

FOR: ...e Commissioners

FROM: James M. Taylor
Executive Director for Operations

SUBJECT: PROPOSED CUMULATIVE CIVIL PENALTIES IN THE AMOUNT OF \$600,000 TO PUBLIC SERVICE ELECTRIC & GAS (PSE&G) COMPANY CONCERNING VIOLATIONS AT SALEM UNITS 1&2

PURPOSE:

To consult with the Commission regarding a proposed "Notice of Violation and Proposed Imposition of Civil Penalties" in the cumulative amount of \$600,000 for numerous violations primarily identified by the NRC during four inspections at the Salem facilities between December 5, 1994, and June 23, 1995. Consultation with the Commission is required, in accordance with Section III(2) of the enforcement policy, since the proposed penalties are in excess of three times the Severity level I values shown in Table 1A of the policy.

BACKGROUND:

During four inspections at the Salem facilities between December 5, 1994, and June 23, 1995, the staff identified numerous violations of NRC requirements, including multiple failures to promptly identify and correct conditions adverse to quality at the facilities. Such failures have been the source of continuing performance problems at Salem, and have formed, in part, the basis for prior escalated enforcement actions issued by the NRC in the recent past, the most notable of which was a \$500,000 civil penalty issued to the licensee on October 5, 1994 for violations identified as a result of an Augmented Inspection Team (AIT) inspection at the facility in April 1994. That AIT was chartered to follow-up on an automatic reactor shutdown and two automatic actuations of the safety injection system in April 1994. That AIT was the fourth AIT sent to the Salem facilities since 1991.

DISCUSSION:

The violations that are the subject of the enclosed proposal are symptomatic of the continuing poor performance at Salem as a result of inadequate approaches to problem resolution, and include additional examples of licensee staff failing to promptly and effectively correct adverse conditions affecting the operability of safety-related equipment. Rather, the licensee frequently has worked around apparent problems, and attempted to defer decision-making or justify operability of degraded equipment with insufficient basis. The proposed enforcement action is aimed at directing the licensee's attention toward the need to accomplish critical review and evaluation of degraded conditions, identify root causes, and establish effective corrective actions, including prompt and rational operability decisions. The specific violations are described in the enclosed proposal, and were discussed with the licensee during a predecisional enforcement conference on July 28, 1995.

CONTACT: J. Lieberman, OE
415-2741

PROPOSED ENFORCEMENT ACTION
NOT FOR PUBLIC RELEASE WITHOUT APPROVAL OF THE DIRECTOR, OE

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The staff notes that as a result of conclusions reached relative to safety-related equipment operability, the licensee shutdown Unit 1 on May 17, 1995, and Unit 2 on June 7, 1995. Afterwards, the NRC issued a Confirmatory Action Letter to the licensee on June 9, 1995, which confirmed certain commitments made by the licensee, including the commitment to obtain NRC agreement prior to restarting either of the Salem units, and to perform a review of long-standing equipment reliability and operability issues, as well as the effectiveness and quality of management review and oversight of activities at the facility. Subsequently, the licensee has initiated action to comprehensively review, evaluate, identify, and correct equipment reliability issues; improve processes, such as work control, root cause assessment, and corrective action determination; and establish a personnel performance standard based on the recognition of accountability and responsibility for problem resolution and performance improvement. In order to accomplish and manage the change necessary to effect performance improvement, a new senior management team has been established, including the Senior Vice President-Nuclear Operations, the Senior Vice President-Nuclear Engineering, the General Manager-Salem Operations, and Director-Quality Assurance and Nuclear Safety Review.

While the staff recognize that the licensee has taken significant steps in changing the management team at Salem, and shutting down both Salem units, the staff nonetheless proposes the cumulative penalties of \$600,000 to further emphasize to the licensee the significance of these violations, as well as the continuing concern that the NRC maintains with regard to the lack of substantial improvement in performance.

RECOMMENDATION:

If the Commission does not direct otherwise, within two weeks from the date of this paper, the staff intends to issue the proposed civil penalties to PSE&G.

COORDINATION:

The Office of General Counsel has no legal objection to this action. Also, while an OI evaluation of this matter has been opened, OI does not object to the issuance of this action.

NOTE:

This paper and its issues should not be disclosed publicly because the matter involves predecisional enforcement issues.

James M. Taylor
Executive Director for Operations

Enclosure: Proposed Notice of Violation and Proposed Imposition
of Civil Penalties

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For The Commissioners

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<p>RI:RC KSmith 8/16/95</p>	<p>RI:DRA WKane 1/1995</p>	<p>RI:BA TMartin 8/17/95</p>	
<p>OE JLieberman / /95</p>	<p>DEDR JMilhoan / /95</p>		

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EAs 95-62; 95-65; 95-117

Mr. E. James Ferland
Chairman and Chief Executive Officer
Public Service Electric and Gas Company
80 Park Place
Newark, New Jersey 07101

Dear Mr. Ferland:

SUBJECT: NOTICE OF VIOLATION AND PROPOSED IMPOSITION OF CIVIL PENALTIES
- \$600,000
(Inspection Reports Nos. 50-272/94-32; 50-311/94-32; 50-272/95-02;
50-311/95-02; 50-272/95-07; 50-311/95-07; 50-272/95-10;
50-311/95-10)

Between December 5, 1994 and June 23, 1995, Region I staff conducted the four subject inspections at the Salem Nuclear Generating Station, Hancocks Bridge, New Jersey and identified numerous violations of NRC requirements. The inspection reports were sent to you previously on March 30, April 7, May 24, and July 14, 1995, respectively. Several of the violations involved the failure to promptly identify and correct conditions adverse to quality at the Salem facilities. On July 28, 1995, Mr. T. Martin, Regional Administrator, Region I conducted a predecisional enforcement conference with Mr. B. Simpson and other members of your staff to discuss the violations, their causes, and your corrective actions. The violations are described in detail in the enclosed Notice of Violation and Proposed Imposition of Civil Penalties.

I have considered carefully these violations, several of which involve the failure to promptly respond to, and correct, conditions adverse to quality at Salem. I am dismayed at the number and nature of the violations, and am disappointed with the overall response by your staff and management relative to decision-making and approach to resolution of these issues.

I have sent four Augmented Inspection Teams (AIT) to Salem in the past four years. AIT inspections are rare and reserved for significant occurrences. Four AIT inspections in four years is extremely rare. As a result of the last of those four AIT inspections in April 1994, I issued a \$500,000 civil penalty on October 5, 1994, for numerous violations associated with an event at the facility, including similar violations involving failure to recognize and effectively correct conditions that challenged the safe and uneventful operation of the Salem facilities. In my letter transmitting that civil penalty, I expressed my concerns about nonconservative operational decision-making at the facility. I raised questions regarding the manner in which management's expectations are established and communicated to the Salem staff regarding their

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performance at the station. I noted that while I found your immediate corrective actions acceptable for that event, the NRC was unwilling to predict or assume success for your long-term actions because historically, the implementation of such actions for past problems has proven to be ineffective. I further noted that it appeared that you have tolerated an atmosphere that accepts degraded conditions rather than establishing an atmosphere of a high quality operating environment.

Now, approximately one year later, my concerns remain. For example, although Westinghouse informed you in March 1993 of nonconservatism in the setpoint methodology for low temperature overpressure transient conditions, the problem remained unresolved for more than a year and half. Two other examples involved degraded equipment affecting switchgear ventilation equipment in Unit 1, and residual heat removal (RHR) minimum flow recirculation valves in Unit 2. In these cases, your staff failed to respond promptly when component failures affecting these systems were first identified in December 1994 and January/February 1995, respectively. Even after it became more imperative to address these component issues, your staff delayed operability decision-making until it was apparent that a basis could not be established to justify continued operation. Subsequently, the units were shut down in accordance with license requirements on May 16 and June 7, 1995, respectively. Numerous other examples are described in the Notice. These examples indicate a management and staff attitude that is not conducive to the safe operation of a nuclear power plant.

This attitude and inclination to delay decision-making at Salem must change. Problems must be addressed promptly and directly rather than worked around. Root causes must be identified and effective corrective actions established. Operability of safety-related equipment must be ensured. It is imperative that management assure that these changes occur before operation of the units is resumed.

I recognize that you have shut down both of the Salem units and have agreed, as noted in the NRC Confirmatory Action Letter sent to you on June 9, 1995, to not restart the units without first obtaining NRC agreement. I also recognize that you recently have brought an entirely new management team to oversee the Salem and Hope Creek facilities. I further recognize the commitments by your management team, at the predecisional enforcement conference, to effect demonstrable performance improvement. Nonetheless, in order to reinforce to you, your management team, and your staff, the seriousness with which we regard your deficient conduct of operations, cumulative civil penalties in the amount of \$600,000 are proposed for these violations which are classified either individually, or in the aggregate, at Severity Level III in accordance with the "General Statement of Policy and Procedures for NRC Enforcement Actions," (Enforcement Policy) (60 FR 34381, June 30, 1995).

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The base civil penalty amount for each Severity Level III violation or problem is \$50,000. In each case, I have decided to exercise enforcement discretion, after consultation with the Commission, and issue \$100,000 penalties in each case so as to appropriately reflect the NRC concern regarding the violations and causes, and to convey an appropriate message, given that (1) the Salem enforcement history has not been good, (2) the majority of the violations were identified by the NRC, and (3) your prior actions to ensure problems are identified and corrected in a timely manner have not been effective.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. In your response, you should document the specific actions taken and any additional actions you plan to prevent recurrence. After reviewing your response to this Notice, including your proposed corrective actions and the results of future inspections, the NRC will determine whether further NRC enforcement action is necessary to ensure compliance with NRC regulatory requirements.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure(s), and your response will be placed in the NRC Public Document Room (PDR). To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction.

The responses directed by this letter and the enclosed Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, Pub. L. No. 96.511.

Sincerely,

James M. Taylor
Executive Director
for Operations

Docket Nos. 50-272; 50-311
License Nos. DPR-70; DPR-75

Enclosure: Notice of Violation and Proposed Imposition of Civil Penalties

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cc w/encl:

- L. Eliason, Chief Nuclear Officer and President
- J. Storz, Senior Vice President - Nuclear Operations
- E. Simpson, Senior Vice President - Nuclear Engineering
- J. Hagan, Vice President - Business Support
- C. Schaefer, External Operations - Nuclear, Delmarva Power & Light Company
- R. Burricelli, Director - External Affairs
- C. Warren, General Manager - Salem Operations
- J. Benjamin, General Manager - Quality Assurance and Nuclear Safety Review
- F. Thomson, Manager - Licensing and Regulation
- R. Kankus, Joint Owner Affairs
- A. Tapert, Program Administrator
- R. Fryling, Jr., Esquire
- M. Wetterhahn, Esquire
- P. MacFarland Goelz, Manager, Joint Generation Department, Atlantic Electric Company
- Consumer Advocate, Office of Consumer Advocate
- W. Conklin, Public Safety Consultant, Lower Alloways Creek Township
State of New Jersey
State of Delaware

Public Service Electric and Gas
Company

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ENCLOSURE

NOTICE OF VIOLATION
AND
PROPOSED IMPOSITION OF CIVIL PENALTIES

Public Service Electric and Gas Company
Salem Nuclear Generating Station
Units 1 & 2

Docket Nos.: 50-272; 50-311
License Nos.: DPR-70; DPR-75
EAs 95-062; 95-065; 95-117

During four NRC inspections conducted between December 5, 1994 and June 23, 1995, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," (60 FR 34381; June 30, 1995), the Nuclear Regulatory Commission proposes to impose civil penalties pursuant to Section 234 of the Atomic Energy Act of 1954, as amended (Act), 42 U.S.C. 2282, and 10 CFR 2.205. The particular violation and associated civil penalties are set forth below:

I. 10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action, requires, in part, that conditions adverse to quality are promptly identified and corrected; and in the case of significant conditions adverse to quality, the cause of the condition shall be documented, appropriately reported to levels of management, and corrective action taken to preclude repetition.

