U. S. NUCLEAR REGULATORY COMMISSION

INSPECTION REPORT

FACILITY DOCKET NOS.	50-272 and 50-311
INSPECTION REPORT NO.	50-272 and 50-311/90-80
FACILITY LICENSE NOS.	DPR-70 and 75
LICENSEE:	Public Service Gas and Electric Company P. O. Box 236 Hancocks Bridge, New Jersey 08038
FACILITY:	Salem Units 1 and 2
INSPECTION DATES:	January 16 - 25, 1990
INSPECTION TEAM:	
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DETAILS

1.0 EXECUTIVE SUMMARY

A special, announced team inspection was conducted of the Salem emergency procedures. The purpose of the inspection was to determine if the emergency procedures used at Salem were technically correct; if their specified actions could be physically accomplished using the existing equipment, controls and instrumentation; and if the available procedures had the usability necessary to provide the operators with an effective operating tool. For this inspection, the term emergency procedures included the EOPs, AOPs, and all procedures referenced, either directly or indirectly, within the EOPs and the AOPs specified above. The inspection consisted of reviewing facility documents and procedures, performing procedure walkdowns both in the control room and in the plant and interviewing facility personnel.

The overall assessment of the Salem emergency procedures in place at the time of the inspection is that the program for generation and maintenance of the procedures was very good with only one problem identified in the EOP maintenance program dealing with the incorporation of changes related to modification of plant equipment (Paragraph 5.3.b.). The procedures were well written and the operators were able to use them during both the plant walkdowns and during the simulator exercises. The AOPs were identified by the inspection team as being a much less effective operating tool than the EOPs. The principle problem was the lack of in-plant Verification and Validation walkdowns of the AOPs which resulted in procedure errors and numerous procedure versus component labeling discrepancies.

Additionally the AOPs are the responsibility of the Technical Department while the EOPs are the responsibility of the Operations Department although both sets of procedures are used by the operations department personnel. This division of responsibility makes revision and upgrade priority scheduling more difficult since the user is not the author.

2.0 BASIC COMPARISON OF OWNERS' GROUP ERGs WITH FACILITY'S EOPs (TASK-1)

2.1 PURPOSE:

To ensure that the licensee had developed sufficient procedures in the appropriate areas to address the broad spectrum of possible accidents and equipment failures.

2.2 SCOPE:

The inspector compared the Salem Generating Station (SGS) EOPs

(Revision 1) to the Westinghouse Owner's Group (WOG) list of Emergency Response Guidelines (ERGs), Revision 1 of the High Pressure Version, to ensure the licensee developed procedures in accordance with WOG recommendations. The inspector reviewed differences to assess the adequacy of the technical justification and documentation of safety significant deviations.

2.3 FINDINGS:

SGS did not develop site specific EOPs corresponding to the following ERGs:

ES-0.0 Rediagnosis

ES-3.2 Post-SGTR Cooldown Using Blowdown

SGS developed five EOPs Appendices which required plant specific generation, specifically:

EOP-APPX-1 Component Cooling Water Restoration

EOP-APPX-2 Pressurizer Heater Emergency Feed

EOP-APPX-3 SI Verification

EOP-APPX-4 Post SI System Restoration

EOP-APPX-6 RCP Seal Cooling Restoration

To determine the acceptability of the deleted and developed EOPs, the team reviewed the justification, background documents, and held discussions with the licensee. Deletion of ES-3.2 was justified due to plant specific limitations which rendered the procedure non-useful and ES-0.0 guidance was adequately incorporated into EOP-TRIP-1. The developed procedures involved plant specific implementation of ERG recommendations.

2.4 CONCLUSIONS:

The team determined that appropriate procedures addressing the broad spectrum of accidents and equipment failures had been developed and implemented by the licensee.

3.0 INDEPENDENT TECHNICAL ADEQUACY REVIEW OF THE EMERGENCY PROCEDURES (TASK-2)

3.1 PURPOSE:

Review the emergency procedures to assure that procedures are technically adequate and accurately incorporate the guidelines of the ERGs.

3.2 SCOPE:

The procedures listed in Attachment 1 were reviewed to verify that the appropriate prioritization of accident mitigation strategies were incorporated into the EOPs as directed by the ERGs.

3.3 FINDINGS:

a. DEVIATIONS BETWEEN EOPs and ERGs

These deviations, warranted by the plant specific design, were incorporated into the EOPs. However, some ERG provisions were not incorporated in the EOPs and there was no documentation to justify these deviations. The following were instances where justification of deviations were not documented.

1. Step 21, RNO c. in the ERG(ECA-0.0) states "Reset containment spray signal." This action is not contained in LOPA-1 Step 69 and there is no justification in the deviation document.

2. Step 15 in the ERG (ECA-0.1) states "Verify Natural Circulation: RCS subcooling based on core exit TCs - GREATER THAN 10 DEGREES F." The LOPA-2 Step 25.1 only states "ARE TCs STABLE OR DECREASING." There is no justification in the deviation document.

3. One Caution prior to Step 8 in the ERG(ECA-0.2) contains the sentence "RCP thermal barrier cooling should not be established to an RCP with excessive seal leakage." The LOPA-3 Step 16 states "CAUTION RCP SEAL COOLING SHOULD BE ESTABLISHED WITH CAUTION TO MINIMIZE POTENTIAL FOR INTRODUCTION OF STEAM INTO CCW SYSTEM AND THERMAL SHOCK TO RCP SEALS" and there is no mention of this restriction in the following step of the EOP. There is no justification in the deviation document.

4. Step 41 of EOP-TRIP-1 corresponds to step 23 in the ERGS. This step checks for a ruptured steam generator. The late performance of this step limits the operator's ability to cool the primary system and reduce pressure to equal the secondary side to minimize the transfer of primary water to the secondary side of the steam generator. This concern was discussed with the licensee. The licensee was aware of this problem and has incorporated changes into Revision 2 of the EOPs. The changes have been tested on the simulator and enabled the operators to equalize pressure across the steam generator and stop primary to secondary leakage in less than 30 minutes, as assumed in the Final Safety Analysis Report (FSAR), on a design basis tube rupture.

There were also some deviations that had a technical basis, but the documentation was lacking in detail or not completely developed. The licensee agreed to correct the errors noted and more fully detail the justifications in the deviation document in conjunction with Revision 2 of the EOPs.

b. SETPOINT DOCUMENTATION

Several plant specific setpoints were selected from the EOPs and compared to the setpoint documentation. All of the setpoints selected from the EOPs matched the setpoint documentation, and the documentation was well controlled.

c. COMPLIANCE WITH WRITER'S GUIDE

1. Some Action Statements in the EOPS are located before the decision steps associated with the action, which results in confusion. For example, step 43 of SGTR-2 tells the operator to dump steam using the steam dumps and the next step asks if the steam dumps are available. The licensee agreed to review the Revision 2 EOPs and correct any incorrect logic statements identified. This action will be completed prior to issuance of Revision 2 EOPs in September, 1990.

2. Many of the Cautions in the EOPs contain action steps. One example, identified in SGTR-1 through SGTR-5, instructs the operator to shift Auxiliary Feedwater Pump suction to its alternate source if a low level alarm on the Auxiliary Feedwater Storage Tank is received. This action requirement in a caution statement is not in accordance with the Writer's Guide. The licensee has recognized this deficiency, and it is being corrected in the next revision of the EOPs, which is under development at this time.

3.4 CONCLUSIONS:

The team's review of the EOPs did not identify any significant deviations from the guidance provided by the Writer's Guide. The team determined that the EOPs generally follow the recommended vendor step sequence except where site specific design dictates otherwise. Entry, exit, and procedural transition points were correct and could be followed. The EOPs were technically adequate and incorporated the guidance and intent of the Westinghouse Emergency Response Guidelines. The licensee agreed to review and correct the deviation documentation and upgrade it to reflect Revision 2 of the EOPs by the end of September, 1990. The weaknesses identified in Paragraph 3.3.a and c above will be tracked under Item No. 272 & 311/90-80-02.

