.34°F).

2. Unit 1 chemical debris head loss values are based on a measured chemical head loss value of 142 mbar (4.75 ft WC) at 46.2°C (115.16°F).

3. Unit 2 non-chemical debris head loss values are based on a measured non-chemical head loss value of 239.9 mbar (8.02 ft WC) at 47.7°C (117.86°F).

4. Unit 2 chemical debris head loss values are based on a measured chemical head loss value of 291 mbar (9.73 ft WC) at 45°C (113°F).

5. Units 1 and 2 non-chemical head loss values are viscosity and flow rate scaled.

6. Chemical head loss values are not scaled.

The computation of the total head loss values at various temperatures is provided in the following tables.

Attachment 1
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Table 1: Preliminary Head Loss Values without Chemical Effects at 193.7°F

Scenario	Clean Strainer Head Loss (ft-WC)	Debris Head Loss w/o Chemical Effects (ft-WC)	Total Head Loss w/o Chemical Effects (ft-WC)	Allowables	
				Hydraulic (ft-WC)	Structural (ft-WC)
Unit 1 – 1 pump (5110 gpm)	1.15	0.36	1.51	2.70	16.94
Unit 1 – 2 pump (8850 gpm)	3.32	0.63	3.95	9.18	16.94
Unit 2 – 1 pump (4980 gpm)	1.13	2.93	4.05	4.14	16.94
Unit 2 – 2 pump (8850 gpm)	3.55	5.2	8.75	9.18	16.94

Table 2: Preliminary Head Loss Values with Chemical Effects at 60°F

Scenario	Clean Strainer Head Loss (ft-WC)	Debris Head Loss with Chemical Effects (ft-WC)	Total Head Loss with Chemical Effects (ft-WC)	Allowables	
				Hydraulic (ft-WC)	Structural (ft-WC)
Unit 1 – 1 pump (5110 gpm)	1.19	4.75	5.94	25.4	16.94
Unit 1 – 2 pump (8850 gpm)	3.54	4.75	8.29	31.9	16.94
Unit 2 – 1 pump (4980 gpm)	1.13	9.73	10.86	26.9	16.94
Unit 2 – 2 pump (8850 gpm)	3.57	9.73	13.30	31.9	16.94

Table 3: Preliminary Head Loss Values with Chemical Effects at 175°F

Scenario	Clean Strainer Head Loss (ft-WC)	Debris Head Loss with Chemicals (ft-WC)	Total Head Loss with Chemicals (ft-WC)	Allowables	
				Hydraulic (ft-WC)	Structural (ft-WC)
Unit 1 – 1 pump (5110 gpm)	1.19	4.75	5.94	10.7	16.94
Unit 1 – 2 pump (8850 gpm)	3.54	4.75	8.29	17.2	16.94
Unit 2 – 1 pump (4980 gpm)	1.13	9.73	10.86	12.2	16.94
Unit 2 – 2 pump (8850 gpm)	3.57	9.73	13.30	17.2	16.94