A. Contrary to the above, a condition adverse to quality existed at the Salem Unit 2 facility from January 26, 1995, until June 7, 1995, in that the No. 22 Residual Heat Removal (RHR) pump minimum recirculation flow valve would not open on low RHR flow as required to prevent pump failure. Similarly, the same condition adverse to quality existed at the facility from February 9, 1995, until June 7, 1995, for the No. 21 RHR pump minimum recirculation flow valve. However, plant staff did not determine the cause of the failure or initiate corrective measures. As a result, both trains of RHR for Salem Unit 2 were inoperable from February 9, 1995 until June 7, 1995, when the plant was shut down due to this condition.

This is a Severity Level III Violation (Supplement I)
Civil Penalty - \$100,000

B. Contrary to the above, a condition adverse to quality existed at the Salem Unit 1 facility from December 12, 1994, until May 16, 1995, in that a failure of the No. 12 safety related switchgear ventilation supply fan was not recognized as a condition that failed to meet the design basis relative to ventilation of safety-related switch gear, and the plant staff did not initiate resolution of the condition or effect any corrective measures to resolve the condition promptly. As a result from December 12, 1994, the licensee operated Unit 1 outside the design basis described in the Updated Final Safety Analysis Report Section 9.4.6, failed to consider the matter as an

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unreviewed safety question; and did not initiate any corrective action until a second fan motor failed on May 12, 1995. After a delay in determining the operability of the system, the Unit was shut down on May 16, 1995, due to the condition.

This is a Severity Level III Violation (Supplement I).
Civil Penalty - \$100,000

C. Contrary to the above, the licensee was informed by Westinghouse on March 15, 1993, of a significant condition adverse to quality involving nonconservatism in the setpoint methodology for the Pressurizer Overpressure Protection System (POPS) for low temperature overpressure transient conditions; however, the matter was not corrected adequately or promptly in that:

1. The licensee took nine months of analysis, from March 1993 to December 1993, to conclude that the corrected peak transient pressure would exceed pressure/temperature (P/T) limits as described in each unit's technical specifications limits.
2. The licensee initially dispositioned the matter, after its analysis, by administratively limiting operation to two reactor coolant pumps when less than 200°F and increasing each unit's P/T limit by 10%, based on ASME code case N-514 that was not approved by the NRC for use at the Salem facilities;
3. In January 1994, at the latest, the licensee recognized the inappropriateness of using an unapproved code case and subsequently elected to take credit for the capacity provided by residual heat removal (RHR) system suction relief valve RH3 to augment Pressurizer Overpressure Protection System (POPS) relief. The licensee's analysis indicated that with RH3 available, the transient peak pressure would remain below the specified pressure/temperature limits, and the licensee took credit for the RH3 valve until April 1994; however, this corrective action was deficient in that the licensee neither sought a license amendment, nor performed an analysis, pursuant to 10 CFR 50.59, to ensure that the change did not involve an unreviewed safety question.

This is a Severity Level III Violation (Supplement I)
Civil Penalty - \$100,000

D. Contrary to the above, on several occasions, conditions adverse to quality existed, but were not identified and promptly corrected, as evidenced by the following examples:

1. On June 7, 1994, the licensee identified that material management documentation for limit switches related to the reactor head vent valves, improperly classified the components as non-safety related. A nuclear design discrepancy evaluation form (DEF) identified that a switch short circuit could render two head vent valves inoperable since the components were powered from the same common circuit. Notwithstanding, the DEF did not identify any concern relative to operability or safety. In February 1995, the licensee determined that non-safety related limit switches were actually installed in reactor head vent valves IRC41 and IRC43 at Salem Unit 1. Subsequently, the licensee failed to perform and document an engineering evaluation to demonstrate the acceptability of continued Salem Unit 1 operation with non-safety-related parts installed in a safety-related application.
2. On February 24, 1995, Unit No. 1 operators placed control of a Power Operated Relief Valve (PORV) in the manual mode, rendering it inoperable, and failed to adhere to the Technical Specification 3.4.3 action statement which required operators to close the block valve within one hour. A shift supervisor discovered the error and corrected it on February 25, 1995, about 25 hours later. This performance error is similar to a violation of the same technical specification requirement involving Salem Unit No. 2 on March 24, 1994.
3. On July 6, 1994, safety-related reactor head vent valve 2RC40 failed to operate (stroke open) during testing while Unit No. 2 was in cold shutdown. Subsequently, the valve was returned to normal service on July 10, 1994, without any review or assessment in accordance with established procedures; that is, the licensee failed to process this occurrence in accordance with the applicable "Work Control Process" procedure. Consequently, this failure of a safety-related component was never documented and formally assessed relative to preventive maintenance, operability, actions to prevent recurrence, or generic implications.
4. An oil sample laboratory report, dated August 4, 1994, recommended resampling and changing the oil on the No. 21 high-head safety injection pump based upon a ten-fold increase in wear particle concentration. An oil analysis, dated November 28, 1994, identified high wear particle concentration in the No. 22 high-head safety injection pump speed increaser oil. In both these cases, the system engineer, though aware of the findings of the lab reports, did not initiate any follow-up evaluation or corrective measure, nor establish a

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bases for operability or reliability in view of the apparent degraded condition of the equipment. The degraded nature of the equipment was not entered into the Equipment Malfunction Identification System (EMIS) until March 20, 1995.

5. A lab report, dated October 6, 1994, recommended resampling the No. 23 Auxiliary Feedwater (AFW) turbine lube oil due to a detectable amount of water contamination and an increase in wear particle concentration. However, the degraded nature of the equipment was not entered into the EMIS until March 27, 1995, and the system engineer did not initiate review, evaluation, or establish any basis for equipment operability or reliability.
6. LER 95-05 identified seven instances, between May 8, 1990 and January 14, 1995, of pressurizer safety valves (PSVs) being beyond the 1% tolerance required by TS 4.0.5 for Unit 1. Four instances were identified between November 14, 1994, and January 14, 1995, which involved 2 of the 3 installed PSVs. In all instances, the vendor notified the appropriate system engineer by telephone and written follow-up reports. However, the responsible system engineer never initiated an Incident Report. Consequently, root cause, operability, and reportability actions were not accomplished.
7. On March 6, 1995, May 3, 1995, and May 8, 1995, the Salem Unit 1 staff failed to determine the cause, correct, or prevent recurrence of failure of the Containment 100 foot elevation personnel airlock to pass its local leak rate test. As a result, from March 6, 1995 until May 8, 1995, the containment boundary was incapable of withstanding a single failure and continue to perform its intended function.
8. From February 29, 1992 until June 7, 1995, Salem Unit 1 staff failed to correctly determine the cause or take action to preclude recurrence of failures of instrument lines connected to the jacket water cooling system for the No. 1B and No. 1C emergency diesel generators.
9. From July 11, 1992 until June 10, 1995, Salem staff failed to determine the cause, evaluate the potential safety consequences, and establish corrective action for an abnormal condition affecting the No. 21 Residual Heat Removal discharge manual isolation valve (21RH10) which resulted in impact noise from the interior of the valve.

Collectively, these violations represent a Severity Level III problem. (Supplement I)
Civil Penalty - \$100,000

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- II. 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings", requires that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances, and shall be accomplished in accordance with these instructions, procedures and drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Contrary to the above, during a modification in May 1993, to install a drain system for the Salem Unit 2 pressurizer code safety loop seals, the licensee did not ensure that an activity affecting quality was satisfactorily accomplished in that it did not adequately ensure that the drain valves were properly positioned prior to plant startup after the modification. Specifically, valve 2PR66, a valve in a common drain line for the 2PR3, 2PR4, and 2PR5, pressurizer safety valves, was left closed throughout the operating cycle between May 1993 and October 1994. As a result, the licensee operated Salem Unit 2 in that period with the loop seals filled with water.

This is a Severity Level III Violation. (Supplement I)
Civil Penalty - \$100,000

- III. 10 CFR 50.59 allows licensees to make changes in the facility as described in the Final Safety Analysis Report (FSAR) without prior NRC approval, unless the proposed change involves an unreviewed safety question, or involves a change to the technical specification incorporated in the license. 10 CFR 50.59 (b)(2) requires licensees to establish a written safety evaluation which provides the basis for determining that the change does not involve an unreviewed safety question.

Contrary to the above, on or about April 19, 1994, the licensee changed the pressurizer overpressure protection systems (POPS) design basis by revising the limiting transient upon which the setpoint was based as described in Technical Specifications (TS) (TS 3.4.9.3 for Unit 1; and TS 3.4.10.3 for Unit 2), FSAR Section 7.6.3.3, and the NRC Safety Evaluation Report upon which the POPS technical specification was based, without evaluating the change pursuant to 10 CFR 50.59 to ensure that the change did not involve an unreviewed safety question. The specific change in the limiting transient involved limiting the magnitude of mass addition by procedural control of possible injection sources.

This is a Severity Level III Violation. (Supplement I)
Civil Penalty - \$100,000

Pursuant to the provisions of 10 CFR 2.201, Public Service Electric and Gas Company (Licensee) is hereby required to submit a written statement or explanation to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, within 30 days of the date of this Notice of Violation and Proposed Imposition of Civil Penalties (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each alleged violation: (1) admission or denial of the alleged violation, (2) the reasons for the violation if admitted, and if denied, the reasons why, (3) the corrective steps that have been taken and the results achieved, (4) the corrective steps that will be taken to avoid further violations, and (5) the date when full compliance will be achieved.

If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as why the license should not be modified, suspended, or revoked or why such other action as may be proper should not be taken. Consideration may be given to extending the response time for good cause shown. Under the authority of Section 182 of the Act, 42 U.S.C. 2232, this response shall be submitted under oath or affirmation.

Within the same time as provided for the response required above under 10 CFR 2.201, the Licensee may pay the civil penalties by letter addressed to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, with a check, draft, money order, or electronic transfer payable to the Treasurer of the United States in the amount of the civil penalty proposed above, or the cumulative amount of the civil penalties if more than one civil penalty is proposed, or may protest imposition of the civil penalties in whole or in part, by a written answer addressed to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission. Should the Licensee fail to answer within the time specified, an order imposing the civil penalties will be issued. Should the Licensee elect to file an answer in accordance with 10 CFR 2.205 protesting the civil penalties, in whole or in part, such answer should be clearly marked as an "Answer to a Notice of Violation" and may: (1) deny the violations listed in this Notice, in whole or in part, (2) demonstrate extenuating circumstances, (3) show error in this Notice, or (4) show other reasons why the penalties should not be imposed. In addition to protesting the civil penalties in whole or in part, such answer may request remission or mitigation of the penalties.

In requesting mitigation of the proposed penalties, the factors addressed in Section VI.B.2 of the Enforcement Policy should be addressed. Any written answer in accordance with 10 CFR 2.205 should be set forth separately from the statement or explanation in reply pursuant to 10 CFR 2.201, but may incorporate parts of the 10 CFR 2.201 reply by specific reference (e.g., citing page and paragraph numbers) to avoid repetition. The attention of the Licensee is directed to the other provisions of 10 CFR 2.205, regarding the procedure for imposing civil penalties.

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Enclosure

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Upon failure to pay any civil penalties due which subsequently have been determined in accordance with the applicable provisions of 10 CFR 2.205, this matter may be referred to the Attorney General, and the penalties, unless compromised, remitted, or mitigated, may be collected by civil action pursuant to Section 234c of the Act, 42 U.S.C. 2282c.

