Public Service
Electric and Gas
Company

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MAR 19 1992

NLR-N92031

United States Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Gentlemen:

RESPONSE TO SAFETY EVALUATION ON STATION BLACKOUT (SBO)
SALEM GENERATING STATION, UNITS 1 AND 2
DOCKET NOS. 50-272 AND 50-311

Public Service Electric and Gas (PSE&G) submits the attached information in response to the recommendations and questions identified in the NRC "Safety Evaluation of Response to the Station Blackout Rule, Salem Nuclear Generating Station, Units 1 and 2" dated January 13, 1992. Attachment 1 contains a response to each individual recommendation stated in the Safety Evaluation with the same section number and order as in the SER.

In response to the NRC Safety Evaluation, a reanalysis of the Salem Generating Station site specific historical weather data has been performed. This reanalysis was performed to verify that the Salem Generating Station is a four hour coping plant. The reanalysis utilizes weather data applicable to the Salem site and employs a more conservative approach to calculate the frequencies of Loss of Offsite Power (LOOP) due to severe weather (SW) and extremely severe weather (ESW) conditions. PSE&G believes the result of these calculations show that Salem Generating Station belongs to ESW Group 1 and SW Group 2. Based on these values, the Salem Generating Station falls into the four (4) hour SBO coping category in accordance with the guidance provided in NUMARC 87-00 and Regulatory Guide 1.155.

Based on a four hour SBO coping duration, a proposed schedule for completion of SBO response procedures and the proposed plant modifications is provided in Attachment 2. This schedule indicates achievement of compliance with 10CFR50.63 by January of 1994. Appropriate staff training programs will be initiated to assure an effective response to an SBO event.

PSE&G is currently proceeding with the schedule outlined in Attachment 2 for a four hour coping duration. If the NRC makes a final determination, after review of the enclosed material, that the Salem Generating Station is not a four hour coping plant, PSE&G may have to revise the schedule outlined in Attachment 2.

PSE&G would like to extend an offer to review our coping duration evaluation with the NRC staff. Please contact us at your earliest convenience regarding this matter.

Sincerely,

A. E. Burns

Attachments

C Mr. T. T. Martin, Administrator - Region I
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Mr. J. C. Stone, Licensing Project Manager - Salem
U. S. Nuclear Regulatory Commission
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Rockville, MD 20852

Mr. T. P. Johnson (S09)
USNRC Senior Resident Inspector

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ATTACHMENT NO. 1
NLR-N92031

2.1 STATION BLACKOUT DURATION

The licensee has calculated a minimum acceptable station blackout (SBO) duration of 4 hours based on a plant offsite power design characteristic Group "P1," an emergency AC (EAC) power configuration Group "D," and a target emergency diesel generator (EDG) reliability of 0.975. The target EDG reliability is based on Salem Generating Station having an average EDG reliability greater than 0.95 over the last 100 demands. The "P1" grouping is based on an independence of offsite power classification Group I 1/2," a severe weather (SW) classification Group "2," and an extremely severe weather (ESW) classification Group "2."

According to Table 3.2 of NUMARC 87-00, the expected frequency of LOOPs due to ESW conditions is ESW Group "4," which places the site in an offsite power design characteristic Group "P2." In the submittal, the licensee states that if site-specific data is used, the ESW group is "2," which places the site in an offsite power design characteristic Group "P1." Since the licensee has failed to justify the discrepancy between their ESW grouping and the one provided in NUMARC 87-00, we consider the site to be classified as "P2."

We agree with the licensee's EAC classification as Group "D" based on each unit having three EDGs, two of which are necessary to safely shutdown a unit.

The licensee selected an EDG target reliability of 0.975 based on EDG reliability data for the last 100 demands. The licensee should have an analysis showing the EDG reliability statistics for the last 20 and 50 demands in its SBO submitted supporting documentation.

Based on the plant's offsite power design characteristic Group "P2," and a target EDG reliability of 0.975 the minimum coping duration is 8 hours. Therefore, this Safety Evaluation (SE) is based upon the plant coping capability for a duration of 8 hours.

