

November 1, 1988

Docket No. 50-311

Mr. Steven E. Miltenberger
Vice President and Chief Nuclear
Officer
Public Service Electric and Gas
Company
Post Office Box 236
Hancocks Bridge, New Jersey 08038

Dear Mr. Miltenberger:

SUBJECT: SCHEDULAR EXEMPTION FROM 10 CFR 50.46(a)(1)(i)

RE: SALEM GENERATING STATION, UNIT 2

In response to your letters dated October 21 and October 24, 1988, the Commission has issued the enclosed Exemption for the Salem Generating Station, Unit 2, from the requirements of Paragraph 50.46(a)(1)(i) of 10 CFR Part 50. It exempts Salem, Unit 2, from the requirement to have reevaluated the effect on peak clad temperature of steam generator tube plugging and unrecovered loose parts in the reactor vessel, using an updated Emergency Core Cooling System (ECCS) evaluation model and submitting the reanalysis in accordance with 10 CFR 50.46(a)(1)(i), until March 31, 1989. A copy of the Safety Evaluation supporting this exemption is also enclosed. A copy of the exemption has been forwarded to the Office of the Federal Register for publication.

Sincerely,

/s/

James C. Stone, Project Manager
Project Directorate I-2
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Exemption
- 2. Safety Evaluation

cc w/enclosures:
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

November 1, 1988

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Vice President and Chief Nuclear
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Public Service Electric and Gas
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Post Office Box 236
Hancocks Bridge, New Jersey 08038

Dear Mr. Miltenberger:

SUBJECT: SCHEDULAR EXEMPTION FROM 10 CFR 50.46(a)(1)(i) (TAC NO. 69814)

RE: SALEM GENERATING STATION, UNIT 2

In response to your letters dated October 21 and October 24, 1988, the Commission has issued the enclosed Exemption for the Salem Generating Station, Unit 2, from the requirements of Paragraph 50.46(a)(1)(i) of 10 CFR Part 50. It exempts Salem, Unit 2, from the requirement to have reevaluated the effect on peak clad temperature of steam generator tube plugging and unrecovered loose parts in the reactor vessel, using an updated Emergency Core Cooling System (ECCS) evaluation model and submitting the reanalysis in accordance with 10 CFR 50.46(a)(1)(i), until March 31, 1989. A copy of the Safety Evaluation supporting this exemption is also enclosed. A copy of the exemption has been forwarded to the Office of the Federal Register for publication.

Sincerely,

A handwritten signature in cursive script that reads "James C. Stone".

James C. Stone, Project Manager
Project Directorate I-2
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

Enclosures:

1. Exemption
2. Safety Evaluation

cc w/enclosures:
See next page

Mr. Steven E. Miltenberger
Public Service Electric & Gas Company

Salem Nuclear Generating Station

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)

PUBLIC SERVICE ELECTRIC AND)
GAS COMPANY)

(SALEM GENERATING STATION, UNIT 2))

Docket No. 50-311

EXEMPTION

I.

The Public Service Electric & Gas Company (the licensee) is the holder of Facility Operating License No. DPR-75 which authorizes operation of the Salem Generating Station, Unit 2, at a power level not in excess of 3411 megawatts thermal. The facility is a pressurized water reactor located at the licensee's site in Salem County, New Jersey. The license provides, among other things, that the facility is subject to all rules, regulations and orders of the Commission now or hereafter in effect.

II.

Paragraph 50.46(a)(1)(i) of 10 CFR Part 50 requires that Emergency Core Cooling System (ECCS) cooling performance be calculated with an acceptable evaluation model and the results conform to the criteria set forth in paragraph 50.46(b) of 10 CFR Part 50. Generic Letter 86-16, Westinghouse ECCS Evaluation Models, dated October 22, 1986, requires that plants using the 1978 version of the Westinghouse ECCS Evaluation Model be reanalyzed using a corrected evaluation model if an ECCS analysis is used to support a future licensing action. Salem Unit 2 currently uses the 1978 Westinghouse Evaluation Model.

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During the fourth refueling outage at Salem Unit 2, 2.7% of the steam generator tubes were plugged and some unrecoverable loose parts were left in the Reactor Coolant System (RCS). A safety evaluation has been performed, including an estimate of the effect of such change on the Large Break LOCA analysis. The safety evaluation found that the proposed exemption is acceptable. However, the requirement exists to revise the Large Break LOCA analysis to accurately reflect and document the current plant configuration in the ECCS Appendix K model. The licensee has proposed a one-time exemption from the requirements of 50.46(a)(1)(i) to allow Salem Unit 2 to operate while the ECCS analysis is being performed. Submittal of the ECCS reanalysis is scheduled for March 31, 1989. The staff has found that approval of the proposed exemption is warranted and should be granted so that Salem Unit 2 may return to power operation without encountering any unnecessary delay.

III.