The response noted above (Reply to Notice of Violation, letter with payment of civil penalties, and Answer to a Notice of Violation) should be addressed to: Mr. James Lieberman, Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, One White Flint North, 11555 Rockville Pike, Rockville, MD 20852-2738, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region I, and a copy to the NRC Resident Inspector at the facility that is the subject of this Notice.

Because your response will be placed in the NRC Public Document Room (PDR), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction. However, if you find it necessary to include such information, you should clearly indicate the specific information that you desire not to be placed in the PDR, and provide the legal basis to support your request for withholding the information from the public.

Dated at Rockville, Maryland
this ____ day of ____ 1995

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20545-0001

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F.I.
Re BPs
et al.

October 16, 1995

EAs 95-62; 95-65; 95-117

Mr. E. James Ferland
Chairman and Chief Executive Officer
Public Service Electric and Gas Company
80 Park Place
Newark, New Jersey 07101

10/16/95 - DJH

SUBJECT: NOTICE OF VIOLATION AND PROPOSED IMPOSITION OF CIVIL PENALTIES
- \$600,000
(Inspection Reports Nos. 50-272/94-32; 50-311/94-32; 50-272/95-02;
50-311/95-02; 50-272/95-07; 50-311/95-07; 50-272/95-10;
50-311/95-10)

Dear Mr. Ferland:

Between December 5, 1994 and June 23, 1995, Region I staff conducted the four subject inspections at the Salem Nuclear Generating Station, Hancocks Bridge, New Jersey, and identified numerous violations of NRC requirements. The inspection reports were sent to you previously on March 30, April 7, May 24, and July 14, 1995, respectively. Several of the violations involved the failure to promptly identify and correct conditions adverse to quality at the Salem facility. On July 28, 1995, Mr. T. Martin, Regional Administrator, Region I, conducted a predecisional enforcement conference with Mr. B. Simpson and other members of your staff to discuss the violations, their causes, and your corrective actions. The violations are described in detail in the enclosed Notice of Violation and Proposed Imposition of Civil Penalties.

We have carefully considered these violations, several of which involve the failure to promptly respond to, and correct, conditions adverse to quality at Salem. The number and nature of the violations demonstrate inadequate performance by a licensee of the Commission. The past overall response by your staff and management relative to decision-making on operability issues and the approach to resolution of these issues has not been acceptable.

As you are aware, the NRC has sent four Augmented Inspection Teams (AIT) to Salem in the past four years. AIT inspections are relatively rare and reserved for significant occurrences. Four AIT inspections dispatched to one facility in four years is extremely rare. As a result of the last of those AIT inspections in April 1994, NRC issued a \$500,000 civil penalty on October 5, 1994, for numerous violations associated with an event at the facility, including similar violations involving failure to recognize and effectively correct conditions that challenged the safe operation of the Salem facility. In our letter transmitting that civil penalty, we expressed concerns about nonconservative operational decision-making at the facility. We raised questions regarding the manner in which management's expectations are established and communicated to the Salem staff regarding their performance at the station. We noted that while NRC found your immediate corrective actions

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acceptable for that event, the NRC was unwilling to predict or assume success for your long-term actions because historically, the implementation of such actions for past problems has proven to be ineffective. We further noted that it appeared that you have tolerated an atmosphere that accepts degraded conditions rather than establishing an atmosphere of a high quality operating environment.

Now, approximately one year later, our concerns remain. For example, although Westinghouse informed you in March 1993 of nonconservatism in the setpoint methodology for low temperature overpressure transient conditions, the problem remained unresolved for more than 18 months. Two other examples involved: 1) degraded equipment affecting switchgear ventilation equipment in Unit 1, and 2) residual heat removal (RHR) minimum flow recirculation valves in Unit 2. In these cases, your staff failed to respond promptly when component failures affecting these systems were first identified in December 1994 and January/February 1995, respectively. Even after it became more imperative to address these component issues, your staff delayed operability decision-making until it was apparent that a basis could not be established to justify continued operation. Subsequently, the two units were shut down in accordance with license requirements on May 16 and June 7, 1995. Numerous other examples are described in the Notice, including failures to perform adequate testing of modifications and evaluation of changes. These examples indicate a management and staff attitude that was not conducive to the safe operation of a nuclear power plant.

This attitude and inclination to delay decision-making regarding licensed activities at Salem must change. Problems must be addressed promptly and directly rather than worked around. Root causes must be identified and effective corrective actions established and implemented. Operability of safety-related equipment must be ensured. It is imperative that management assure that these changes occur before operation of the units is resumed.

We recognize that you have shut down both of the Salem units and have agreed, as noted in the NRC Confirmatory Action Letter sent to you on June 9, 1995, not to restart either unit without first gaining NRC agreement. We also recognize that you recently have introduced an entirely new management team to oversee the Salem and Hope Creek facilities. We further recognize the commitments by your new management team, at the predecisional enforcement conference, to effect demonstrable performance improvement. Nonetheless, in light of your past failures to achieve lasting corrective actions and in order to reinforce to you, your management team, and your staff, the seriousness with which we regard the deficient conduct of operations at Salem, cumulative civil penalties in the amount of \$600,000 are proposed for six violations, each of which is classified at Severity Level III in accordance with the "General Statement of Policy and Procedures for NRC Enforcement Actions," (Enforcement Policy) (NUREG 1600; 60 FR 34381, June 30, 1995).

The base civil penalty amount for each Severity Level III violation is \$50,000. In each case, we have decided to exercise discretion, after consultation with the Commission, and propose a \$100,000 civil penalty for

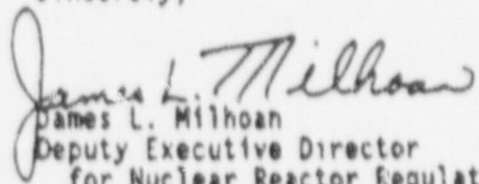
each violation, so as to appropriately reflect the NRC's concern regarding the violations and causes, and to convey an appropriate message, given that (1) the Salem enforcement history has not been good, (2) the majority of the violations were identified by the NRC, and (3) your organization's prior actions to ensure problems are identified and corrected in a timely manner have not been effective. Were it not for your voluntary action in maintaining both units at the facility in a shutdown condition for an extended period to implement broad-scope and long-term corrective actions, the enforcement action might have been more severe.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. In your response, you should document the specific actions taken and any additional actions you plan to prevent recurrence. After reviewing your response to this Notice, including your proposed corrective actions and the results of future inspections, the NRC will determine whether further NRC enforcement action is necessary to ensure compliance with NRC regulatory requirements.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure(s), and your response will be placed in the NRC Public Document Room (PDR). To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction.

The responses directed by this letter and the enclosed Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, Pub. L. No. 96.511.

Sincerely,


James L. Milhoan
Deputy Executive Director
for Nuclear Reactor Regulation
Regional Operations and Research

Docket Nos. 50-272; 50-311
License Nos. DPR-70; DPR-75

Enclosure: Notice of Violation and
Proposed Imposition of Civil Penalties

cc w/encl:

L. Eliason, Chief Nuclear Officer and President
J. Storz, Senior Vice President - Nuclear Operations
E. Simpson, Senior Vice President - Nuclear Engineering
J. Hagan, Vice President - Business Support
C. Schaefer, External Operations - Nuclear, Delmarva Power & Light Company
cc w/encl: (See Next Page)

Public Service Electric
and Gas Company

4

cc w/encl: (Con't)

R. Burricelli, Director - External Affairs

C. Warren, General Manager - Salem Operations

J. Benjamin, General Manager - Quality Assurance and Nuclear Safety Review

F. Thomson, Manager - Licensing and Regulation

R. Kankus, Joint Owner Affairs

A. Tapert, Program Administrator

R. Frying, Jr., Esquire

M. Wetterhahn, Esquire

P. MacFarland Goetz, Manager, Joint Generation Department, Atlantic Electric
Company

Consumer Advocate, Office of Consumer Advocate

W. Conklin, Public Safety Consultant, Lower Alloways Creek Township

State of New Jersey

State of Delaware

NOTICE OF VIOLATION
AND
PROPOSED IMPOSITION OF CIVIL PENALTIES

Public Service Electric and Gas Company
Salem Nuclear Generating Station
Units 1 & 2

Docket Nos: 50-272; 50-311
License Nos. DPR-70; DPR-75
EAs 95-062; 95-065; 95-117

During four NRC inspections conducted between December 5, 1994 and June 23, 1995, at the Salem Nuclear Generating Station of the Public Services Electric and Gas Company (Licensee), violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedures for NRC Enforcement Actions," (NUREG-1600; 60 FR 34381, June 30, 1995), the Nuclear Regulatory Commission proposes to impose civil penalties pursuant to Section 234 of the Atomic Energy Act of 1954, as amended (Act), 42 U.S.C. 2282, and 10 CFR 2.205. The particular violations and associated civil penalties are set forth below:

- I. 10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action, requires, in part, that conditions adverse to quality are promptly identified and corrected; and in the case of significant conditions adverse to quality, the cause of the condition shall be documented, appropriately reported to levels of management, and corrective action taken to preclude repetition.
 - A. Contrary to the above, a significant condition adverse to quality existed at the Salem Unit 2 facility from January 26, 1995, until June 7, 1995, in that the Licensee was aware that the No. 22 Residual Heat Removal (RHR) pump minimum recirculation flow valve would not open on low RHR flow as required to prevent pump failure. Similarly, the Licensee was aware that the same significant condition adverse to quality existed at the facility from February 9, 1995, until June 7, 1995, for the No. 21 RHR pump minimum recirculation flow valve. However, prior to June 7, 1995, the Licensee failed to determine the cause of the valve failures or initiate corrective measures. (01013)

This is a Severity Level III Violation (Supplement I)
Civil Penalty - \$100,000

- B. Contrary to the above, a significant condition adverse to quality existed at the Salem Unit 1 facility from December 12, 1994, until May 16, 1995, in that the No. 12 safety related switchgear ventilation supply fan failed on December 12, 1994, and the Licensee did not initiate resolution of the condition or effect any corrective measures to resolve the condition promptly. (02013)

This is a Severity Level III Violation (Supplement I).
Civil Penalty - \$100,000

- C. The Licensee was informed by Westinghouse on March 15, 1993, of a significant condition adverse to quality involving

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nonconservatism in the setpoint methodology for the Pressurizer Overpressure Protection System (POPS) for low temperature overpressure transient conditions.