4.0 REVIEW OF THE EMERGENCY PROCEDURES BY CONTROL ROOM AND PLANT WALKDOWN

4.1 PURPOSE:

To assure that the emergency operating procedures (EOPs) and abnormal operating procedures (AOPs) can be successfully accomplished using the installed equipment, instrumentation and controls.

4.2 SCOPE:

Licensed and non-licensed operators were used to walkdown the procedures listed in Attachment 1. The walkdowns were conducted in the control room, the simulator and in the plant to ensure that: (1) actions required by the procedure could be accomplished using the installed equipment, instrumentation and controls; and (2) procedural guidance was clear and detailed enough such that operator confusion and error would be minimized.

Except as detailed in 4.3 below, the procedures inspected were clear and provided sufficient detail for the operator to complete the required actions.

4.3 FINDINGS:

During the procedure reviews and walkdowns, deficiencies were identified and subsequently discussed with the licensee prior to the exit meeting. The licensee acknowledged the inspectors' comments and committed to correction of the identified deficiencies. In some cases, the licensee had already identified the deficiency and corrective actions had been planned or were in process. Deficiencies considered to be generic weaknesses identified during the procedure walkdowns are listed below:

a. Inadequate in-plant labeling of valves and equipment in the following general categories:

   1) Label tags missing on valves

   2) Valves incorrectly labeled

   3) Labels on the non-visible side of components or in difficult to read locations.

The licensee agreed to identify and correct deficiencies while performing Validation and Verification (V & V) of Revision 2 of the EOPs and during the V & V of AOPs. Revision 2 of the EOPs is in process and will be completed prior to the scheduled issue date of the end of September 1990.

Although the control room labeling was quite good, several items were identified as needing correction. The licensee agreed to correctly identify the containment air particulate detector isolation valves and remove 3 BIT valve lights that are not used following a plant modification and to remove the indicating lights for CV 139 and 140 which are not used. These corrections will be made as part of the currently ongoing control room design modification. Correction of labeling deficiencies will be tracked as Item 272 & 311/90-80-03.

b. AOPs did not receive adequate V & V which resulted in deficiencies in the following general areas:

1) Caution statements after the applicable action statement, noted in several procedures.

2) Lack of detailed instructions to perform specific tasks. For example, Loss of 2A 125 VDC Bus, AOP-ELEC-125-A, did not give instructions to transfer loads from the "A" DC bus to its alternate supply. It simply referred to table A which is a listing of loads on the "A" DC bus and listed the alternate DC bus. It did not specify breakers and did not note additional breakers inside the 4160 VAC vital bus breakers for control power and closing coil power that must be locally operated. Similar comments apply to all 125 VDC and 28 VDC control power AOPs.

3) Numerous errors between in-plant valve and breaker label versus procedure valve and breaker identification, some examples are noted in Attachment 2.

The licensee noted that a procedure upgrade program is in progress at the time, however, most effort had been directed toward correction of maintenance and instrument and control procedures. The licensee agreed to perform walkdown V & V of AOPs as they are revised. At present the AOPs are in a 2 column format. This format is under evaluation to determine if its use will continue. The V & V program including AOP V & V is discussed further in Paragraph 5.3.a and c of this report. In-plant walkdown and revision of AOPs will be tracked as Item Nos. 272 & 311/90-80-04.

c. Normal and emergency lighting deficiencies. During the procedure walkdowns the team identified 4 battery type emergency lights that did not operate when tested. The licensee subsequently tested 142 emergency lights and identified 11 that were out of service. The team also noted that in certain areas of the plant the normal lighting levels appeared to be marginal. These items were discussed with the licensee.

During the exit meeting the licensee agreed to have existing normal lighting fixtures relamped and to assess the lighting level to determine adequacy. They also agreed to assess the emergency lighting problem to determine the root cause and actions necessary to correct the deficiency. Subsequent to the exit meeting the licensee informed the NRC that the lighting problem was due to work being performed on the No. 22 Emergency Lighting Inverter. When power was secured to the emergency lights the battery packs completely discharged and even when reenergized would not recharge. The batteries had to be replaced in the affected units. The inverter also supplies the normal lighting that was noted as deficient in the above paragraph. To prevent recurrence the licensee has modified the Tagging Request Information System (TRIS) to flag tagging operations that will cause emergency lighting to be unnecessarily energized so the battery can be disconnected.

d. General plant conditions noted by the team indicated that the upper level, normally accessed areas of the Turbine and Auxiliary Buildings appeared to be clean and in good repair. The lower levels such as the condenser bay, penetration areas, and the service water pipe chase were not so well maintained.

   Fire doors throughout the plant were another noted problem. Doors were often found open due to the direction of ventilation air flow. The air flow requires personnel action to close the doors after they are opened. In some areas the flow is so strong that it presents a personnel hazard when the door is opened. This has been a long standing problem.

The licensee was aware of the above problems. The poor plant condition in the lower plant levels is aggravated by a ground water problem that has to date resisted licensee efforts to stop it. The licensee stated that further efforts were in progress in an attempt to correct the problem.

The second item, fire doors, was also known by licensee management and is a long term problem. Previous attempts to balance the plants ventilation system have not corrected the problem. The Vice President of Nuclear Operations stated that on February 1, 1990, a dedicated team was being established to determine the root cause of the fire door problem and to propose a recommended fix. During a subsequent conversation, a licensee site protection representative explained that compensatory measures were, and had been, in place. The compensatory measures, as stated, are composed of a roving fire watch on each level of the plant that makes tours once per hour and a daily tour by a member of the site protection group. The roving fire watches were established to check penetrations (fire barriers) in all plant locations; however, not to specifically address the fire doors. Fire watches are instructed to note open fire doors and close them if found open. The inspector requested and was provided documentation to support the compensatory measures. The inspector expressed concern that as fire barrier penetration concerns are

corrected the roving fire watches may be discontinued before the problem with the automatic fire door closure can be corrected. Licensee actions concerning correction of the fire door closure and interim compensatory measures is considered Unresolved (272 and 311/90-80-01) pending NRC review of the licensee's proposed action.

4.4 CONCLUSION:

The team determined that the EOPs could be successfully accomplished using the installed equipment, instrumentation and controls. The team also determined that successful performance of local manual operations using the AOPs and the EOP Tables in many instances required reliance on operator knowledge to locate valves/components and perform the correct actions, since only limited location or procedural direction was provided.

5.0 SIMULATOR OBSERVATION (TASK-4)

5.1 PURPOSE:

To assure that the emergency operating procedures (EOP) can be correctly implemented during emergency conditions, to further evaluate concerns about EOP useability, and to ensure that EOP training provides the operators with the necessary background.

5.2 SCOPE:

Utilizing the plant referenced simulator, the team assessed the adequacy of the training on the EOPs by observing the actions of two crews of licensed operators during unrehearsed scenarios designed to exercise crew familiarity with and ability to use the EOPs.

The scenarios were developed with the intent of providing the team the opportunity to:

a. Observe the crews performance to validate or resolve concerns resulting from the review of the EOPs or AOPs.

b. Assess the licensee's operating philosophy with respect to the EOPs and AOPs, especially where initial reviews identified differences from the ERGs.

c. Assess the human factors elements associated with the performance in a "real time" situation.

d. Assess the operating crew's diagnosis of accident conditions and transitions from one EOP to another EOP (or AOP).