RESPONSE:

As suggested by the SAIC review, Salem Generating Station calculations for the expected frequency of LOOP due to ESW conditions have been revised to normalize the conductor height at 30 meters. The calculations are shown in the revised report No. NUS-5175 (Attachment 3). This report also demonstrates the appropriateness of using Wilmington National Weather Service (NWS) data

for calculating Salem Generating Station expected frequency of LOOP due to SW and ESW conditions and shows the conservativeness used in the calculations. For calculating expected frequency of LOOP due to SW conditions, the fastest one-minute wind data has been adjusted by adding 13mph instead of 10 mph as recommended by NUREG/CR 4492. This yields greater probabilities of LOOP. The calculations also use a vertical wind distribution which is more severe than that recommended in NUREG/CR 4492. For calculating expected frequency of LOOP due to ESW conditions, the calculations have used sustained winds (one-minute average) as suggested in NUREG/CR 4492 rather than fastest-mile winds (NUREG/CR-2639) to be conservative. The calculations also include an analysis of wind conditions at Atlantic coastal locations to get an extreme upper bound.

The calculations provide an estimated frequency of LOOP of 3.69 E-3 per year due to SW conditions and 2.02 E-6 per year due to ESW conditions. These verify that Salem Generating Station belongs to an ESW Group 1 and SW Group 2 in accordance with NUMARC 87-00, Table 3-1 and 3-4 respectively.

The extreme upper bound frequency of LOOP due to ESW conditions based on extreme winds at Atlantic coastal locations has been calculated as 8.06 E-4 per year. This corresponds to an ESW Group 2. These ESW and SW classifications based on an offsite power system (I Group) grouping of I 1/2 verify that Salem Generating Station belongs in the Offsite Power Design Characteristic Group of P1 in accordance with NUMARC 87-00, Table 3-5a.

The EDG reliability has been evaluated for the last 20 and 50 demands with the
same data used for 100 demands. This shows that the reliability is 0.95 for 20 demands and 0.98 for 50 demands. These are higher than the minimum required values of 0.90 for 20 demands and 0.94 for 50 demands specified in NUMARC 87-00. The calculations are shown in Attachment 4. This verifies that Salem Generating Station EDG target reliability is 0.975.

The Off-Site Power Design Characteristics Group P1, EAC classification of Group D and EDG target reliability of 0.975 verify that Salem Generating Station belongs in the SBO coping duration category of 4 hours in accordance with NUMARC 87-00, Table 3-8.

2.2.1 CONDENSATE INVENTORY FOR DECAY HEAT REMOVAL

RECOMMENDATION:

The licensee should provide an alternate and/or additional source of water to cope with an 8 - hour SBO event at the Salem plant.

RESPONSE:

As described in Section 2.1 the site specific weather data reanalysis verifies that Salem Generating Station falls into a four (4) hour coping duration category. Since the condensate inventory requirement for 4 hours is less than the technical specification minimum for the condensate storage tank, the condensate inventory is adequate for Salem Generating Station to cope with an SBO event as stated in the NRC Safety Evaluation.

2.2.2 CLASS IE BATTERY CAPACITY

RECOMMENDATION:

The licensee should add an alternative AC (AAC) source to power a battery charger or reevaluate and confirm the battery capability to support the SBO loads for an 8 - hour SBO coping duration. If load shedding or modifications are required, the licensee should submit this information for staff review.

RESPONSE:

For Salem Generating Station the battery capacity and capability have been verified to support the SBO coping and recovery components for a duration of four (4) hours as stated in the NRC Safety Evaluation. As discussed in Section 2.1, a reevaluation of the site specific weather data verifies and confirms an SBO coping duration of four (4) hours for Salem Generating Station.

2.2.3 COMPRESSED AIR

RECOMMENDATION:

The licensee should provide the plan for implementation of the above cited modification (addition of a permanently installed diesel-driven air compressor).