1. Contrary to Criterion XVI, the Licensee took nine months of analysis, from March 1993 to December 1993, to conclude that the corrected peak transient pressure would exceed pressure/temperature (P/T) limits as described in each unit's technical specifications limits. After completing the analysis, from December 30, 1993, and continuing for approximately one month, the Licensee dispositioned the matter of the nonconservatism in the setpoint methodology for the POPS by 1) administratively limiting RCS operation to two reactor coolant pumps when the RCS was less than 200°F and 2) increasing each unit's P/T limit by 10%; the latter corrective action was inadequate because it utilized as a basis an unauthorized ASME Code Case (N-514), which the Licensee was aware was not acceptable pursuant to 10 CFR 50.55(a). (03013)

This is a Severity Level III Violation (Supplement I)
Civil Penalty - \$100,000

2. Contrary to Criterion XVI, in January 1994, following the Licensee recognizing the unacceptability of using unauthorized Code Case N-514 as a corrective action to disposition the POPS setpoint methodology, the Licensee elected to implement corrective action by taking credit for the relief capacity provided by RHR system suction relief valve RH3 to augment POPS relief capacity. However, as the Salem FSAR (Section 7.6.3.2) describes the POPS system to include two Power Operated Relief Valves (PORVs) and does not describe Valve RH3, this corrective action was inadequate because an evaluation was not performed to determine the acceptability of the use of Valve RH3 as part of the POPS system. In addition, the Licensee failed to identify that on the receipt of a safety injection (SI) signal a previously operating positive displacement charging pump's discharge, combined with the discharge from the high head safety injection pump that starts on receipt of the SI signal, could have injected water mass into the RCS at a rate that could have prevented POPS from performing its function. (04013)

This is a Severity Level III Violation (Supplement I)
Civil Penalty - \$100,000

- D. Contrary to the above, on several occasions, conditions adverse to quality existed, but were not identified and promptly corrected, as evidenced by the following examples:

1. On June 7, 1994, the Licensee identified that material management documentation for limit switches related to the reactor head vent valves, improperly classified the components as non-safety related. A nuclear design discrepancy evaluation form (DEF) identified that a switch short circuit could render two head vent valves inoperable since the components were powered from the same common circuit. Notwithstanding, the DEF did not identify any concern relative to operability or safety. In February 1995, the Licensee determined that non-safety related limit switches were actually installed in reactor head vent valves 1RC41 and 1RC43 at Salem Unit 1. Subsequently, the Licensee failed to perform and document an engineering evaluation to demonstrate the acceptability of continued Salem Unit 1 operation with non-safety-related parts installed in a safety-related application.
2. On February 24, 1995, Unit No. 1 operators placed control of a PORV in the manual mode, rendering it inoperable, and failed to adhere to the Technical Specification 3.4.3 action statement which required operators to close the block valve within one hour. A shift supervisor discovered that the PORV had been erroneously placed in the manual mode and corrected it on February 25, 1995, about 23 hours later.
3. On July 6, 1994, safety-related reactor head vent valve 2RC40 failed to operate (stroke open) during testing while Unit No. 2 was in cold shutdown. Subsequently, the valve was returned to normal service on July 10, 1994, without any review or assessment in accordance with established procedures; that is, the Licensee failed to process this occurrence in accordance with the applicable "Work Control Process" procedure. Consequently, this failure of a safety-related component was never documented and formally assessed relative to preventive maintenance, operability, actions to prevent recurrence, or generic implications.
4. An oil sample laboratory report, dated August 4, 1994, recommended resampling and changing the oil on the No. 21 high-head safety injection pump based upon a ten-fold increase in wear particle concentration. An oil analysis, dated November 28, 1994, identified high wear particle concentration in the No. 22 high-head safety injection pump speed increaser oil. In both these cases, the system engineer, though aware of the findings of the lab reports, did not initiate any follow-up evaluation or corrective measure, nor establish a bases for operability or reliability in view of the apparent degraded condition of the equipment. The degraded nature of the equipment was not entered into the Equipment Malfunction Identification System (EMIS) until March 20, 1995.

5. A lab report, dated October 6, 1994, recommended resampling the No. 23 Auxiliary Feedwater (AFW) turbine lube oil due to a detectable amount of water contamination and an increase in wear particle concentration. However, the degraded nature of the equipment was not entered into the EMIS until March 27, 1995, and the system engineer did not initiate review, and evaluation, or establish any basis for equipment operability or reliability.
6. LER 95-05 identified seven instances, between May 8, 1990 and January 14, 1995, of pressurizer safety valves (PSVs) being beyond the 1% tolerance required by TS 4.0.5 for Unit 1. Four instances were identified between November 14, 1994, and January 14, 1995, which involved 2 of the 3 installed PSVs. In all instances, the vendor notified the appropriate system engineer by telephone and written follow-up reports. However, the responsible system engineer never initiated an Incident Report. Consequently, root cause, operability, and reportability actions were not accomplished.
7. On March 6, 1995, May 3, 1995, and May 8, 1995, the Salem Unit 1 staff failed to determine the cause, correct, or prevent recurrence of failure of the Containment 100 foot elevation personnel airlock to pass its local leak rate test.
8. From February 29, 1992 until June 7, 1995, Salem Unit 1 staff failed to correctly determine the cause or take action to preclude recurrence of failures of instrument lines connected to the jacket water cooling system for the No. 1B and No. 1C emergency diesel generators.
9. From July 11, 1992 until June 10, 1995, Salem staff failed to determine the cause, evaluate the potential safety consequences, and establish corrective action for an abnormal condition affecting the No. 21 Residual Heat Removal discharge manual isolation valve (21RH10) associated with impact noise from the interior of the valve. (05013)

This is a Severity Level III violation. (Supplement I)
Civil Penalty - \$100,000

11. 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings", requires that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances, and shall be accomplished in accordance with these instructions, procedures and drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Contrary to the above, following a modification in May 1993, that installed a drain system for the Salem Unit 2 pressurizer code safety loop seals, the Licensee did not ensure that an activity affecting quality was satisfactorily accomplished in that the procedure that directed the installation of the modification to the pressurizer code safety loop seals drains did not adequately ensure that the drain valves were properly positioned prior to plant startup after the modification. Specifically, valve 2PR66, a valve in a common drain line for the 2PR3, 2PR4, and 2PR5, pressurizer safety valves, was left closed throughout the operating cycle between May 1993 and October 1994. (06013)

This is a Severity Level III Violation. (Supplement I)
Civil Penalty - \$100,000

Pursuant to the provisions of 10 CFR 2.201, Public Service Electric and Gas Company (Licensee) is hereby required to submit a written statement or explanation to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, within 30 days of the date of this Notice of Violation and Proposed Imposition of Civil Penalties (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each alleged violation: (1) admission or denial of the alleged violation, (2) the reasons for the violation if admitted, and if denied, the reasons why, (3) the corrective steps that have been taken and the results achieved, (4) the corrective steps that will be taken to avoid further violations, and (5) the date when full compliance will be achieved.

If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as why the license should not be modified, suspended, or revoked or why such other action as may be proper should not be taken. Consideration may be given to extending the response time for good cause shown. Under the authority of Section 182 of the Act, 42 U.S.C. 2232, this response shall be submitted under oath or affirmation.

Within the same time as provided for the response required above under 10 CFR 2.201, the Licensee may pay the civil penalties by letter addressed to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, with a check, draft, money order, or electronic transfer payable to the Treasurer of the United States in the amount of the civil penalty proposed above, or the cumulative amount of the civil penalties if more than one civil penalty is proposed, or may protest imposition of the civil penalties in whole or in part, by a written answer addressed to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission. Should the Licensee fail to answer within the time specified, an order imposing the civil penalties will be issued. Should the Licensee elect to file an answer in accordance with 10 CFR 2.205 protesting the civil penalties, in whole or in part, such answer should be clearly marked as an "Answer to a Notice of Violation" and may: (1) deny the violations listed in this Notice, in whole or in part, (2) demonstrate

extenuating circumstances, (3) show error in this Notice, or (4) show other reasons why the penalties should not be imposed. In addition to protesting the civil penalties in whole or in part, such answer may request remission or mitigation of the penalties.

In requesting mitigation of the proposed penalties, the factors addressed in Section VI.B.2 of the Enforcement Policy should be addressed. Any written answer in accordance with 10 CFR 2.205 should be set forth separately from the statement or explanation in reply pursuant to 10 CFR 2.201, but may incorporate parts of the 10 CFR 2.201 reply by specific reference (e.g., citing page and paragraph numbers) to avoid repetition. The attention of the licensee is directed to the other provisions of 10 CFR 2.205, regarding the procedure for imposing civil penalties.

Upon failure to pay any civil penalties due which subsequently have been determined in accordance with the applicable provisions of 10 CFR 2.205, this matter may be referred to the Attorney General, and the penalties, unless compromised, remitted, or mitigated, may be collected by civil action pursuant to Section 234c of the Act, 42 U.S.C. 2282c.

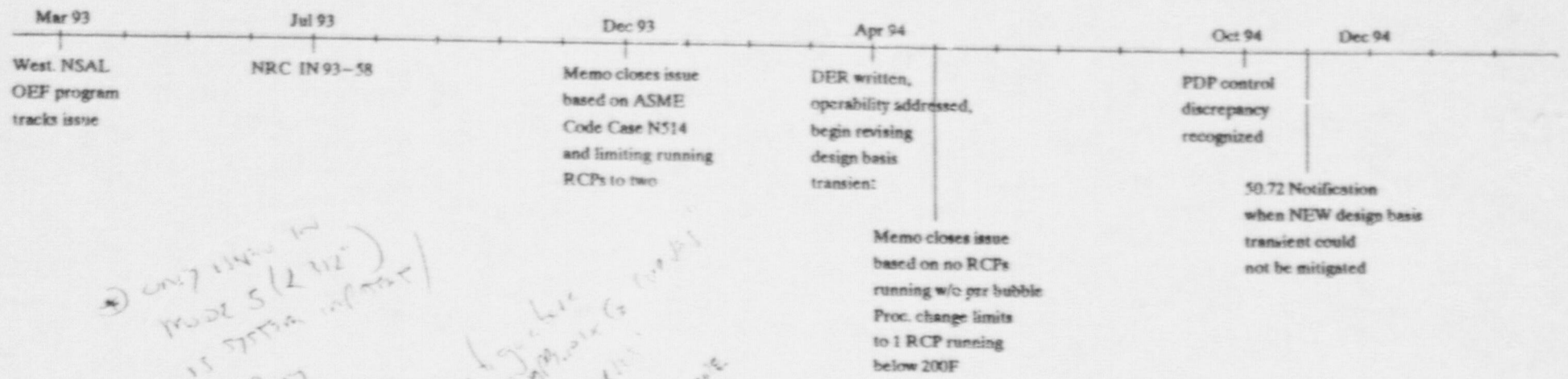
The response noted above (Reply to Notice of Violation, letter with payment of civil penalties, and Answer to a Notice of Violation) should be addressed to: Mr. James Lieberman, Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, One White Flint North, 11555 Rockville Pike, Rockville, MD 20852-2738, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region I, and a copy to the NRC Resident Inspector at the facility that is the subject of this Notice.

Because your response will be placed in the NRC Public Document Room (PDR), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction. However, if you find it necessary to include such information, you should clearly indicate the specific information that you desire not to be placed in the PDR, and provide the legal basis to support your request for withholding the information from the public.

Dated at Rockville, Maryland
this 16th day of October 1995

2-17: in design physical basis changed - plant 11 whole basis for fuel spec. has changed

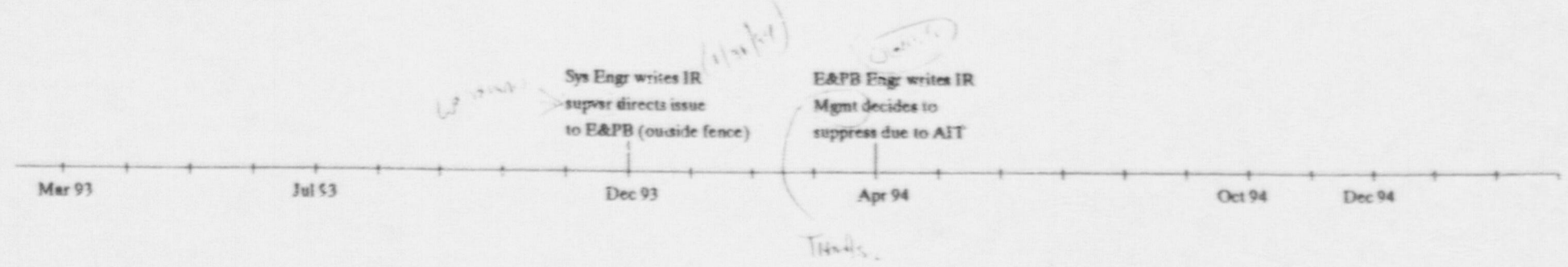
Salem POPS Time Line



→ 50.72 NRC IN 93-58 (2/11/94) 15 5773A info

→ can't get back to 1 RCP running below 200F

ADDITIONAL INFO FROM ALLEGER TRANSCRIPTS:



John H. ...