The NRC staff has evaluated the licensee's basis for requesting the schedular exemption in providing the revised ECCS analysis and finds that not granting this exemption would require Salem Unit 2 to remain shutdown for a period of about five months while the analysis is being done. The staff reviewed the licensee's safety evaluation of a Large Break LOCA for both steam generator tube plugging and unrecovered loose parts in the reactor coolant system.

Based on the licensee's Large Break LOCA sensitivity study, a conservative estimate of the penalty would be 28°F associated with 3.5% tube plugging and 22°F associated with loose parts in the RCS of Salem Unit 2. However, the

licensee indicated that the licensing basis Large Break LOCA analysis for Salem was performed using fuel performance parameters which are now overly conservative. Using the lower rod internal back fill pressure of the fuel currently in Salem Unit 2, results in a peak clad temperature (PCT) benefit larger than the combined penalty of the approximately 50°F due to the steam generator tube plugging and the loose parts in the RCS. Thus, the net effect will result in no increase to the current calculated PCT of 2130°F for a Large Break LOCA. This PCT is low enough to assure that the other criteria for a Large Break LOCA will be met. The staff considers that the licensee evaluation is reasonable and conservative. This is also discussed in the attached Safety Evaluation. Based on the above information, provided by the licensee, and the staff's evaluation of the licensee's submittal, the staff concludes that the licensee has provided an adequate basis for the conclusion, that granting the exemption will not result in operation of Salem Unit 2 outside the acceptance criteria of paragraph 50.46(b) of 10 CFR Part 50.

The regulations in 10 CFR 50.12 state that the Commission will not consider granting an exemption unless special circumstances are present. In its letter of October 21, 1988, the licensee addressed three of those special circumstances which are applicable to this request for exemption. The licensee states that special circumstances of 10 CFR 50.12(a)(2)(ii) are present in that submittal of the formally amended ECCS analysis prior to restart of Salem Unit 2 versus the requested five-month exemption is not necessary to achieve the underlying purpose of 10 CFR 50.46. 10 CFR 50.46(a)(1)(i) requires that the calculated cooling performance of the ECCS conform to the

acceptance criteria of paragraph 50.46(b). The licensee has provided safety evaluations which indicate that sensitivity studies performed on the current ECCS analysis assure that the calculated peak clad temperature value is bounding and in compliance with the acceptance criteria of paragraph 50.46(b).

The licensee states that the special circumstances of 10 CFR 50.12(a)(2)(iii) are present in that extending the current outage for the five months necessary to complete the reanalysis would result in a severe financial penalty and the associated costs of replacement power. Also, similar requests have been granted to the Tennessee Valley Authority for Sequoyah Unit 1 and Pacific Gas and Electric for Diablo Canyon Unit 2, which if not extended to Salem Unit 2, would result in costs well in excess of those incurred by others.

The licensee also states that the special circumstances of 10 CFR 50.12(a)(2)(v) are present in that the exemption would provide only temporary relief from the applicable regulation and became necessary as a result of the unanticipated plugging of all row 1 steam generator tubes and the unrecoverable loose parts in the reactor coolant system. The licensee has provided the bases for its conclusion, that operation of Salem Unit 2 until March 31, 1989 while the ECCS reanalysis is being performed will not result in conditions such that criteria of paragraph 50.46(b) will be exceeded, and the staff agrees. These bases are discussed in more detail in the enclosed Safety Evaluation and the licensee's submittals.

Prior history of the operation of the Salem, Unit 2 steam generators has shown an excellent record of performance with minimal tube degradation. These row 1 failures have followed a classic pattern of onset, i.e., a prolonged

period of operation with no apparent degradation followed by an abrupt occurrence of multiple defects. Also, Salem, Unit 1 has not experienced the same type of failure even though it has been in operation about five years longer than Salem, Unit 2. At the time of discovery the licensee promptly contacted Westinghouse for the ECCS reanalysis. Because the reanalysis requires significant engineering manpower expenditures by Westinghouse (i.e., inputting amended parameters into computer codes, running lengthy computer codes, verifying output results and generating a final report) the reanalysis will take about five months to complete. The licensee has shown a good faith effort to comply with the regulations and will be in compliance as promptly as is reasonable.

Based on the staff's findings, as discussed above, the staff has determined that operation of Salem Unit 2, while the ECCS reanalysis is being performed, would not result in a situation wherein the peak clad temperature would exceed 2200°F. Therefore, the staff concludes that special circumstances of 10 CFR 50.12(a)(2)(v), in that the exemption is temporary and a good faith effort by the licensee to comply has been demonstrated. Accordingly, the NRC staff finds that operation of Salem Unit 2 during the proposed exemption period is acceptable. Therefore, the staff finds the proposed exemption from 10 CFR 50.46(a)(1)(i) until March 31, 1989, to be acceptable.