RESPONSE:

The Emergency Control Air System's (ECAS) primary function is to provide a backup to the station air system in order to supply compressed air to safety - related instrumentation, controls and equipment. The existing ECAS consists of two (2) redundant control air headers, two (2) redundant 500 SCFM at 110 PSIG motor driven air compressors, two (2) dual tower heatless desiccant - type air dryers and associated support equipment.

To mitigate the consequences of a Station Blackout (SBO) event a permanently installed diesel - driven air compressor rated 500 SCFM at 125 PSIG in a separately protective enclosure is planned to be installed.

A schedule for completion of this plant modification is provided in the Attachment 2.

2.2.4 EFFECTS OF LOSS OF VENTILATION

RECOMMENDATIONS:

Since the staff determined that the minimum coping duration for an SBO event at the Salem plant is 8 hours (See Section 2.1), the licensee should verify that the ventilation is adequate for equipment operability for an 8 - hour SBO event. In addition, the licensee should verify that the plant will have sufficient staff to perform the above cited operator actions within 30 minutes following an SBO event and that these operator actions are incorporated in the SBO response procedure in accordance with the guidance described in NUMARC 87-00.

RESPONSE:

As discussed in Section 2.1, the site specific weather data reanalysis verifies that the Salem Generating Station falls into a four (4) hour coping duration category. The analysis of the effects of loss of ventilation has verified the operability of SBO response equipment for this period as stated in the NRC Safety Evaluation.

Additionally, adequate SBO response procedures are planned to be prepared in the form of technical and emergency operating procedures to assist the operators in performing their intended functions during the SBO event. Adequate staff and training will be provided to perform the identified manual actions.

A schedule of preparation of various procedures and other plant modifications are provided in Attachment 2.

2.3 REACTOR COOLANT INVENTORY

RECOMMENDATION:

The licensee should state how and from where it plans to supplement the RCS inventory in order to keep the core covered and cooled during an 8 - hour SBO event.

RESPONSE:

As discussed in Section 2.1, on the basis of the reevaluation of the site specific weather data Salem Generating Station is classified as a four (4) hour coping duration category plant. Adequate coolant inventory is available for four (4) hours to keep the reactor core covered and cooled during an SBO event based on the MAAP analysis performed by PSE&G and submitted to the NRC on September 17, 1991..

2.5 PROPOSED MODIFICATIONS

RECOMMENDATION:

The licensee should consider other plant modifications, such as the addition of an AAC source, in order to achieve the required 8 - hour coping duration.

RESPONSE:

As discussed in Section 2.1, the site specific weather data reanalysis verifies that the Salem Generating Station is a four (4) hour coping duration category plant. The only plant modifications needed to establish Salem Generating Stations SBO coping capability are addition of a diesel-driven air compressor and Battery Room heaters. The schedule for these modifications are provided in Attachment 2.