Chronology Of POPS Evaluation By PSE&G

- March 15, 1993 Westinghouse issues NSA-93-005B on cold overpressure mitigation system nonconservatism
- July 26, 1993 NRC Information Notice 93-58, "Nonconservatism In Low-Temperature Overpressure Protection For Pressurized-Water Reactors," is issued.
- December 30, 1993 PSE&G memo MEC-93-917 recommends restricting the number of RCPs in operation, while in Mode 5, to no more than two RCPs. The memo takes credit for ASME Code Case N514 and closes the AT5 item on NSAL-93-005B.
- April 19, 1994 Discrepancy Evaluation 94-0060 was initiated after it was recognized that NRC approval is necessary for use of the Code Case. Memo points out that even with 1 RCP operating in Mode 5, the existing POPS analysis shows a calculated peak pressure in excess of the Technical Specification limit. Memo also points out that the plant design basis relies on one PORV set at 375 psig, and that with the current plant configuration the RHR relief valve (RH3) would be available to mitigate LTOP transients. PSE&G did not consider the DEF an operability concern, taking credit for the Code Case. DEF recommends either getting the Code Case approved for use at Salem by the NRC or, completing the calculations for LTOP using the RH3 valve and revising the plant design basis.
- May 26, 1994 PSE&G memo MEC-94-630 was issued, superseding MEC-93-917, and dispositions the issue based on an assessment that did not account for the setpoint error introduced by RCPs running during the mass addition transient. Interviews with licensee personnel indicate that because operation of a RCP when RCS is water solid is precluded procedurally, the mass addition transient analysis did not account for the setpoint error associated with running RCPs. On this basis, the memo recloses the AT5 item for the NSAL.
- June 29, 1994 During the evaluation of an unrelated DEF by a different department, the licensee determines that the Configuration Baseline Document for CVCS contains an error concerning control of the positive displacement charging pump. The document incorrectly states that the PDP is tripped by an SI signal. If the PDP is running when the SI signal is initiated, and offsite power is available, the pump will not trip. In addition, engineering review had determined that trip signals to the PDP will be blocked until the SI signal is reset.

- September 27, 1994 Problem Report No. 940927126 was initiated when a new worst case scenario was identified, during efforts to take credit for RH3. The scenario is: RCS in Mode 5 with a pressurizer bubble and one RCP running; then an inadvertent SI signal starts the centrifugal charging pump, collapses the bubble, and the RCP continues to run. The PR recognizes that the current design basis transient is not plausible and provides analysis showing the new worst case scenario results in acceptable peak pressures. The PR states that PSE&G will pursue revising the current plant design basis and also seek a license change to take credit for RH3 (to add margin for future revisions of the PT curve limits). The PR requests that the Code Case approval be sought, to alleviate infringement on the current design basis without reanalysis.
- September 28, 1994 PSE&G memo NLR-194900 requests engineering provide additional analysis. The licensing engineers recognize that analyses have relied on the use of two PORVs and RH3 to mitigate the transient (two out of three valves would provide sufficient relief and meeting single failure criterion). Memo also questions new worst case not starting with a water solid RCS. Issue left open pending further engineering analysis and plans are made to apply for a license change (add RH3 to TS) and approval of the Code Case for both Salem units.
- November 17, 1994 PSE&G initiates Incident Report No. 94-419 and makes a 10CFR50.72 notification for Unit 1 being in an unanalyzed condition. The licensee recognizes that the PDP design discrepancy affects their analysis for PCPS. The additional mass input from the running PDP causes a peak pressure for the mass addition transient of 474 psig. This analysis was for a single PORV (due to single failure considerations) since no licensing action had been taken to have RH3 included in the design basis. From a safety perspective: the licensee has three valves available, any two of which will mitigate the effects of an LTOP transient.

Allegat. No.: RI-0159
Site: Salem
Panel Date: 8/8/96

Branch Chief (AOC) Later to
Acknowledged: Yes do N/A #1-95013
Confidentiality Granted: Yes No

ALLEGATION PANEL DECISIONS (Previous Allegation Panels on issue: Yes No)

Attendees: Chair - Casper Branch Chief (AOC) - Barbo (w) SAC - Holody to
OI Rep. - Leff, Lagan RI Counsel - Others - Chandberg, Roland, School

DISPOSITION ACTIONS: (State actions required for closure (including special concurrences), responsible person, ECD and expected closure documentation)

1) ~~Acknowledgment~~ ^{draft update} letter (if known allegor) _____

Responsible Person: Holody BCD: 8/15/96 ^{8/15/96}
Closure Documentation: _____ Completed: _____

2) Regarding Items 4, 6, 7, Chandberg to look at adequacy of Synagis response, + followup at site + issue inspection report that addresses the same

Responsible Person: Roland (Chandberg) BCD: Inv. 10/18/96 ^{Inv. rpt 11/15/96}
Closure Documentation: _____ Completed: _____

3) Regarding Item 20, Barbo indicated this is Restat Item and Roland to incorporate status in the draft update letter (Find out who knew, what to be done, when to be done)

Responsible Person: Roland BCD: 8/9/96
Closure Documentation: _____ Completed: _____

4) Regarding Item 22, the wrongdoing aspects of Item 2 (already closed since testimony issue closed), wrapped into Item 22 for tracking. OI also address to look at the sick nurse issue allegedly made by Thomson - OI could not substantiate. DRs to

Responsible Person: OI BCD: TBD ^{Review ECD + consistency of interview with allegor to see if will be etc in 22 or same as 22 - credit Report 9/12/96}
Closure Documentation: _____ Completed: _____

5) Regarding Item 16, (reporting delay) OI looked at PPS as example and inquest is still pending - OI likely to make a willful call against the company

Responsible Person: OI BCD: TBD
Closure Documentation: _____ Completed: _____

Safety Significance Assessment: _____

NOTES: ↪ If the same, 22 is not substantiated; If it is a distinct issue, report.
Brandon PPS dealt with in 2 + timeline 22. #IK
Rep Person: Roland ECD: 9/8/96

Factors to Consider Prior to Referral to a Licensee

- If an allegation is to be referred to a licensee, the following factors are to be considered:
- a. The licensee's past record in dealing with allegations, that is, the likelihood that the licensee will effectively identify, investigate, document, and resolve the allegation.
 - b. The possibility that the release of information could bring harm to the allegor.
 - c. Whether the allegation is made against the licensee, applicant, or vendor management or those parties who would normally receive and address the allegation.
 - d. Whether the allegor has voiced objections over the release of the allegation to the licensee, applicant, or vendor.
 - e. Whether the allegation is based on information received from another governmental agency, which does not approve of the information being released in a referral.
 - f. Whether the allegor has already taken this concern to the licensee with unsatisfactory results.

Also, referrals are not to be made if it could compromise the identity of the allegor, or if it could compromise an inspection or investigation. Note: Document the basis for referring allegations to a licensee in those cases where the criteria listed above indicate that it is questionable whether a referral is appropriate.

Distribution: Panel Attendees, Regional Counsel, OI, Responsible Persons (original to SAC)

R. L. ...

1-75013
b

Date and Time of Board: 2/16/95 3:30pm Location of Board: DRS Conference Room
Licensee Name: PSE&G Salem Docket/License Number(s): 50-272,273 DPR-20,75
Types of Licensed Activities: Power Reactor Last Day of Inspection: February 17, 1995

ATTENDEES

Board Chairman: J. Wiggins Enforcement Representative: D. Holody
Cognizant Section Chief: E. Kelly Responsible DRP Manager (Rx Licensees): J. White
Lead Inspector: D. Moy Others: B. McDermott

Potentially Escalated Violations (include specific requirements violated): Licensee failed to notify NRC for 11 months & continued to operate plant outside design basis for FOPS (50.72) In March 1994 PSE&G revised the POPS design basis listed in FSAR without an USO evaluation. (50.59) See proposed NOV attached.

Safety Significance/Apparent Severity Levels: Reasonable assurance of safety provided by RHR suction relief valve (not credited as part of POPS in FSAR). Possibility of intentional wrong doing.

Root causes: The issue was not entered into any discrepancy program until 1 yr after information from Westinghouse. Issue was managed primarily by memorandum.

Method of Identification (NRC, Licensee, Other State or Federal Inspector, Allegation, etc.): Allegation

Corrective Actions Taken or Planned to Date: A 50.59 evaluation was done after significant discussion with NRC, the licensee maintains that no NRC approval for this type of change is necessary. No corrective actions for the less than adequate management of the issue have been presented by PSE&G.

Prior Licensee Performance (CPs, Orders, No. of Viols, Similar Viols, SALPs): The licensee is a SALP 2 in engineering and a lack of attention to potential safety issues has been previously documented.

Prior Notice of Previous Problems (i.e., Audits, INs, Bulletins, NMSS Newsletters, etc.): The issue was first formally presented to industry in a Westinghouse NSAL, March 1993. Then again in NRC IN93-58, dated July 1993. Information from allegor shows plant management was aware of the generic concern in February 1993.

Multiple Examples: Several opportunities to identify the issue as a condition outside design basis through the Incident Report system and via 50.72 were either missed or intentionally ignored.

Duration: 1 year and 8 months after being notified of the problem (via Westinghouse NSAL), the licensee made a 50.72 report based on being outside their NEW DESIGN BASIS.

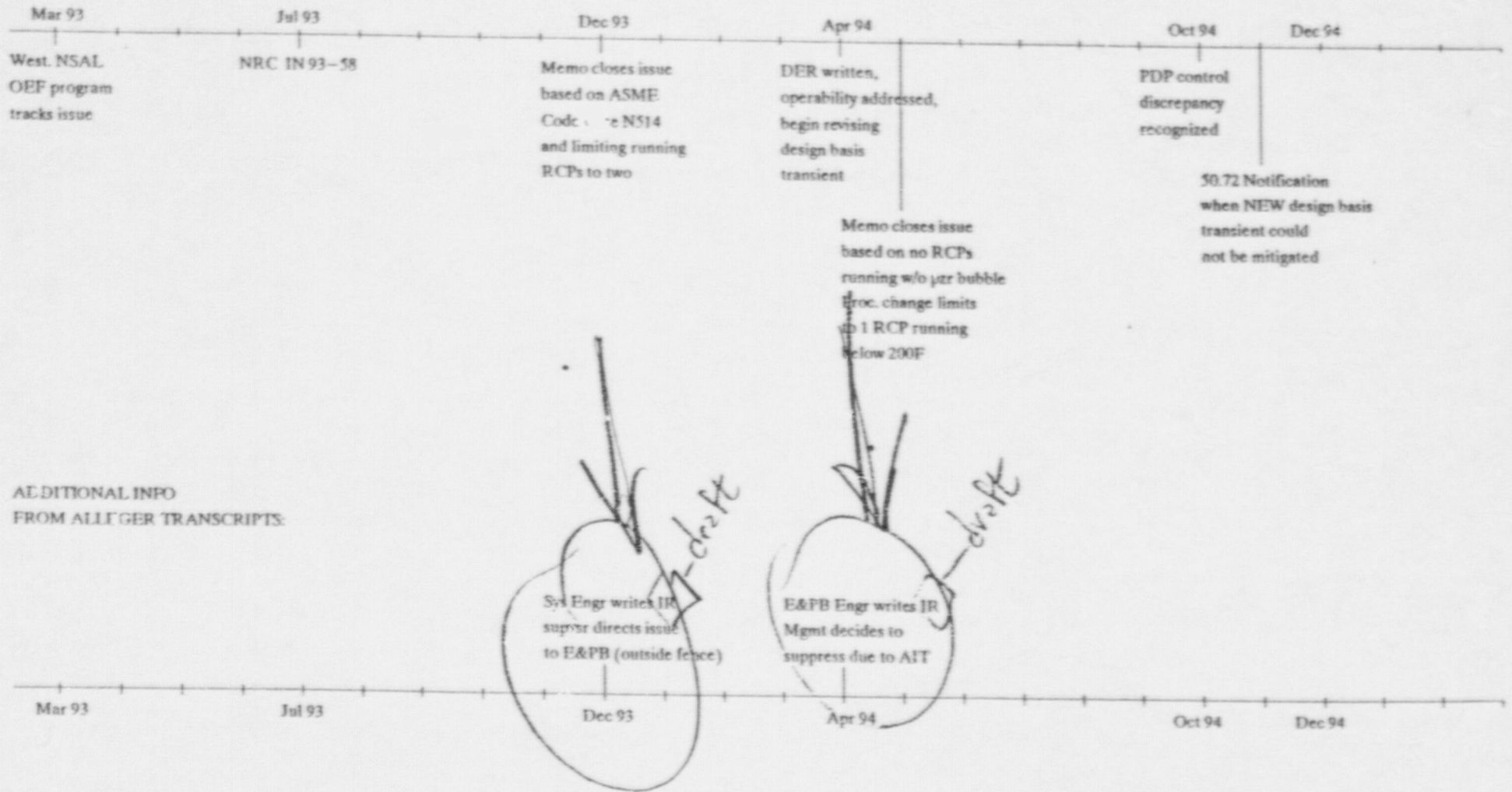
Delegation of Authority Determination (Materials Licensee Only): _____