The scenarios consisted of the following (information enclosed in parenthesis identifies expected procedure usage):

First crew:

Scenario 1:
Steam generator blow down radiation monitor fails
Pressurizer pressure transmitter fails
Pressurizer spray valve fails open
Feed regulating valve position indicator fails
Steam generator atmospheric relief fails open
LOCA outside containment (120 gpm)
(RAD -1, PZR-1, TRIP-1, TRIP-2, IOP-8)

Scenario 2:
Steam generator level transmitter fails
RCP number 1 seal failure
RCP seal package failure
ATWAS
PORV sticks open
Associated block valve fails to close
Letdown isolation valve fails to close on SI
Undercompensated intermediate range detector
(OP-IV.10.3.1, RCP-2, TRIP-1, FRSM-1, LOCA-1, LOCA-2)

Scenario 3:
Charging pump trips
Letdown heat exchanger leak to CCW system
Steam generator feedwater pump trips
MDAFW pump fails to auto start
Main steam line break in containment (delayed)
Both containment spray pumps fail to start
Steam generator tube rupture on another SG
(II-3.3.1, RAD-3, CC-2, TRIP-1, TRIP-2, FRCE-1, LOSC-1, SGTR-1)

Second crew:

Scenario 1:
Rapid power reduction
Pressurizer level transmitter fails
Service water leak from CFCU
Stuck rod
Steam generator feedwater pump trips
Main feed line break in containment
Loss of main and auxiliary feedwater
(SW-1, CN-1, ROD-1, TRIP-1, FRHS-1)

Scenario 2:
Charging pump trips
Letdown heat exchanger leak to CCW system
Steam generator feedwater pump trips
MDAFW pump fails to auto start
Main steam line break in containment (delayed)
Both containment spray pumps fail to start
Steam generator tube rupture on another SG
(II-3.3.1, RAD-3, CC-2, TRIP-1, TRIP-2, FRCE-1, LOSC-1, SGTR-1)

Scenario 3: Steam generator level transmitter fails
RCP number 1 seal failure
RCP seal package failure
DBA LOCA
ATWAS
Letdown isolation valve fails to close on SI
Undercompensated intermediate range detector
(OP-IV.10.3.1, RCP-2, TRIP-1, FRSM-1, FRTS-1, LOCA-3)

5.3 FINDINGS:

a. Both crews observed were capable of using the procedures to mitigate the accidents. The operators referred to the proper procedures and transitioned from one procedure to another correctly. Generally, the operators performed well except for an error in proceeding through the logic path of AOP-RCP-2. One transition from EOP-TRIP-1 to EOP-LOCA-3 was made on low RWST level. Although this was the correct procedure transition, EOP-TRIP-1 does not contain a statement in its Continuous Action Summary (CAS) that allowed that transition. The SRO stated that a continuous caution in EOP-FRTS-1 (the procedure prior to EOP-TRIP-1) allowed the transition; however, AD-44 in Paragraph 4.4.4.c states that the continuous caution (double border) must be remembered throughout a procedure, which implies that it is no longer applicable after a transition to another procedure is made. Communications were also noted as being inconsistent between the different crews.

b. The steps in the tables in EOP-TRIP-1 were not in the proper sequence to minimize movement across the control room by the board operator as he performs the immediate actions. The licensee agreed to correct and incorporate corrected tables in Revision 2 EOPs.

c. In the simulator, the desk operator is not provided a P/A phone to expedite communications between the control room and the equipment operator and to minimize the handling of the present P/A phone between the board operator and the desk operator. The licensee noted that the actual control room has this capability and that the simulator would be changed to replicate the control room capability.

5.4 CONCLUSIONS:

Based on the observation of two crews participating in a total of six scenarios, the team determined that the AOPs and EOPs can be implemented during abnormal and emergency conditions. The team also determined that the flow chart EOP format had adequate useability for the operators. The deficiencies identified in Paragraph 5.3.b. and c. will be tracked as Item No. 272 and 311/90-80-05.

6.0 ON-GOING EVALUATION OF THE EMERGENCY PROCEDURES (TASK-5)

6.1 PURPOSE:

Determine if the licensee has established a long term evaluation program for the emergency procedures as recommended in Section 6.2.3 of NUREG-0899.

6.2 SCOPE:

A review of the Salem system of on-going evaluation and revision of EOPs was conducted to assess whether the licensee's current system could ensure high quality EOPs over time. The system was evaluated on the basis of a number of elements, including but not limited to:

a. the completeness of a method for ensuring that changes in plant design, technical specifications, technical guidelines, the writer's guide, referenced plant procedures, and the control room are promptly reflected in the EOPs;

b. the completeness of a method for revising the EOPs to reflect findings from operational experience and use, training experience, simulator exercises, and control room/in-plant walkdowns;

c. the timeliness of revisions to the EOPs when incorrect or incomplete information is identified;

d. the adequacy of the system for determining necessary training, validation, and verification, when procedures are changed or revised;

e. the adequacy of basis documents, including technical guidelines and writer's guide;

f. the adequacy of verification and validation;

g. the effectiveness of a system of soliciting and using feedback from procedure users and other cognizant personnel.

6.3 FINDINGS:

Procedures and records were reviewed and licensee personnel were interviewed to determine whether the licensee has an acceptable program for long-term continuing evaluation and maintenance of the EOPs. The inspectors found that Administrative Directive (AD) - 44, "EOP Program Maintenance," delineates a systematic maintenance program to ensure the following:

(1) Changes in plant design, technical specifications, plant procedures or any other items that could potentially affect the Emergency Operating Procedures (EOPs) are incorporated in the EOPs.

(2) EOPs are maintained current in light of operational experience, training experience, simulator exercises, and industrial experience.

(3) Tools, ladders, and kits that are necessary for performing in-plant EOP actions are available for use at designated locations, with the exception of those noted in Attachment 2.

(4) Changes to the Westinghouse Emergency Response Guidelines (ERGs) based on plant specific evaluation and justification are incorporated into the EOPs.

(5) Standardizing guidelines on how to format and prepare Emergency Operating Procedures so that they are complete, accurate, convenient, readable, and acceptable to their users.

In summary, AD-44 provides direction on how to initiate a change to the EOPs, the extent of verification and validation to be done on EOP changes, the extent of training on EOP revisions, control of EOP related tools and equipment, EOP/WOG coordination, the EOP author's guide, and usage guidelines for the EOP network. In general AD-44 is a well written and comprehensive document. However several weaknesses were noted and are detailed in the following paragraphs.

a. AUTHOR'S GUIDE:

Upon review of a number of the EOPs it was evident that many cautions contained operator actions. This is not only contrary to guidance provided in NUREG 0899 but also contrary to the guidance in AD-44.

The licensee was aware of this discrepancy, and is currently taking corrective action for Rev. 2 of the EOPs. The inspection team reviewed draft copies of the Rev. 2 EOPs and determined that these changes were being made.

Upon review of paragraph 12.0, section G. of AD-44 it was noted that not all of the EOPs ended with a specific transition to another EOP, to the applicable Integrated Operating Procedure (IOP) or to "procedure and step in effect." EOP-TRIP-4, 5, and 6 terminated contrary to this guidance.

The licensee agreed to review this discrepancy and make changes to the above referenced EOPs or to paragraph 12.0 of AD-44.

The EOP inspection also involved procedures that fall under the EOP umbrella of procedures, including Abnormal Operating Procedures (AOPs). The AOPs are written in accordance with the Artificial Island Implementing Procedures Writer's Guide. Upon review of this document and a number of AOPs the following concerns were identified:

- AOPs are currently written in a dual column format. However the RNO column is not only used as a response not obtained column, but also for supplemental information and notes. The inspection team noted that if the operator is not directed to the RNO column, by getting a "no" response, the supplemental information or note will not be read. Notes and supplemental information are not placed in the procedure in a manner that ensures they will not be missed.