IV.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12, the proposed exemption is authorized by law, will not endanger life or property or the common defense and security and is otherwise in the public interest. Therefore, the Commission hereby grants the exemption as follows:

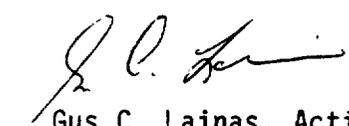
"An exemption is granted from the requirement to have the ECCS cooling performance calculated in accordance with an acceptable evaluation model. This exemption is granted for the period ending on March 31, 1989 and is applicable to Salem Unit 2 as indicated in the Safety Evaluation Report issued in support of this exemption."

Pursuant to 10 CFR 51.32, the Commission has determined that the issuance of the exemption will have no significant impact on the environment (53 FR 44134).

This exemption is effective on November 1 , 1988 and is to expire on March 31, 1989.

Dated at Rockville, Maryland this 1st day of November 1988.

FOR THE NUCLEAR REGULATORY COMMISSION


Gus C. Lainas, Acting Director
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING SCHEDULAR EXEMPTION FROM 10 CFR 50.46(a)(1)(i)
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
PHILADELPHIA ELECTRIC COMPANY
DELMARVA POWER AND LIGHT COMPANY
ATLANTIC CITY ELECTRIC COMPANY
SALEM UNIT 2
DOCKET NO. 50-311

1.0 INTRODUCTION

During the Salem Unit 2 fourth refueling outage, defective tubes were discovered in two steam generators. The licensee decided to plug the row 1 tubes in all four Salem Unit 2 steam generators as a precautionary measure. As a result of this decision, 2.7% of the Salem Unit 2 steam generator tubes have been plugged. Also, during refueling operations, a burnable poison rodlet assembly hold down nut, a locking weld pin and a hand held gamma measurement probe with cable connector were inadvertently dropped into the reactor cavity of Salem Unit 2. Subsequent efforts to retrieve these items were unsuccessful. As a result, a decision was made by the licensee to evaluate these objects as loose parts within the reactor cooling system (RCS). These changes in plant configuration affect the peak cladding temperature (PCT) during a large break loss-of-coolant-accident (LOCA).

For plants licensed based on the 1978 Westinghouse large break LOCA model, NRC generic letter 86-16 requires subsequent plant changes which affect the results of the model, to be reevaluated against the updated, approved model and submitted in accordance with 10 CFR 50.46(a)(1)(i). Based on this requirement, the licensee is required to perform a formal reanalysis to confirm that Salem Unit 2 meets the applicable criteria of 10 CFR 50.46(b) based on the current plant configuration.

By letters dated October 21, 1988 and October 24, 1988, the licensee states that the required formal reanalysis with the new ECCS model cannot be completed for approximately 5 months and because Salem Unit 2 is scheduled to enter mode 2 on November 1, 1988, the licensee requests a one-time, temporary exemption from 10 CFR 50.46(a)(1)(i) based on its specific circumstances. The licensee provided a safety evaluation of large break LOCA for both steam generator tube plugging and unrecovered loose parts in RCS to support its request for exemption. The licensee has committed to submit its formal reanalysis by March 31, 1989.

2.0 EVALUATION

The licensee in attachments 2 and 3 to its letter dated October 21, 1988, provided the results of its safety evaluation of large break LOCA for both steam generator tube plugging and unrecovered loose parts in RCS.

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Based on the licensee's large break LOCA sensitivity study, a conservative estimate of the penalty would be 28°F associated with 3.5% tube plugging and 22°F associated with loose parts in RCS of Salem Unit 2. However, the licensee indicated that the licensing basis large break LOCA analysis for Salem was performed using fuel performance parameters which are now overly conservative. Accounting for the lower rod internal back fill pressure of the fuel currently in Salem Unit 2, results in a peak clad temperature (PCT) benefit larger than the combined penalty of approximately 50°F due to the steam generator tube plugging and the loose parts in the RCS. Thus, the net effect will result in no increase to the current calculated PCT of 2130°F for large break LOCA. This PCT is low enough that there are no concerns from meeting other criteria for a large break LOCA. The staff considers that the licensee evaluation is reasonable and conservative.

3.0 CONCLUSION

Based on the information presented in the licensee's letter dated October 21, 1988, the staff has concluded the following;

1. Granting a one time temporary exemption from 10 CFR 50.46(a)(1)(i) for Salem Unit 2 in order to return to power operation is acceptable. The licensee will submit its formal reanalysis by March 31, 1989.
2. The licensee has made a good faith effort to comply with the regulation and the licensee's request for exemption meets the criteria in 10 CFR 50.12(a)(2) in that special circumstances are present which warrant approval.
3. The licensee has provided the results of its safety evaluation regarding the steam generator tube plugging and loose parts in RCS. The staff considers that these changes in plant configuration will not significantly affect the safety margin of Salem Unit 2.

Dated: November 1, 1988