Board Recommendations: _____

- ATTACHMENTS:
- 1 POPS TIME LINE
 - 2 POPS DETAILED CHRONOLOGY
 - 3 DRAFT REPORT SECTION
 - 4 PROPOSED NOV

D/3

Salem POPS Time Line



Chronology Of POPS Evaluation By PSE&G

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- April 19, 1994 Discrepancy Evaluation 94-0060 was initiated after it was recognized that NRC approval is necessary for use of the Code Case. Memo points out that even with 1 RCP operating in Mode 5, the existing POPS analysis shows a calculated peak pressure in excess of the Technical Specification limit. Memo also points out that the plant design basis relies on one PORV set at 375 psig, and that with the current plant configuration the RHR relief valve (RH3) would be available to mitigate LTOP transients. PSE&G did not consider the DEF an operability concern, taking credit for the Code Case. DEF recommends either getting the Code Case approved for use at Salem by the NRC or, completing the calculations for LTOP using the RH3 valve and revising the plant design basis.
- May 26, 1994 PSE&G memo MEC-94-630 was issued, superseding MEC-93-917, and dispositions the issue based on an assessment that did not account for the setpoint error introduced by RCPs running during the mass addition transient. Interviews with licensee personnel indicate that because operation of a RCP when RCS is water solid is precluded procedurally, the mass addition transient analysis did not account for the setpoint error associated with running RCPs. On this basis, the memo recloses the ATS item for the NSAL.
- June 29, 1994 During the evaluation of an unrelated DEF by a different department, the licensee determines that the Configuration Baseline Document for CVCS contains an error concerning control of the positive displacement charging pump. The document incorrectly states that the PDP is tripped by an SI signal. If the PDP is running when the SI signal is initiated, and offsite power is available, the pump will not trip. In addition, engineering review had determined that trip signals to the PDP will be blocked until the SI signal is reset.

- September 27, 1994 Problem Report No. 940927126 was initiated when a new worst case scenario was identified, during efforts to take credit for RH3. The scenario is: RCS in Mode 5 with a pressurizer bubble and one RCP running; then an inadvertent SI signal starts the centrifugal charging pump, collapses the bubble, and the RCP continues to run. The PR recognizes that the current design basis transient is not plausible and provides analysis showing the new worst case scenario results in acceptable peak pressures. The PR states that PSE&G will pursue revising the current plant design basis and also seek a license change to take credit for RH3 (to add margin for future revisions of the PT curve limits). The PR requests that the Code Case approval be sought, to alleviate infringement on the current design basis without reanalysis.
- September 28, 1994 PSE&G memo NLR-I94900 requests engineering provide additional analysis. The licensing engineers recognize that analyses have relied on the use of two PORVs and RH3 to mitigate the transient (two out of three valves would provide sufficient relief and meeting single failure criterion). Memo also questions new worst case not starting with a water solid RCS. Issue left open pending further engineering analysis and plans are made to apply for a license change (add RH3 to TS) and approval of the Code Case for both Salem units.
- November 17, 1994 PSE&G initiates Incident Report No. 94-419 and makes a 10CFR50.72 notification for Unit 1 being in an unanalyzed condition. The licensee recognizes that the PDP design discrepancy affects their analysis for POPS. The additional mass input from the running PDP causes a peak pressure for the mass addition transient of 474 psig. This analysis was for a single PORV (due to single failure considerations) since no licensing action had been taken to have RH3 included in the design basis. From a safety perspective: the licensee has three valves available, any two of which will mitigate the effects of an LTOP transient.

BACKGROUND- Draft Inspection Report

2.1 Pressurizer Overpressure Protection System (POPS)

Background

The POPS uses two pressurizer power-operated relief valves (PORVs) to mitigate low temperature (<312°F) overpressure transients, keeping the peak pressure below 10 CFR 50 Appendix G limits for brittle fracture protection. The Appendix G limits are incorporated in Technical Specifications (TS) as pressure-temperature (P/T) curves specific to each unit's reactor vessel. The original design-basis mass addition transient for the POPS was based on the start of a safety injection pump (780 gpm) and its injection into a water solid reactor coolant system (RCS). An NRC Safety Evaluation Report, dated February 21, 1980, associated with Amendment No. 24 to the TS, approved the Salem POPS setpoint of 375 pounds per square inch gage (psig), based on the calculated peak transient pressure of 446 psig and a 14 psi margin (at that time) below the Unit 1 Appendix G limit. The system was designed to meet the single failure criterion, with either PORV having sufficient relief capacity to limit the peak pressure to less than the P/T curve limit.

The inspector noted that the P/T limits for each unit will decrease with successive operating cycles due to irradiation effects. Therefore, margin between the peak transient pressure and the P/T limit could change as subsequent revision of the Salem TS P/T curves are reviewed and approved by the NRC. The Unit 1 P/T curves were revised after the original POPS safety evaluation by TS Amendment No. 108, which established a more restrictive limit of 450 psig at low temperatures. These curves are valid for up to 15 effective full power years of operation.

Setpoint Nonconservatism

On March 15, 1993, Westinghouse issued a Nuclear Safety Advisory Letter (NSAL-93-005B), informing PSE&G about nonconservatism in the setpoint methodology for POPS. The dynamic head, resulting from running reactor coolant pumps (RCPs) and the static head due to elevation of sensors relative to the reactor vessel midplane, were found not to have been considered in the original setpoint methodology. For each operating RCP, the difference between actual pressure and that sensed by the POPS instrumentation could differ by approximately 25 psi. Consequently, for a four-loop plant such as Salem, the sensed pressure (with all four RCPs running) could be as much as 100 psi less than the actual pressure at the reactor vessel midplane (the area of concern for P/T curves). NRC Information Notice (IN) 93-58, "Nonconservatism in Low-Temperature Overpressure Protection For Pressurized-Water Reactors," was issued on July 26, 1994. The IN noted that administrative restrictions, recommended by the Westinghouse NSAL, were intended to provide interim actions until either setpoints were verified to be accurate, or appropriately revised in TS.

After reevaluating the existing POPS analysis to address the NSAL concerns, PSE&G determined that the peak transient pressure would exceed the P/T limits of 450 psig for Unit 1 and 475 psig for Unit 2. With two RCPs running, the corrected peak pressure became 477 psig (for either unit since the analyzed transient is the same). At that point, the licensee dispositioned the issue by memorandum dated December 30, 1993, administratively limiting to two the number of reactor coolant pumps in service below 200°F (the most limiting area of the P/T curve) and increasing each unit's P/T limit by 10% using ASME Code Case N514.

The inspector considered that, at the point PSE&G became aware that the margins to TS P/T limits for Appendix G brittle fracture considerations were not only reduced, but in fact lost (and could be potentially exceeded), both Salem Units were being operated in an unanalyzed condition outside the plants' design bases. Therefore, the condition was reportable and is an apparent violation of 10 CFR 50.72 and 73.

Operability Questioned

On April 19, 1994, a Discrepancy Evaluation Form (DEF 94-0060) was initiated when the PSE&G licensing staff discovered that the ASME Code Case had been relied upon for closure of the issue without prior NRC approval. The DEF resolved the immediate operability concerns by taking credit for the capacity of the residual heat removal (RHR) suction relief valve (RH3) to augment the analyzed POPS relief capacity. Valve RH3 has the same relief setpoint as POPS, but has a greater effective flow area and will actuate faster than a PORV once its setpoint is reached. A subsequent analysis confirmed the licensee's initial judgement that the peak pressure would remain well below the Appendix G limit, if valve RH3 was credited. However, RHR relief RH3 was not initially credited in Amendment No. 24 to the Salem Unit 1 TS. Procedure changes also were initiated limiting RCP operation to one pump, thus further minimizing the dynamic head error when the plant was below 200°F. At this time, April 1994, the licensee concluded that there was no operability concern based on the additional margin provided by the ASME Code Case and their compensatory measures. The inspector noted that ASME Code Case N514 was not (and is still not) approved for use by the NRC, either generically via Regulatory Guide 1.85 or specifically for Salem by exemption from 10 CFR Appendix G.

Revised Design Basis

On May 26, 1994, the issue was once again thought to be closed based on a procedural requirement to achieve a pressurizer bubble before starting a RCP. Because of this requirement, it was reasoned that only a correction for static head was necessary (relatively a small effect) and, therefore, the original analysis was still valid. After further consideration, the licensee determined that they should consider the effects of a running RCP on the POPS analysis. Since the existing POPS analysis did not provide acceptable results with a running RCP, engineering personnel established what they considered a "realistic" event as the basis for the POPS setpoint analysis. The new transient begins with the reactor in Mode 5 (<200°F), the positive displacement (PD) charging pump in service and one RCP running, whereafter an inadvertent SI signal would cause the centrifugal charging pump to start, the PD charging pump to trip, and the isolation of letdown to the chemical and volume control system. Evaluation of this scenario using the GOTHIC computer code (and the POPS setpoint of 375 psig) resulted in a peak pressure of 438 psig, below the P/T limits of each unit.

By September 1994, the licensee believed they had reached a final resolution of this issue because the new transient could be mitigated by the original POPS hardware using the existing 375 psig TS setpoint. Although the licensee had not changed the TS setpoint, they had changed the justification for it by revising the limiting transient upon which the Unit 1 POPS TS 3.4.9.3a is based, as described in TS bases (Page B3/4 4-11). Further, the new transient that changed the design basis for POPS (and reduced the margin of protection to Appendix G P/T limits), also invalidated the NRC's SER upon which Amendment No. 24 - and TS 3.4.9.3.a - was based. The description of the limiting transient and the design-bases for POPS in Salem FSAR Section 7.6.3.3 were, therefore, no longer relevant.

The inspector noted that, since March 1993, there was no formal quality record or corrective action "vehicle" that addressed this issue, and that only a memorandum (MEC-93-917) in effect "carried" the problem through the licensee's engineering processes.

Another opportunity to evaluate thoroughly all relevant nuclear safety considerations of this issue was missed because, even as of the conclusion of this inspection, no formal written safety evaluation had been performed as required by 10 CFR 50.59. The inspector was of the opinion that, since the margins to safety for overpressure protection (viz. peak pressure versus Appendix G P/T limits) had either been significantly reduced or lost altogether (depending upon which transient and assumptions are adopted as limiting), the new "limiting" transient represents a potential unreviewed safety question.