The licensee agreed to evaluate this concern. The licensee also stated that they are currently evaluating the dual versus single column format as part of the Procedure Upgrade Program.

- The AOP writer's guide currently has no requirements for distinctions to be made between control room and in-plant actions.

The licensee agreed to evaluate this comment and take appropriate action to revise the AOP writer's guide.

The weaknesses identified in paragraph 5.3.a will be tracked as Item No. 272 and 311/90-80-06.

b. CHANGES TO THE PROCEDURES:

During the EOP control room walkdowns it was noted by the inspection team that in a few instances plant modifications were not reflected in the current revision of the EOP (i.e., BIT modification). Upon review of AD-44 it was also determined that the timeliness of EOP revisions or changes was not specifically addressed.

The licensee agreed with this finding and will modify AD-44 to require all EOP immediate changes to be made within two weeks.

During the review/walkdown of AOPs, it was noted that many of the AOPs had not received a two year review as required by AP-32 and Section 6.8.2 of the Technical Specifications.

The licensee was aware of this finding and was in the process of writing a letter to the NRC to request a waiver of the requirement to perform these reviews in consideration of the Procedure Upgrade Program development of upgraded AOPs. This item concerning the failure to perform the required 2 year review and the licensee's request for a waiver of that requirement will be reviewed by the NRC resident staff to determine the full extent of the problem. Results of the NRC review will be detailed in NRC Inspection Report Number 50-272/90-11 and 50-311/90-11.

Also related to the procedure change process are the training requirements that result from EOP changes. The inspection team identified a lack of guidance in AD-44 concerning how much and what kind of training will be done on EOP revisions and changes.

The licensee agreed to develop a formal and objective means to determine required training on EOP revisions which will parallel the criteria used to determine validation methodology.

The weaknesses identified in paragraph 6.3.b above will be tracked as Item No. 272 and 311/90-80-07.

c. VERIFICATION AND VALIDATION PROGRAM:

During EOP and AOP in-plant and control room walkdowns the inspection team identified several generic weaknesses that are directly attributable to the lack of in-plant walkdowns during the validation process:

- several examples of unlabeled equipment referenced in the EOP or AOP.

- numerous examples of a mismatch between procedure nomenclature and numbering and in-plant nomenclature and numbering.

- in-plant labeling poorly oriented in such a way as to make it difficult or impossible for an operator to read from a normal viewing angle or approach.

Upon review of AD-44, the inspection team found no requirements for in-plant walkdowns as part of the Validation program. Likewise a review of the Procedure Upgrade Program document, revealed a lack of requirements for in-plant walkdowns for AOPs.

The licensee concurred with the above findings and has agreed to update AD-44 to specifically include in-plant walkdowns as part of the validation program. Also, the Procedure Upgrade Program document will be updated, similar to AD-44, to include in-plant walkdowns as part of AOP validation .

The weaknesses identified in paragraph 6.3.c above will be tracked as Item No. 272 and 311/90-80-08.

6.4 CONCLUSIONS:

The team determined that at present the licensee has an adequate on-going EOP maintenance program as documented in AD-44, with the exception of the program weaknesses discussed in Paragraph 6.3 above.

7.0 EOP USER INTERVIEWS (TASK-6)

7.1 PURPOSE:

To augment and clarify findings from other inspection tasks through interviews with procedures users, developers, trainers and other appropriate plant staff.

7.2 SCOPE:

Interviews were conducted with nine Salem personnel; including reactor operators, senior reactor operators, equipment operators and the EOP coordinator.

7.3 CONCLUSION:

The interviews were used to both corroborate and augment inspection findings. The specific results of the interviews are reflected in the appropriate sections of the inspection report.

8.0 MANAGEMENT MEETINGS

8.1 WORKING MEETING (January 25, 1990)

The details of the inspection findings were discussed with facility management at the working meeting. The purpose of the meeting was:

(1) to ensure that the facility understood all of the findings;

(2) to give the facility a chance to refute the findings, as appropriate; and,

(3) to obtain commitments from the facility with respect to correction of the valid findings.

8.2 EXIT MEETING (January 25, 1990)

The major inspection findings were presented and the remainder of the findings were summarized. The Vice President - Nuclear Operations confirmed the facility's commitments with respect to the deficiencies discussed in this report and listed in Attachment 2.

9.0 PERSONNEL CONTACTED

Licensee:

* K. Buddenbohn, Delmarva Power
* J. Carey, Salem Instrumentation and Control
* B. Connor, Salem Technical Department
+#* L. Curran Jr., Operating Engineer
* D. Dodson, Principal Engineer - Nuclear Licensing
+#* G. Englert, Principal Safety Review Engineer (Audit Manager)
+#* T. Floyd, Operations - EOP Coordinator
+#* W. Grau, Licensing Engineer
* E. Krufka, Atlantic Electric - Site Representative Salem
+ * S. LaBruna, Vice President - Nuclear Operations
+ * J. Lloyd, Principal Training Supervisor
+ * L. Miller, General Manager - Salem Operations
+ * P. O'Donnell, Salem Instrumentation and Control Supervisor
+ P. Ott, Technical Engineer - NSS
+ M. Pastva, Engineering, Licensing and Regulations
+#* V. Polizzi, Operations Manager
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#* F. Priestley, Nuclear Control Operator
* T. Robb, Philadelphia Electric
* D. Schultz, Lead Licensing Engineer
+ W. Schultz, Manager - Station Quality Assurance
* F. Thomson, Assistant Station General Manager
+#* J. Varga, Operations - EOP Coordinator Supervisor
+ E. Viller, Station Licensing Engineer - Salem

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+#* D. Allsopp, Resident Inspector
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 #* P. Eselgroth, Chief, PWR Section
 #* T. Johnson, Senior Resident Inspector
+ * S. Pindale, Resident Inspector
+#* D. Silk, Senior Operations Engineer

NRC Contractors:

+#* C. Meeker, System Engineer, COMEX Corporation
+#* G. Wilford, Human Factors Specialist, SAIC

\+ Attended Entrance Meeting on January 16, 1990
\# Attended Pre-Exit Meeting on January 25, 1990
* Attended Exit Meeting on January 25, 1990

ATTACHMENT 1

DOCUMENTS REVIEWED

Document Number	Document Title
	Westinghouse Owners Group Emergency Response Guidelines, Revision 1A