2.7 EDG RELIABILITY PROGRAM

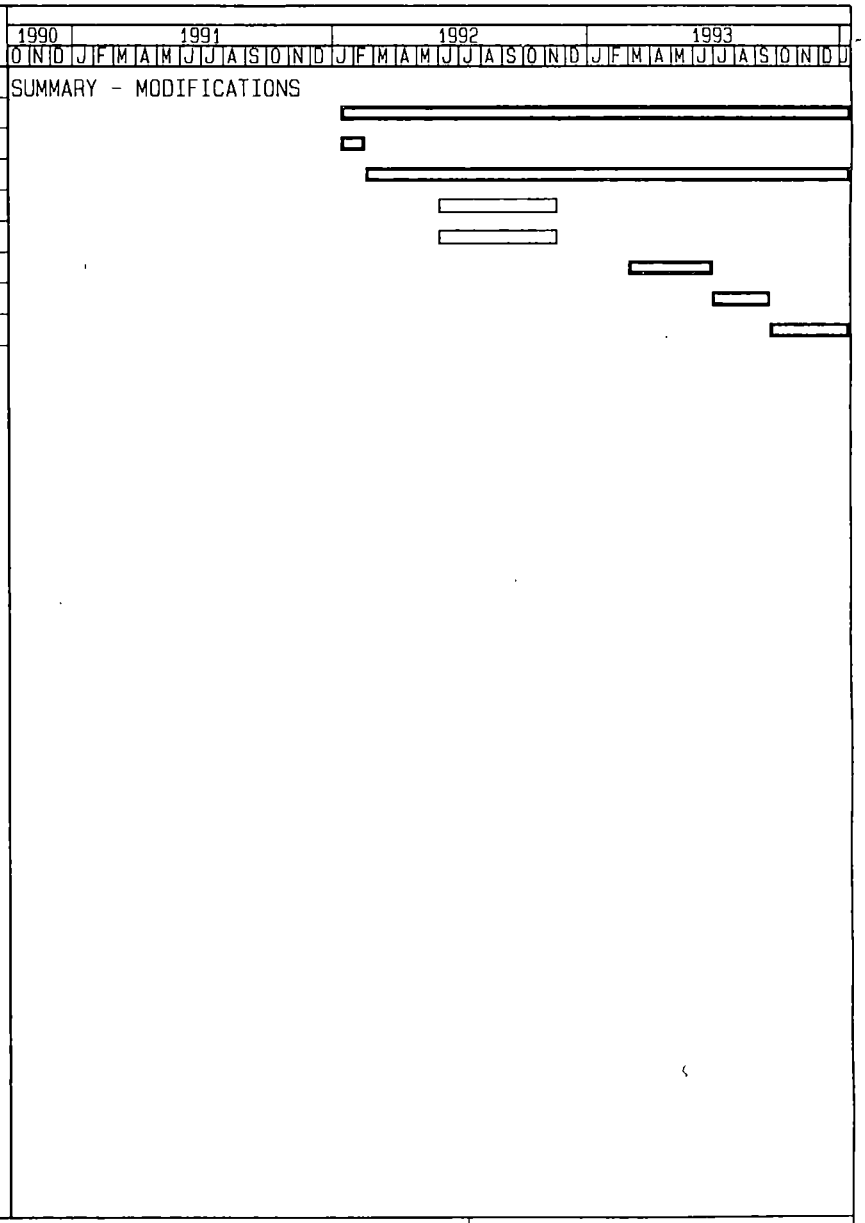
RECOMMENDATION:

The licensee should supplement an EDG reliability program which meets the guidance of RG 1.155, Section 1.2. If an EDG reliability program currently exists, the program should be evaluated and adjusted in accordance with RG 1.155. Confirmation that such a program is in place or will be implemented should be included in the documentation supporting the SBO submittals that is to be maintained by the licensee.

RESPONSE:

Development of a comprehensive EDG reliability program is being undertaken to satisfy the requirements of Regulatory Guide 1.155, Section 1.2, and NUMARC 87-00, Appendix D, and is scheduled to be completed by January of 1994.

ACTIVITY ID	ACTIVITY DESCRIPTION	ORIG DUR	EARLY START	EARLY FINISH
N.3.3A.1	SUMMARY - MODIFICATIONS	525	13JAN92	14JAN94
N.4.4.00	REVISE SBO PSP FOR SALEM	25	13JAN92	14FEB92
N.4.4A.0	PREPARE SBO PROCEDURES	500	17FEB92	14JAN94
N.4.5.00	DEVELOP AIR COMPRESSOR DCP	121	1JUN92	16NOV92
N.4.6.00	DEVELOP BATTERY ROOM HEATERS DCP	121	1JUN92	16NOV92
N.4.7.00	DCP CONSTRUCTON	88	1MAR93	30JUN93
N.4.8.00	DCP CLOSEOUT - PART "A"	60	1JUL93	22SEP93
N.4.9.00	DCP CLOSEOUT - PART "B"	82	23SEP93	14JAN94



Activity Bar/Early Dates
Critical Activity

Primavera Systems, Inc. 1986-1991

Planning Unit : Day

PSE&G

SALEM STATION BLACKOUT

Project Start : 10CT90
Project Finish: 14JAN94

Sheet 1 of 1

Data Date: 10CT90
Plot Date: 16MAR92

PLANNING & SCHEDULING - JOE ANDREOZZI EX 1708

Date	Revision	Checked	Approved