Recent Development

By November 1994, the licensee recognized that an error, recently identified in their configuration baseline document, would adversely effect their new POPS analysis. The configuration document stated that the PD charging pump trips off on a SI signal; however, if off-site power is available when the SI signal occurs, the pump continues to run and trip signals are blocked (until the SI signal is reset). After discovering this error, the "realistic" analysis was revised to include the PD charging pump flow and resulted in a peak pressure of 474 psig.

Incident Report (IR) 94-419, dated November 17, 1994, documented this new information and concluded that the Unit 1 POPS no longer met its design-basis single failure criterion because a single PORV could no longer mitigate the transient. PSE&G reported this to the NRC under 10 CFR 50.72 as an unanalyzed condition for Salem Unit 1. IR 94-419 provided justification for the continued operation of Unit 1 based on RHR relief valve RH3 being available to augment POPS. With the three valves (2 PORVs and RH3) available below 312°F, sufficient relief capacity would be provided. The licensee considered Unit 2 to be not reportable because it was still 1.0 psi below its P/T curve limit.

The inspector reviewed the licensee's documentation and interviewed personnel involved with the POPS issue during the 20 months between the NSAL issuance in March 1993 and PSE&G's 50.72 notification in November 1994. The inspector concluded that there is currently an adequate assurance of safety, based on the additional relief capacity of valve RH3 and the margin which can be gained with use of ASME Code Case N514. The relief capacity of any two of the three valves will be sufficient, since the relief area is, at minimum, double the original design. Based on the inspector's discussions with representatives from the NRC Office of Nuclear Reactor Regulation (NRR), while not yet formally approved, ASME Code Case N514 is apparently acceptable.

On December 16, 1994, a conference call between PSE&G and NRC management was held to discuss the licensee's actions to resolve the POPS issue. During this call, the licensee committed to limit the number of RCPs in service when the RCS temperature is below 200°F and to maintain procedural controls preventing an Intermediate Head Safety Injection Pump from injecting into the RCS. These commitments were restated in a letter from PSE&G issued later that same day. On December 22, 1994, PSE&G submitted an application for NRC approval of ASME Code Case N514. Included in the submittal were the calculations supporting the new design-basis transient for POPS. PSE&G must credit RH3 on Unit 1 to meet the design-basis single failure criterion for POPS. However, for Unit 2, the licensee does not need to credit Valve RH3 because the peak pressure, based on a single PORV, is 1.0 psi below its P/T limit.

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RCS Vent Path

As discussed earlier, the POPS system is designed to use two redundant PORVs, either of which can provide sufficient relief capability in case of a single failure. Both the original analyses and the licensee's revised calculations show that the effective flow area of each PORV is sufficient to meet this requirement.

Salem TS require cold (<312°F) overpressure protection, provided by either the redundant PORVs (the POPS system) or a reactor coolant system vent of greater than or equal to 3.14 square inches. The venting of the RCS is an alternative to having the POPS operable. In the event a PORV fails and cannot be restored within 7 days, the reactor must be depressurized and the RCS must then be vented.

The inspector could find no specific justification for the TS-required vent area of 3.14 square inches. However, the inspector concluded that the vent area in TS 3.4.9.3 was adequate based on: 1) the flow from a 2-inch pipe flange will encounter less flow resistance than flow through a PORV (2-inch nominal pipe size); 2) a single PORV can be shown to provide sufficient relief capability; and 3) the vent area is passive protection and, therefore, does not need to be redundant.

The inspector considered several aspects of PSE&G's actions to resolve the POPS issue over the past 20 months as less than adequate:

- The POPS issue was initially dispositioned based on using an unapproved ASME Code Case without prior NRC approval, and no operability determination was documented.
- After the licensee identified that inclusion of the setpoint nonconservatism put them outside the plant's design basis, no reports were made pursuant to 10 CFR 50.72 and 73.
- Prior to revising the POPS design-basis transient described in the FSAR, the licensee failed to perform an evaluation pursuant to 10 CFR 50.59. At the time of the exit meeting, this evaluation had still not been completed.
- The NRC safety evaluation, that approved the POPS design and the 375 psig TS setpoint, was based, in part, on a margin of 14 psi between the peak transient pressure and the Appendix G limit. This margin has been reduced in the revised design-basis transient.
- The licensee has taken 1 year and 8 months to conclude that the NSAL nonconservatism would result in a condition outside the design-basis of Unit 1. The priority assigned to this issue was very low, and the due dates were extended twice, once more than allowed by administrative procedure.

The adequacy of the new design-basis for POPS is currently under review by the NRC's Office of Nuclear Reactor Regulation. The inspector concluded that the licensee's failure to perform an adequate safety evaluation or otherwise resolve the POPS issue under a quality engineering process was not appropriate. Further, during the fragmented process used to address the issue (memorandum superseding memorandum), several violations of NRC requirements occurred. The apparent violations are being considered for escalated enforcement in accordance with the NRC Enforcement Policy set forth in Appendix C of 10 CFR 50.2. (EEI 50-272/94-32-01).

Proposed NOV

1. 10 CFR 50.72(b)(1)(ii)(B) requires licensees notify the NRC within one hour of any condition during operation that results in the nuclear power plant being outside its design basis.

The pressurizer overpressure protection system is designed to limit the peak reactor pressure during cold temperature transients to less than the limits established by 10 CFR 50 Appendix G and described in Technical Specification Figure 3.4-3.

Contrary to the above, on December 30, 1993, PSE&G concluded the pressurizer overpressure protection system was not capable of limiting peak pressure to below the limits listed in Figure 3.4-3 and did not notify the NRC.

This is a Severity Level ____ violation (Supplement 1).

2. 10 CFR 50.59 allows licensees to make changes in the facility as described in the safety analysis report without prior NRC approval unless the proposed change involves an unreviewed safety question. 10 CFR 50.59, paragraph a(2), requires licensees to evaluate proposed changes to determine whether an unreviewed safety question exists.

Contrary to the above, on or about April 19, 1994, PSE&G changed the pressurizer overpressure protection systems (POPS) design basis transient for mass addition that is described in the Salem ~~Updated Final~~ Safety Analysis Report section 7.6.3.3, without evaluating the change pursuant to 50.59, paragraph a(2).

This is a Severity Level ____ violation (Supplement 1)

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INSPECTION REPORT 94-32
DETAILS

1.0 INSPECTION SCOPE

This inspection evaluated the response of Public Service Electric and Gas (PSE&G) to information regarding the nonconservatisms identified in Technical Specification setpoint for the Pressurizer Overpressure Protection Systems (POPS) at both Salem units. The nonconservatisms in the original Westinghouse setpoint methodology were communicated to PSE&G in a letter from the vendor dated March 15, 1993. NRC Information Notice 93-58, "Nonconservatism in Low-Temperature Overpressure Protection For Pressurized-Water Reactors," dated July 26, 1993, reiterated the problems identified by Westinghouse.

2.0 FINDINGS

Background

The POPS uses two pressurizer power-operated relief valves (PORVs) to mitigate low temperature (<312°F) overpressure transients, keeping the peak pressure below 10 CFR 50 Appendix G limits for brittle fracture protection. The Appendix G limits are incorporated in Technical Specifications (TS) as pressure-temperature (P/T) curves specific to each unit's reactor vessel. The original design-basis mass addition transient for the POPS was based on the start of a safety injection pump (780 gpm) and its injection into a water solid reactor coolant system (RCS). POPS was designed to meet the single failure criterion, with either PORV having sufficient relief capacity to limit the peak pressure to less than the P/T curve limit. An NRC Safety Evaluation Report, dated February 21, 1980, associated with Amendment No. 24 to the TS, approved the Salem POPS setpoint of 375 pounds per square inch gage (psig), based on the calculated peak transient pressure of 446 psig and a 14 psi margin (at that time) below the Unit 1 Appendix G limit. Requirements for the Unit 2 POPS were incorporated into the unit's TS prior to initial startup and were approved based on the Unit 1 Safety Evaluation.

The P/T limits for all reactor vessels will decrease with successive operating cycles due to irradiation effects on the vessel materials. Therefore, margin between the peak transient pressure and the P/T limit will change as subsequent revisions of P/T curves for Salem are reviewed and approved by the NRC. The Unit 1 P/T curves were revised after the original POPS safety evaluation by TS Amendment No. 108, which established a more restrictive limit of 450 psig at low temperatures. These curves are valid for up to 15 effective full power years of operation. The Unit 2 P/T curves were approved by TS Amendment No. 86, which established a low temperature pressure limit of 475 psig.

Setpoint Nonconservatism

On March 15, 1993, Westinghouse issued a Nuclear Safety Advisory Letter (NSAL-93-005B) informing PSE&G about nonconservatism in the setpoint methodology for POPS. The dynamic head, resulting from running reactor coolant pumps (RCPs) and the static head, due to elevation of sensors relative to the reactor vessel midplane, were found not to have been considered in the original setpoint methodology. The static head error for Salem is relatively small, resulting in a 4.7 psi increasing the peak transient pressure.

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However, the dynamic head error is more significant. Each operating RCP will increase the difference between pressure at the reactor vessel midplane and that sensed by the POPS instrumentation by approximately 25 psi. Consequently, for a four-loop plant such as Salem, the sensed pressure (with all four RCPs running) could be as much as 100 psi less than the actual pressure at the reactor vessel midplane (the area of concern for P/T curves). These errors simply can be added to the original peak transient pressure since their effect is to offset (nonconservatively) the pressure at which POPS will actuate. NRC Information Notice (IN) 93-58, "Nonconservatism in Low-Temperature Overpressure Protection For Pressurized-Water Reactors," was issued on July 26, 1994. The IN noted that administrative restrictions, recommended by the Westinghouse NSAL, were intended to provide interim actions until either setpoints were verified to be accurate, or appropriately revised in TS.

In December 1993, after re-evaluating the original POPS analysis to address the NSAL concerns, PSE&G determined that the corrected peak transient pressure would exceed the P/T limits of both units. Even with limiting the number of running RCPs to two, the corrected peak pressure would be 485 psig (for either unit since the analyzed transient is the same). On December 30, 1993, the licensee dispositioned the issue by memorandum, administratively limiting the maximum number of RCPs in service to two, limiting the dynamic error in the most restrictive area of the P/T curve (below 200°F), and increasing each unit's P/T limit by 10% using American Society of Mechanical Engineers (ASME) Code Case N-514.

The inspector considered that, at the point PSE&G became aware that the margins to TS P/T limits for Appendix G brittle fracture considerations were not only reduced, but in fact lost (and could be potentially exceeded), both Salem Units were being operated in an unanalyzed condition outside the plants' design bases. Therefore, the condition was reportable and is an apparent violation of 10 CFR 50.72 and 73.

Operability Questioned

An April 19, 1994, Discrepancy Evaluation Form (DEF 94-0060) identified that the ASME Code Case N-514 could not be relied upon for closure of the issue without prior NRC approval. The DEF resolved the immediate operability concerns by taking credit for the capacity of the residual heat removal (RHR) suction relief valve (RH3) to augment the analyzed POPS relief capacity. The spring operated relief valve, RH3, has the same setpoint as POPS, but has a greater effective flow area and will actuate faster than a PORV once its setpoint is reached. A subsequent analysis confirmed the licensee's initial judgement that the peak pressure would remain well below the Appendix G limit, if valve RH3 was credited. However, RH3 was not credited the original POPS analysis for Salem or the NRC Safety Evaluation for the system.