EMERGENCY OPERATING PROCEDURES

EOP-TRIP-1	REACTOR TRIP OR SAFETY INJECTION
EOP-TRIP-2	REACTOR TRIP RESPONSE
EOP-TRIP-3	SAFETY INJECTION TERMINATION
EOP-TRIP-5	NATURAL CIRCULATION RAPID COOLDOWN WITHOUT RVLIS
EOP-TRIP-6	NATURAL CIRCULATION RAPID COOLDOWN WITHOUT RVLIS
EOP-LOCA-1	LOSS OF REACTOR COOLANT
EOP-LOCA-3	TRANSFER TO COLD LEG RECIRCULATION
EOP-LOCA-5	LOSS OF EMERGENCY RECIRCULATION
EOP-LOCA-6	LOCA OUTSIDE CONTAINMENT
EOP-LOPA-1	LOSS OF ALL AC POWER
EOP-LOPA-2	LOSS OF ALL AC POWER RECOVERY/SI NOT REQUIRED
EOP-LOPA-3	LOSS OF ALL AC POWER RECOVERY/SI REQUIRED
EOP-LOSC-1	LOSS OF SECONDARY COOLANT
EOP-LOSC-2	MULTIPLE STEAM GENERATOR DEPRESSURIZATION
EOP-SGTR-1	STEAM GENERATOR TUBE RUPTURE
EOP-SGTR-2	POST SGTR COOLDOWN
EOP-SGTR-3	SGTR WITH LOCA - SUBCOOLED RECOVERY
EOP-SGTR-4	SGTR WITH LOCA - SATURATED RECOVERY
EOP-SGTR-5	SGTR WITHOUT PRESSURIZER PRESSURE CONTROL
EOP-FRSM-1	RESPONSE TO NUCLEAR POWER GENERATION
EOP-FRSM-2	RESPONSE TO LOSS OF CORE SHUTDOWN
EOP-FRCC-1	RESPONSE TO INADEQUATE CORE COOLING
EOP-FRCC-2	RESPONSE TO DEGRADED CORE COOLING
EOP-FRCC-3	RESPONSE TO SATURATED CORE COOLING CONDITIONS
EOP-FRHS-1	RESPONSE TO LOSS OF SECONDARY HEAT SINK
EOP-FRHS-2	RESPONSE TO STEAM GENERATOR OVERPRESSURE
EOP-FRHS-3	RESPONSE TO STEAM GENERATOR HIGH LEVEL
EOP-FRHS-4	RESPONSE OF LOSS OF SG ATMOSPHERIC RELIEFS AND CONDENSER DUMP VALVES
EOP-FRHS-5	RESPONSE TO STEAM GENERATOR LOW LEVEL
EOP-FRTS-1	RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITIONS
EOP-FRTS-2	RESPONSE TO ANTICIPATED PRESSURIZED THERMAL SHOCK CONDITIONS
EOP-FRCE-1	RESPONSE TO EFFECTIVE CONTAINMENT PRESSURE
EOP-FRCE-2	RESPONSE TO HIGH CONTAINMENT SUMP LEVEL
EOP-FRCE-3	RESPONSE TO HIGH CONTAINMENT RADIATION
EOP-FRCI-1	RESPONSE TO HIGH PRESSURIZER LEVEL
EOP-FRCI-2	RESPONSE TO LOW RCS INVENTORY
EOP-FRCI-3	RESPONSE TO VOID IN REACTOR VESSEL

ATTACHMENT 1 (cont.)

DOCUMENTS REVIEWED

Document Number	Document Title
EOP-APPX-1	COMPONENT COOLING WATER RESTORATION
EOP-APPX-2	PRESSURE HEATER EMERGENCY FEED
EOP-APPX-3	SI VERIFICATION
EOP-APPX-4	POST SI SYSTEM RESTORATION
EOP-APPX-6	RCP SEAL COOLING RESTORATION

ABNORMAL OPERATING PROCEDURES

AOP-BLACKOUT-1	STATION BLACKOUT MODES 3 THROUGH 6
AOP-CA-1	COMPLETE LOSS OF CONTROL AIR
AOP-CA-2	PARTIAL LOSS OF CONTROL AIR
AOP-CN-1	LOSS OF FEEDWATER PUMP
AOP-CN-2	LOSS OF A HEATER DRAIN PUMP AND AOP-CN-3, LOSS OF CONDENSATE PUMP
AOP-COND-2	LOSS OF CIRCULATING WATER AND/OR CONDENSER VACUUM
AOP-ELEC-4KV-A	LOSS OF 2A VITAL BUS
AOP-ELEC-460/230V-A	LOSS OF 2A 460/230V VITAL BUS
AOP-ELEC-VIB-A	LOSS OF 2A 115V VITAL INSTRUMENT BUS
AOP-ELEC-4KV-B	LOSS OF 2B 4KV VITAL BUS
AOP-ELEC-460/230V-B	LOSS OF 2B 460/230V VITAL BUS
AOP-ELEC-VIB-B	LOSS OF 2B 115V VITAL INSTRUMENT BUS
AOP-ELEC-4KV-C	LOSS OF 2C VITAL BUS
AOP-ELEC-460/230V-C	LOSS OF 2C 460/230V VITAL BUS
AOP-ELEC-VIB-C	LOSS OF 2C 115V VITAL INSTRUMENT BUS
AOP-ELEC-250-DC	LOSS OF THE 250VDC BATTERY BUS
AOP-ELEC-21MAC	LOSS OF 21 MAC 115V DISTRIBUTION CABINET
AOP-ELEC-22MAC	LOSS OF 22 MAC 115V DISTRIBUTION CABINET
AOP-EVAC-1	CONTROL ROOM EVACUATION
AOP-NIS-1	MALFUNCTION OF A POWER RANGE
AOP-NIS-2	MALFUNCTION OF AN INTERMEDIATE RANGE
AOP-NIS-3	MALFUNCTION OF A SOURCE RANGE
AOP-NIS-4	MALFUNCTION OF THE CHANNEL AND/OR DETECTOR
AOP-PZR-1	PRESSURIZER PRESSURE CONTROL MALFUNCTION - LOW PRESSURE
AOP-RAD-1	LOSS OF REFUELING CAVITY LEVEL
AOP-RCP-1	LOSS OF REACTOR COOLANT PUMP AND/OR FLOW
AOP-RCP-2	NO.1 SEAL FAILURE
AOP-RCS-1	PARTIAL LOSS OF REACTOR COOLANT
AOP-RCS-2	REACTOR COOLANT HIGH ACTIVITY
AOP-ROD-1	FAILURE OF A ROD CONTROL BANK TO MOVE
AOP-ROD-2	CONTINUOUS ROD INSERTION OR WITHDRAWAL
AOP-ROD-3	DROPPED ROD
AOP-WIND-1	FLOODING AND/OR HIGH WIND CONDITION

OTHER DOCUMENTS

Salem Technical Specifications
Salem EOP/ERG Comparison Record
Administrative Directive (AD) - 2, Author's Guide for Operations Department Documents
Operations Directive (OD) - 15, Use of Operations Department Procedures
AD-44, EOP Program Maintenance

ATTACHMENT 2

DEFICIENCIES IDENTIFIED

The deficiencies detailed below were discussed with the facility staff prior to the exit meeting. All comments were understood by the facility, and accepted as valid. For some of the comments, specific facility response is included. Not all procedures listed in Attachment 1 were walked down by the inspection team and only those with comments are included in this attachment.

EMERGENCY OPERATING PROCEDURES

EOP-TRIP-1: REACTOR TRIP OR SAFETY INJECTION

1. Step 7
   This step does not mention the number of keys that are required to initiate safety injection.

2. Table C
   Valves "21 and 22 CS2s" are labelled as "21 and 22 C52s" in the simulator.

3. Step 10
   This step does not mention the number of keys that are required to initiate containment spray and phase B isolation.

4. Table D
   The table does not provide location information regarding the dampers. A licensed operator was unable to locate most of the dampers.

5. Step 14
   This step implies that all diesel generators are operable when using the EOPs. This step becomes cumbersome and unnecessary if one of the diesel generators is known to be out of service.

6. Step 18
   The phase A isolation valves are closed in the ERGs during the immediate action steps. The control air valve to containment is a phase A isolation valve but it is not closed during the immediate action steps of TRIP-1.

   Facility response
   Closing this phase A valve has been incorporated into the immediate actions of revision 2.

7. Step 31
   This step does not provide valve numbers for the PORVs and the block valves.

8. Step 42
This step does not specify which monitors are to be checked when monitoring the auxiliary building radiation, thus the operator will be relying on memory to know what monitors to check.

9. Step 42.2
This step does not provide specific criteria for the operator to transition to LOCA-6 (LOCA outside of containment). This transition is dependent upon operator judgement. The procedure does not use radiation monitors alarming in the auxiliary building, increasing auxiliary building sump levels, increased frequency of auxiliary building sump pump operation, and decreasing RCS pressure as criteria to aid the operator's decision.

EOP-TRIP-2: REACTOR TRIP RESPONSE

1. Continuous Action Summary
Does not address a loss of CCW.

2. Step 5
There is no adverse containment values for SG level in this step.

Facility response
The adverse containment value for the SG levels have been included in revision 2.

EOP-TRIP-3: SAFETY INJECTION TERMINATION

1. Continuous Action Summary
Does not address a loss of CCW.

2. Step 27
This step does not specify how to check CCW flow to the RCP thermal barrier.

EOP-TRIP-4: NATURAL CIRCULATION COOLDOWN

1. Step 3
The procedure checks the "CRDM fans" but the board is labelled "Rod Drive Vent Fans."

Facility response
The procedure has been changed to match the labelling on the board in revision 2.

2. Step 23
This step does not include the possibility that a condensate pump is already running but instead assumes that none are running.

EOP-TRIP-5: NATURAL CIRCULATION RAPID COOLDOWN WITHOUT RVLIS

1. Continuous Action Summary
   Does not specify the RCP start criteria.

2. Step 14.1
   This step does not include the possibility that a condensate pump is already running but instead assumes that none are running.

3. Step 33
   The second bullet in this step is performed locally but is not so designated.

EOP-TRIP-6: NATURAL CIRCULATION RAPID COOLDOWN WITHOUT RVLIS

1. Continuous Action Summary
   Does not specify the RCP start criteria.

EOP-LOCA-1: LOSS OF REACTOR COOLANT

1. step 20
   The main turbine has no identification labeling.

2. Step 28
   CV 182 is not labeled in the field. This step requires the operator to operate valves CV182 and CV184 which is not stated in the procedure.

EOP-LOCA-3: TRANSFER TO COLD LEG RECIRCULATION

1. Step 17
   The temporary jumpers referred to in this step have not been made up.

2. Step 70
   Directs operator to "Implement EP1-13." This procedure has been renamed "EPIP 201S."

EOP-LOCA-5: LOSS OF EMERGENCY RECIRCULATION

1. Step 27
   Requires an equipment operator to shut SJ114 but is not so indicated by the procedure.

EOP-LOCA-6: LOCA OUTSIDE CONTAINMENT

1. Step 3
   Refers to valve 2RH16 but should refer to valve 2RH 26.

EOP-LOPA-1: LOSS OF ALL AC POWER

1. Step 10
   Sufficient or readily available details for the EO to rack down breakers is not present.

2. Step 28
   This step does not reference CV52 when directing the operator to control charging flow.

3. Step 52
   The action to "Reset SI" is deleted from the step and no justification for the deviation is documented.

4. Step 54
   Valve 11SW20, located in the service water building, is not labeled (operator could not locate).

5. Step 56
   This step does not state if local or control room action is required when directed to maintain at least one MS45 valve open to the 23 AFW pump.

6. Step 57
   Action step "DECREASE 23 AFW PUMP SPEED UNTIL AFW "SPEED DECREASE" LIGHT LIT." Actual indication is "DECREASE SPEED."

7. Step 58
   This step is not clear if local or control room action is required when directed to operate MS45.

8. Step 66
   ERG contains a caution that "IF LEVEL CANNOT BE MAINTAINED, SG DEPRESSURIZATION SHOULD BE STOPPED UNTIL LEVEL IS RESTORED IN AT LEAST ONE SG." The EOP step does not contain this caution and no justification for the deviation is documented.

9. Step 67
   This step directs the operators to dump steam using the MS10s then to check if the MS10s are available.

10. Step 69
    ERG states "RESET CONTAINMENT SPRAY SIGNAL." EOP step does not contain this action and no justification for the deviation is documented.

11. Steps 74 and 75
    These steps occur much earlier in the ERG and there is no justification documenting the fact that they were relocated.

12. Step 75
The 78 ft mechanical penetration room has no dedicated ladder for accessing valves SW72 and SW58. The ladder must be obtained from the 100 ft level.

13. Step 76
Logic block asks about BIT Temperature. Since the BIT has been removed, this item is not necessary in the step.

14. Step 77
The annunciator tile number for the Spent Fuel Pit Low Level Alarm is not in the step.

EOP-LOPA-2: LOSS OF ALL AC POWER RECOVERY/SI NOT REQUIRED

1. Step 6
This step has not been modified to account for unavailable equipment as done in Step 8 of EOP-TRIP-1.

2. Step 7
Action step refers to EI-1-4.18, which has been superseded by an AOP.

3. Step 21
The EOP states "CONTROL CHARGING AND LETDOWN TO MAINTAIN PZR LEVEL GREATER THAN 17% (25% ADVERSE)," but the ERG states "MAINTAIN PRZR LEVEL BETWEEN 17% (25% ADVERSE) and 50%." No justification for this deviation is documented. Also, CV55, which is used to control charging, is not mentioned in the step.

4. Step 25.1
ERG states that, when natural circulation is verified, " core exit TCs - GREATER THAN 10 DEGREES F." The EOP does not include this as a requirement, and no justification for this deviation is documented.

5. Step 18 of the ERG
Justification for not including this step in the EOP is that the step is unnecessary because the parameters are monitored and maintained in other steps of the EOP. Other EOP steps discuss monitoring some of these parameters, but do not maintain the parameters stable.

EOP-LOPA-3: LOSS OF ALL AC POWER RECOVERY/SI REQUIRED

1. Step 77
The annunciator tile number for the Spent Fuel Pit Low Level Alarm is not in the step.

2. Step 4.1
The step directs the operator to transit to LOCA-3, but the ERG directs a transition to step 3 of this same procedure. No justification for this deviation is documented.

3. Step 14
   The ERG contains a caution about low AFW flow and contains actions if this situation occurs. This concern and action are not included in this EOP and no justification for this deviation is documented.

4. Step 14
   The EOP does not include the restrictions contained in Caution 1 of Step 8 of the ERG. which states "RCP THERMAL BARRIER COOLING SHOULD NOT BE ESTABLISHED TO AN RCP WITH EXCESSIVE SEAL LEAKAGE." No justification for this deviation is documented.

EOP-LOSC-1: LOSS OF SECONDARY COOLANT

1. Step 32
   This step does not direct the operator to check the valve position of CC-131 to verify CCW flow to the RCP thermal barriers.

EOP-LOSC-2: MULTIPLE STEAM GENERATOR DEPRESSURIZATION

1. Step 31
   This step does not direct the operator to check the valve position of CC-131 to verify CCW flow to the RCP thermal barriers.

EOP-SGTR-1: STEAM GENERATOR TUBE RUPTURE

1. Step 22.5
   Valve identified as 2PS2 in step is incorrect, it should be 2PS3.

2. Table "A"
   Table does not provide location information. Operator could not locate 22 and 24MS121 valves. The MS25 valves provide better isolation of the main steam header steam traps than the specified MS124 valves

EOP-SGTR-4: SGTR WITH LOCA - SATURATED RECOVERY

1. Entry to step 31
   Entry is identified as "K" which is incorrect, it should be "H."

2. Step 35
   Reference to tables 2 and 3 of EOP-CFST-1 is incorrect, tables are alphabetically identified.

3. Step 42
   Logic string on no side will bypass several operations if a single no response is obtained when checking CCW lineup.

EOP-FRSM-1: RESPONSE TO NUCLEAR POWER GENERATION

1. Step 1
   Valves 2SJ78, 79, and 108 can be removed from the procedure since the BIT has been modified.

2. Step 3
   Valves 2SJ78, 79, and 108 can be removed from the procedure since the BIT has been modified.

EOP-FRHS-1: RESPONSE TO LOSS OF SECONDARY HEAT SINK

1. Step 13
   Action block states "RESET FW ISOLATION" whereas the button is labeled "FW INTERLOCK."

2. Step 18
   Action block states "CLOSE MSIVs 21 THRU 24 MS167." ERG does not contain this step and no justification for this deviation is documented.