The April DEF also initiated a procedure revision request to limit the number of running RCPs in Mode 5 (below 200°F) to one pump, thus further minimizing the dynamic head error in the most restrictive region of the P/T curves. At this time, April 1994, the licensee concluded that there was no operability concern based on the additional margin provided by the ASME Code Case and

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their compensatory measures. The inspector noted that an exemption request for use of ASME Code Case N-514 had not been submitted by P&E&G at this time. Use of the ASME Code Case would require pre-approval by the NRC, either generically via Regulatory Guide or specifically for Salem by exemption from 10 CFR 50.60. The inspector also noted that even after the issue was entered into the DEF process, the condition outside the design-basis was still not reported to the NRC.

The inspector independently assessed the availability and capability of RH3 for supplementing the POPS. RH3 is available for RCS pressure relief when the RHR system is aligned for shutdown cooling. Review of Salem integrated operating procedures IOP-2, "Cold Shutdown To Hot Standby," and IOP-6, "Hot Standby To Cold Shutdown" showed that RHR shutdown cooling will be in service when POPS is required to be operable (<312°F). One reason RH3 was not credited in the original POPS analysis was the automatic closure interlock that would shut the RHR suction valve on high RCS pressure, isolating RH3 from the RCS. However, this interlock was removed from both Salem units in the late 1980's. This change was generically reviewed by the NRC as WCAP-11736, "Residual Heat Removal System Autoclosure Interlock Removal Report," and conceptually approved in a Safety Evaluation dated August 8, 1989. The inspector also reviewed the valve's relief capacity, actuation response time, and calibration schedule.

The inspector concluded that RH3 would be available to supplement POPS based on the procedural requirements and would substantially reduce the peak transient pressure based on its design. However, crediting RH3 as part of POPS would require a change to Technical Specifications.

In a May 26, 1994, memorandum the issue was once again closed, this time based on a procedural requirement to achieve a pressurizer bubble before starting a RCP. Because of this requirement, it was reasoned that only a correction for static head was necessary (relatively a small effect) and, therefore, the original analysis was still valid. The inspector noted that the procedural requirement to have a pressurizer bubble before starting any RCPs was in effect and reviewed in the 1980 NRC Safety Evaluation Report for POPS. Although the issue was in effect "closed", analysis to support a license change for crediting RH3 as part of POPS was pursued in anticipation of future, more restrictive, revisions to the P/T curves. It was during this analysis that the licensee determined that they should consider the effects of a running RCP on the POPS analysis.

Revised Design Basis Transient

Since it was known that the existing POPS analysis would not provide acceptable results with running RCPs, engineering personnel established what they considered a more "realistic" transient as the limiting event to justify the existing POPS TS setpoint. The original design-basis transient was simply the start of a safety injection pump (intermediate head SI at 780 gpm) and its injection into a water solid RCS. The licensee's new transient is mechanistic and relies upon procedural controls for limiting possible injection sources. The new transient begins with the reactor in Mode 5 (<200°F), the positive displacement (PD) charging pump in service and one RCP running, whereafter an

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inadvertent SI signal would cause the centrifugal charging pump (high head SI at 560 gpm) to start, the PD charging pump to trip, and the isolation of letdown to the chemical and volume control system. Evaluation of this transient (mitigated by a single PORV having a 375 psig setpoint) using the GOTHIC computer code resulted in a peak pressure of 438 psig, below the P/T limits of each unit.

By September 1994, the licensee believed they had reached a final resolution and closed the issue a third time because their new transient could be mitigated by the original POPS hardware using the existing 375 psig IS setpoint. Although the licensee had not changed the TS setpoint, they had changed the justification for it by revising the limiting transient upon which the setpoint is based. The POPS TS and TS Bases for Salem Unit 1 and 2 are, TS 3.4.9.3, Bases 3/4.4.9.3 and TS 3.4.10.3, Bases 3/4.4.10.3, respectively. Further, the new transient, which changed the design basis for POPS, also invalidated the NRC's SER upon which Amendment No. 24 - and both units' POPS TS - was based. The description of the limiting transient and the design-bases for POPS in Salem FSAR Section 7.6.3.3 were, therefore, no longer relevant.

The inspector noted that, since March 1993, no formal corrective action program addressed this issue and that only memorandums "carried" the problem through the licensee's engineering processes. The inspector was of the opinion that, another opportunity to evaluate thoroughly all relevant nuclear safety considerations of this issue was missed because, even as of the conclusion of the exit meeting on December 19, 1994, no formal written safety evaluation had been performed as required by 10 CFR 50.59.

"New" Transient Amended

In November 1994, the licensee recognized that an error, recently identified in their configuration baseline document, would adversely effect their new POPS analysis. The configuration document stated that the PD charging pump trips off on a SI signal; however, if off-site power is available when the SI signal occurs, the pump continues to run and trip signals are blocked (until the SI signal is reset). After discovering this error, analysis for the new transient was revised to include the mass addition of the PD charging pump and resulted in a calculated peak pressure of 474 psig.

Incident Report (IR) 94-419, dated November 17, 1994, documented this latest discovery and concluded that the Unit 1 POPS no longer met its design-basis single failure criterion because a single PORV could no longer mitigate the transient. PSE&G reported this to the NRC under 10 CFR 50.72 as an unanalyzed condition for Salem Unit 1. IR 94-419 provided justification for the continued operation of Unit 1 based on RHR relief valve RH3 being available to augment POPS. With the three valves (2 PORVs and RH3) available below 312°F, sufficient relief capacity would be provided. However, the licensee considered Unit 2 to be "not reportable" because with a single PORV the peak transient was still 1.0 psi below its P/T curve limit.

The inspector was of the opinion that, since the margins to safety for overpressure protection (viz. peak pressure versus Appendix G P/T limits) had

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either been significantly reduced or lost altogether (depending upon which transient and assumptions are adopted as limiting), the new "limiting" transient represents a potential unreviewed safety question.

RCS Vent Path

TS for both Salem units require cold overpressure protection be provided by either the redundant PORVs (the POPS system) or a reactor coolant system vent of greater than or equal to 3.14 square inches. Venting the RCS is an alternative to having the POPS operable and would be accomplished after depressurizing the RCS. The TS action statement for POPS requires that in the event a PORV fails and cannot be restored within 7 days, the reactor must be depressurized and vented through the 3.14 square inch vent within the next eight hours.

The inspector could find no specific justification for the TS-required vent area of 3.14 square inches. However, the inspector concluded that the vent area required in TS should be adequate based on: 1) the flow from a 2-inch pipe flange will encounter less flow resistance than flow through a PORV (2-inch nominal pipe size); 2) a single PORV (having lesser effective flow area) can be shown to provide sufficient relief capability even with its delay for actuation; and 3) the vent area is passive protection and, therefore, does not need to be redundant.

December NRC Inspection

The inspector reviewed the licensee's documentation and interviewed personnel involved with the POPS issue during the 20 months between the NSAL issuance in March 1993 and PSE&G's 50.72 notification in November 1994. The inspector concluded that there was an adequate assurance of safety, based on the additional relief capacity of valve RH3 and the margin which can be gained with use of ASME Code Case N-514. Based on the inspector's discussions with representatives from the NRC Office of Nuclear Reactor Regulation (NRR), while not yet formally approved, ASME Code Case N-514 was apparently acceptable.

On December 16, 1994, a conference call between PSE&G and NRC management was held to discuss the licensee's actions to resolve the POPS issue. During this call, the licensee committed to limit the number of RCPs in service when the RCS temperature is below 200°F and to maintain procedural controls preventing an Intermediate Head Safety Injection Pump from injecting into the RCS. These commitments were formally submitted in a letter from PSE&G issued later that same day.

On December 22, 1994, PSE&G submitted an application for NRC approval of ASME Code Case N-514. Included in the submittal were the calculations supporting the new design-basis transient for POPS. PSE&G must credit RH3 on Unit 1 to meet the design basis single failure criterion for POPS. However, for Unit 2, the licensee does not believe they need to credit RH3 because the peak pressure, based on a single PORV, is still 1.0 psi below the unit's P/T limit.

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6

Recent Developments

By letter dated February 13, 1995, the NRC issued an exemption from the requirements of 10 CFR 50.60 for Salem Units 1 and 2. This exemption permits using the safety margins recommended in ASME Code Case N-514 in lieu of the safety margins required by Appendix G to 10 CFR 50. Therefore, each unit's POPS curve limits for POPS can be increased by 10%; Unit 1's limit becomes 195 psig and the Unit 2's becomes 522 psig.

The inspector noted that the exemption resolves one licensing issue from the perspective that the plant can not meet its original design basis. However, this fact does not justify, or ameliorate the licensee's actions between March 1993 and November 1994. Several actions taken during that time appear to be violations of NRC requirements and were not acceptable means for addressing a potential safety issue. During the licensee's process they have however, brought into question whether the original POPS design-basis transient is appropriate given today's knowledge. This licensing aspect of POPS is not yet resolved.

Conclusions

The inspector considered several aspects of PSE&G's actions to resolve the POPS issue over the past 20 months as less than adequate:

- The POPS issue was initially dispositioned by taking exception to the requirements of 10 CFR 50.60 without prior NRC approval.
- When inclusion of the setpoint nonconservatism put the Salem Units outside the POPS design basis, the reports to the NRC were not made pursuant to 10 CFR 50.72 and 73.
- No safety evaluation pursuant to 10 CFR 50.59 was performed prior to revising the POPS design-basis transient described in the FSAR. As of the December 19, 1994 executive meeting, this evaluation had still not been completed.
- Several times during the licensee's approach to resolution, the margins of safety for POPS reviewed in the February 1980 NRC Safety Evaluation were reduced and not appropriately evaluated.
- It took almost 2 years (March 1993 to February 1995) for PSE&G to take some of the licensing actions necessary to resolve the NSAL nonconservatism and other issues still remain.
- The lowest priority possible was assigned to this issue by the Operational Experience Feedback program and the issue was not appropriately entered into a quality program for resolving engineering problems.

The adequacy of the new design-basis for POPS is currently under review by the NRC's Office of Nuclear Reactor Regulation. Pending their assessment of the

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7

licensee's proposed limiting design-basis transient for POPS, this issue is unresolved (URI 50-272,311/94-32-01).

The inspector concluded that the licensee's reliance on ASME Code Case N-514 without NRC approval, the failure to report a condition outside the design basis, and the failure to perform an adequate safety evaluation of the revised POPS design basis transient are all apparent violations of NRC requirements. Further, that the fragmented process used to address the issue (memorandum superseding memorandum) was not appropriate for potentially safety significant engineering issues. The apparent violations are being considered for escalated enforcement in accordance with the NRC Enforcement Policy set forth in Appendix C of 10 CFR 50.2. (EEI 50-272,311/94-32-02).

3.0 MANAGEMENT MEETINGS

Licensee representatives were informed of the scope and purpose of this inspection at an entrance meeting conducted on December 5, 1994. Findings were periodically discussed with the licensee throughout the course of this inspection.

A telephone conference call was conducted between NRC and PSE&G management representatives (December 15, 1994, to discuss the licensee's plans to resolve several aspects of the POPS issue. During this call PSE&G committed to taking several actions and subsequently documented these commitments in a letter to the NRC issued later that day.

The inspector met with the principals listed below to summarize preliminary findings on December 19, 1994. The licensee acknowledged the preliminary findings and conclusions, with no exceptions taken. Further, the bases for the preliminary conclusions did not involve proprietary information, nor was any such information expected to be included as part of the written inspection report.

Public Service Electric & Gas Company

L. Catalfomo	Operations Manager
M. Danak	Senior Staff, Mechanical Engineering
J. Morrison	Technical Department Manager
M. Morroni	Controls Maintenance Manager
J. Ranalli	Nuclear Mechanical Engineering Manager
D. Smith	Principal Engineer, Nuclear Licensing
J. Summers	Mechanical Maintenance Manager

NRC

C. Marschall	Senior Resident Inspector, DRP
D. Moy	Reactor Engineer, DRS
J. White	Section Chief, DRP