3. Step 33
   This step incorporated ERG Step 18 Caution 2, but it is not indicated in the deviation document.

4. The status of ERG Steps 29 and 30 are not contained in the deviation document, and the deviation documented for ERG Step 28 appears to apply to Step 29 not Step 28.

EOP-FRHS-3: RESPONSE TO STEAM GENERATOR HIGH LEVEL

1. Step 5
   The logic in this step is opposite to that contained in the ERG. The word "GREATER" should read "LESS."

2. Step 5
   There is no adverse value for the lower SG NR level. No justification for this deviation is documented.

EOP-FRHS-5: RESPONSE TO STEAM GENERATOR LOW LEVEL

1. Step 1 NOTE, Steps 4 and 13
   Only the adverse NR SG level is used instead of the two levels listed in the ERG. The justification for this stated that it is more conservative. Using only this one value can cause the operator to enter a functional recovery procedure, when normal operator action is all that is required to correct the situation. This comment is also applicable to the Critical Safety Function Status Tree, Figure 3.

EOP-FRTS-1: RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITIONS

1. Step 1
   Note 1 of the ERG is applicable to the EOP, but is not included in the EOP. No justification for the deviation is documented.

2. Steps 11 and 17
   Step 5 of the ERG specifies a minimum subcooling requirement prior to starting a RCP. These steps do not contain this requirement and no justification for this deviation is documented.

3. Step 16
   Step requires closing BIT recirculation valves. Step is no longer applicable.

4. Step 19
   ERG step 14 requires a recheck of RCS subcooling and RVLIS prior to isolating SI Accumulators. EOP does not contain this requirement and no justification for this deviation is documented.

5. Step 23
   The Caution states "DO NOT ALLOW PRESSURE TO INCREASE OR TEMP TO DECREASE WHILE PERFORMING SUBSEQUENT STEPS." ERG Caution states "RCS PRESSURE AND TEMPERATURE SHOULD BE MAINTAINED STABLE WHILE PERFORMING SUBSEQUENT STEPS IN THIS PROCEDURE." No justification for this deviation was documented.

6. Step 24
   The conditional action step contains a double negative.

7. STEP 30
   ERG Step 21 lists alternate methods of maintaining RCS pressure stable. This step just states "MAINTAIN RCS PRESSURE STABLE." No justification for this deviation is documented.

EOP-FRCE-2: RESPONSE TO HIGH CONTAINMENT SUMP LEVEL

1. Step 1
   Incorrectly identifies valve SW-57 whereas valve SW-58 is intended.

EOP-APPX-3: SI VERIFICATION

1. Step 8
   The sequence of the procedural bullets do not agree with the order that the fans appear on the board.

   Facility response
   The bullets have been reordered in revision 2 to match the order that the fans appear on the board.

2. Step 10
   The "Control Air Supply Fans" in this step, are labelled "CAACS Supply Fans" on the board.

3. Step 10
The "Emergency Control Area Supply Fan" is labelled "EACS Supply Fan" on the board.

4. Step 11
The valves "21 and 22 SJ4" were intended to be "21 and 22 SJ44."

Facility response
This typographical error has been corrected for revision 2.

EOP-APPX-4: POST SI SYSTEM RESTORATION

1. Step 1.1
This step does not direct the operator to depress both buttons to reset containment ventilation isolation.

2. Step 4
This step says "Depressurize" instead of "Depress" the push buttons.

Facility response
This typographical error has been corrected for revision 2.

AOP-BLACKOUT-1: STATION BLACKOUT MODES 3 THROUGH 6

1. Step 3.4, pg 2; Step 3.18.1 and 3.18.2, pg 11; Step3.34 and 3.35.1, pg 18; Step 3.35.5, pg 19; Step 3.36, pg 19
The designation of transmission lines and the associated labeling on the Mimic Bus are not used consistently. New Freedom, Deans, and Keeney are used in some steps and 5021, 5024, and 5037 are used in other steps. Also, only two of the busses are numbered on the Mimic Bus and the Keeney line is labeled "HOPE CREEK."

2. Step 2.16.4, pg 8
Gas Turbine load, voltage, and frequency are only monitored in Unit 1. This step does not specify where this information is found.

3. Step 3.16.5, pg 8; Step 3.22.1, pg 14; Step 3.30.7, pg 17
The reference to Pressurizer Heater busses does not agree with the Control Room labels.

4. Step 3.16.5, pg 8 and 9; Step 3.22.4, pg 14; Step 3.30.7, pg 17
The steps refer to 460V Bus and 230V Bus, but the Control Room labels are "480V" and "240V."

5. Step 3.18.2, pg 11; Step 3.35.5, pg 19
These steps are not clearly organized to indicate which breakers will be operated from the units involved.

6. Step 3.30.4. pg 13
The action step to "CLOSE 13KV Breaker 5-6" is missing from this step.

7. Step 3.22.2, pg 14
This step does not use AOP PZR-1 Appendix 1 to energize the Backup Heaters.

8. Step 3.35.2, Caution, pg 18
The term "Gas Turbine" is not used to designate "Unit 3."

9. Step 3.36, pg 19
Change the word "Section" before 2-8 to "Breaker."

10. Appendix 1, paragraph 1.3, pg APPX-1
Step does not tell operator to use AOP PZR-1, Appendix 1, to obtain power.

AOP-CA-1, COMPLETE LOSS OF CONTROL AIR

The following comments refer to TABLE 1, FAIL POSITION OF AIR OPERATED VALVES:

1. CHEMICAL AND VOLUME CONTROL SYSTEM
The divert valve, 2CV35, is to be in the "Manual Flow to VCT" position instead of the "Letdown Divert to HUT" position.

2. SAFETY INJECTION
Valves 2SJ20, 27,and 93 are affected on all loops (21-24).

3. MAIN STEAM SYSTEM.
Typographical error - "21-14 MS169 and 171" is stated instead of "21-24 MS169 and 171."

4. AUXILIARY BUILDING VENTILATION
The operator doing the walkdown was not sure about what "Cont Purge Supply Diversion" and "Cont Purge Exhaust" were referring A.

5. CONTAINMENT VENTILATION
The listing does not specify the number of dampers (i.e. 21-25) that fail open or closed.

6. The listing does not specify which damper positions are checked by the status of the "Sequence Complete" lights.

7. CONTROL AREA VENTILATION
The operator doing the walkdown said that either the "Normal Supply Fan Discharge" or the "Emergency Supply Fan Discharge Damper" must stay open instead of both failing closed.

AOP-CA-2: PARTIAL LOSS OF CONTROL AIR

1. The same comments apply as those for AOP-CA-1, TABLE 1, because the tables are the same.

AOP-CN-1: LOSS OF FEEDWATER PUMP

1. Step 3.4, pg 1
   Add appropriate valve designators.

2. Step 3.9.1, pg 2
   Add the word "Feed" after S/G, and change "alarm" to "annunciator" to agree with the local panel label.

3. Step 3.12, Caution, pg 2
   Place this step before Step 3.11, if the caution applies to Step 3.11. If it does not, move the caution to the top of page 3 to conform to the Writer's Guide.

AOP-CN-2: LOSS OF A HEATER DRAIN PUMP AND AOP-CN-3, LOSS OF CONDENSATE PUMP

1. Step 3.1, pg 1
   These steps do not conform to Step 2.3 of AOP-CN-1 which perform the same function.

COND-2: LOSS OF CIRCULATING WATER AND/OR CONDENSER VACUUM

1. Step 3.4.2
   This step performed locally but is not specified as such.

2. Steps 3.11, 3.15, 3.17
   Local actions are not differentiated from control room actions by standard verbiage.

3. Steps 3.17 and 3.19
   Component numbering is often not included for Turbine Gland Sealing Steam pressure (PL-1872) and S/G Feed Pump Vacuum (PL-2244).

AOP-ELEC-4KV-A: LOSS OF 2A VITAL BUS

1. Step 3.19, CONTINGENCY ACTION b., pg 4
   Step does not identify valve numbers.

2. TABLE B, pg TBL B-1
   In the Alternate Equipment column for 21 and 22 Service Water Pumps, the items state "13, 14, 15, and 16" instead of "23, 24, 25, and 26."

AOP-ELEC-460/230V-A: LOSS OF 2A 460/230V VITAL BUS

1. Step 3.10, CONTINGENCY ACTION, pg 2
   The step incorrectly sends the operator back to step 3.9, instead of to step 3.12.

2. TABLE A, pg TBL-A-11
   "Air Conditioning" is missing after "Emergency" for 21 and 22 Emergency Supply Fans.

AOP-ELEC-VIB-A: LOSS OF 2A 115V VITAL INSTRUMENT BUS

1. Step 3.12.3.b, pg 3
   The step lists a Solatron output breaker, but it is labeled "No. 2A Vital Instrument Bus Emergency Supply Regulating Transformer." The AOP wording does not agree with the label.

AOP-ELEC-4KV-B: LOSS OF 2B 4KV VITAL BUS

1. TABLE B. pg TBL B-1
   In the Alternate Equipment column for 22 Residual Heat Removal Pump, the last two valves are "11 and 12" instead of "21 and 22."

AOP-ELEC-460/230V-B: LOSS OF 2B 460/230V VITAL BUS

1. Step 3.1.2 and Step 3.1.3, pg 1
   The Battery Charger designations are reversed.

2. Step 3.6, CONTINGENCY ACTION, pg 2
   The step incorrectly sends the operator to Step 3.9 instead of Step 3.8.

AOP-ELEC-VIB-B:, LOSS OF 2B 115V VITAL INSTRUMENT BUS

1. Step 3.12.3.b
   The "Solatron output breaker" is labelled "No. 2B Instrument Bus Emergency Supply Regulator Transformer" in the plant.

AOP-ELEC-VIB-C: LOSS OF 2C 115V VITAL INSTRUMENT BUS

1. Steps 3.7.2 and 3.7.3
   Labeling in plant inconsistent with labeling in procedure for 2C5Y, 2C7Y and Solatron output breaker.

2. Component/Effect of Failure Table appears to be inconsistent, pressurizer liquid temperature is listed as a lost component but "effect of failure" column indicates pressurizer liquid temperature is available.

3. Table A equipment lost on 2C 115V vital instrument bus and Appendix 1 "applicable Technical Specification Action Statements" is an effective enhancement.

4. Steps 3.3.6 and 3.4.6
Operation of GP or EP group heaters, does not specify use of 21 or 22 backup heater controller (as in EOP and AOP-PZR-1). There was some operator confusion when asked which controller to use.

AOP-EVAC-1: CONTROL ROOM EVACUATION

1. Generic
There are numerous examples of differences between procedure nomenclature and equipment labeling with the following examples cited: steps 4.3.3, 4.3.6, 4.3.9 a), b), 4.3.14, 4.3.19 b), 4.3.23 b), 4.3.32 1 and 2, 4.3.39. 4.3.41 a), and 4.3.48g).

2. Step 4.3.8
Panel 207 is not labeled (unit 1).

3. Step 3.3.9 pg 4
Typographical error - this step should be 4.3.9 instead of 3.3.9.

4. Step 4.3.10
CV71 in panel 311 is not labeled (unit 1).

5. Step 4.3.16
On panel 229-1A, 1DR6 AFST Makeup Valve is not labeled.

6. Step 4.3.30 d)
12 primary Water Makeup Pump is not labeled.

7. Fire Hazards Book Box in unit 1 could not be located by the operator or was not labeled.

AOP-PZR-1: PRESSURIZER PRESSURE CONTROL MALFUNCTION - LOW PRESSURE

1. Same label inconsistencies as in EOP-ELEC-VIB-C.

AOP-RAD-1: LOSS OF REFUELING CAVITY LEVEL

1. Steps 3.5, 3.7, and 3.16.
There is no distinction between local and control room actions.

2. Table 2
Valve 2SJ110 label orientation makes it difficult to read.

3. Table 4
Valve 2SF71 label orientation makes it difficult to read.

AOP-RCP-1: LOSS OF REACTOR COOLANT PUMP AND/OR FLOW

1. Step 3.11.2
   Contains a caution which should precede step 3.11.1 (plant depressurization)

AOP-RCP-2: NO.1 SEAL FAILURE

1. Step 3.3
   The "No" path directs the operator to step 3.6 (unit shutdown) but it appears that the operator should be directed to step 3.7.

2. Step 3.4
   "No" path direct operator to: a. Stop affected RCP
   b. Trip the reactor

   This trip sequence is inconsistent with other trip sequences used in other AOPs.

3. Step 3.9
   Appears inappropriate for the following reasons:

   A. Operators looking at bypass flow instead of RCP leakoff.

   B. OHA C-40 should not be in alarm if CV114 is shut which occurs in preceding step.

4. Step 3.15 1)
   "No" path (which indicates a major seal failure) directs power to be reduced to P-7 then stop RCP. It appears that power reduction to below P-8 is needed to allow the RCP to be secured sooner.

AOP-RCS-1: PARTIAL LOSS OF REACTOR COOLANT

1. Step 3.20.1
   Valves 2SJ78, 79, and 108 can be deleted from the procedure since the BIT has been modified.

AOP-ROD-1: FAILURE OF A ROD CONTROL BANK TO MOVE

1. Step 3.4, RNO d
   This step does not direct the operator to look for the "Failure" lights lighted when looking for problems.

AOP-ROD-3: DROPPED ROD

1. Step 3.5.2
   The procedure does not specify the cabinet that contains the P/A converter.

2. Step 3.16
   The procedure does not specify the cabinet containing the Rod Bank Overlap Unit.

3. Step 3.16
   The procedure does not inform the operator to obtain the key from the shift supervisor to open the cabinet containing the Rod Bank Overlap Unit.

AOP-WIND-1, FLOODING AND/OR HIGH WIND CONDITION

1. Step 3.6
   The procedure does not specify which tanks are to be filled.

2. Table 1
   The non-fire doors are not labeled.

3. Table 1
   The door elevations in the procedure are incorrect.

ATTACHMENT 3

LIST OF WEAKNESSES IDENTIFIED AS NEEDING CORRECTION

ITEM NUMBERS APPLY TO BOTH UNITS

Item No.	Para. No.	Description
UNRESOLVED* ITEM 90-80-01	4.3.d.	Resolve fire door automatic closure problem and establish interm compensatory measures.

Item No.	Para. No.	Description
90-80-02	3.3.a. & c.	Correct deviation document errors and more fully document deviation justifications. Review EOPs and correct logic statements that have action and decision steps in the wrong sequence.
90-80-03	4.3.a.	Identify and correct labeling deficiencies.
90-80-04	4.3.b.	Perform V & V walkdowns of AOPs and correct identified deficiencies.
90-80-05	5.3.b. & c.	Organize EOP Table actions to minimize required operator movement in the control room. Provide P/A phone capability for the Desk Operator in the simulator.
90-80-06	6.3.a.	Correct differences between EOP-TRIP-4, 5, and 6 and AD-44. Revise AOP writer's guide to require local versus control room action distinction in AOPs.
90-80-07	6.3.b	Develop a formal and objective means to determine training required on EOP revisions. Revise AD-44 to require immediate EOP changes to be made within 2 weeks.
90-80-08	6.3.c	Revise AD-44 and AD-2 to require in-plant walkdowns of both the EOPs and the AOPs

* Item No. 1 is unresolved, the remainding items are considered open items to be tracked within the scope of the EOP inspection.