

PRELIMINARY SAFETY EVALUATION REPORT

PROCEDURES GENERATION PACKAGE

SALEM NUCLEAR GENERATION STATION, UNITS 1/2

1. INTRODUCTION

Following the Three Mile Island (TMI) accident, the Office of Nuclear Reactor Regulation developed the "TMI Action Plan" (NUREG-0660 and NUREG-0737), which required licensees of operating reactors to reanalyze transients and accidents and upgrade emergency operating procedures (EOPs) (Item I.C.1). The plan also required the NRC staff to develop a long-term plan that integrated and expanded efforts in the writing, reviewing, and monitoring of plant procedures (Item I.C.9). NUREG-0899, "Guidelines for the Preparation of Emergency Operating Procedures," represents the staff's long-term program for upgrading EOPs, and describes the use of a "Procedures Generation Package" (PGP) to prepare EOPs. Submittal of the PGP was made a requirement by Supplement 1 to NUREG-0737, "Requirements for Emergency Response Capability (Generic Letter 82-33)." The Generic Letter requires each licensee to submit to the NRC a PGP which includes:

- (i) Plant-Specific Technical Guideline
- (ii) A Writer's Guide
- (iii) A Description of the Program to be Used for the Validation of EOPs
- (iv) A Description of the Training Program for the Use of Upgraded EOPs

This report describes the review of Public Service Electric and Gas Company's (PSE&G) response to the Generic Letter related to development and implementation of EOPs for Salem 1 and 2. (Section 7 of Generic Letter 82-33.)

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Our review was conducted to determine the adequacy of the licensee's program for preparing and implementing EOPs. Criteria for the review of a PGP are not currently in the Standard Review Plan (SRP). Therefore,

this review was based on NUREG-0899, the reference document for the EOP upgrade portion of Supplement 1 to NUREG-0737 (Generic Letter 82-33). Review criteria based on this guidance will be developed for the next SRP revision. Section 2 of this SER briefly discusses the five parts of the licensee's submittal, the staff review methods, and the acceptability of the submittal. Section 3 contains the conclusions of this review.

As indicated in the following sections, our review determined that the procedure generation program for Salem 1 and 2 is acceptable with the exception of the items identified in Section 2.

The licensee should address these items in a revision to the PGP, or justify why such revisions are not necessary. Our review of the licensee's response to these items will be included in a supplement to this SER. The revision of the PGP, and subsequently of the EOPs, should not impact the schedule for the use of the EOPs. The revision should be made in accordance with the licensee's administrative procedures.

## 2. EVALUATION AND FINDINGS

In a letter dated May 20, 1983, from E. A. Liden (PSE&G) to S. A. Varga (NRC), the licensee submitted its PGP. The PGP contained the following five sections:

Plant-Specific Administrative and Technical Guidelines and EOP Preparation

Author's Guide

Verification Program

Validation Program

Training Program

The comments on these sections, with the verification program and validation program comments combined, are presented below:

A. Plant-Specific Administrative and Technical Guidelines and EOP Preparation

The Plant-Specific Administrative and Technical Guidelines and EOP Preparation section was reviewed to determine if it provided adequate information to meet the objectives of NUREG-0899. The licensee described how the administrative controls for the preparation of EOPs have been incorporated into their existing controls and how the Westinghouse Owners Group Emergency Response Guidelines (ERG) have been converted into plant-specific EOPs. The process described for converting the generic guidelines into EOPs appears adequate, however, the following items should be addressed in the Plant-Specific Administrative and Technical Guidelines and EOP Preparation:

- (1) For utility record purposes and to assure the staff of the use of NRC approved generic guidelines, the PGP should specify the revision or date of the generic guidelines used as the basis for the plant-specific guidelines. The PGP stated that a combination of the high and low pressure versions of the ERGs was used. Because Salem has high pressure safety injection systems, the portions taken from the low pressure guideline should be considered deviations from the approved generic guidelines.

- (2) Section 2.3.2 describes the use of a comparative analysis between the draft EOPs and the applicable ERGs to identify deviations but there is no discussion of an evaluation of the safety significance of the deviations. All deviations from, and additions to, the generic technical guidelines must be evaluated to determine their safety significance and this process should be described in the PGP.
- (3) If the process described in item 2 identifies any safety significant deviations from, or additions to, the generic technical guidelines, a submittal should: (a) identify the safety significant deviations or additions found, and (b) provide the technical justification (i.e., engineering evaluation or analysis, as appropriate) for the plant-specific approach.
- (4) The generic guidelines include guidance for operators to use safety injection to inject boron, if necessary, during an Anticipated Transient Without Scram (ATWS). As an addition to the generic guidelines bases, provide criteria, with justification, for operator verification that the reactor is shut down and for operator termination of the safety injection.
- (5) Describe the process for using the generic guidelines and background documentation to identify the characteristics of needed instrumentation and controls. For the information of this type that is not available from the ERG and background documentation, describe the process to be used to generate the necessary instrumentation and control characteristics. This process can be described in either the PGP or Detailed Control Room Design Review Program Plan with appropriate cross-referencing.

With satisfactory resolution of the above items, the instructions for Salem Plant-Specific Administration and Technical Guidelines and EOP Preparation should provide adequate translation of the ERGs into plant-specific EOPs. The staff will confirm that the licensee adequately addresses these items and will describe the review in a supplement to the SER.

#### B. Writer's Guide

The writer's guide was reviewed to determine if it provided acceptable methods for accomplishing the objectives of NUREG-0899. The licensee described a process that will use the Salem ERGs and writer's guide to develop emergency procedures. The procedures will use a single column format for entry conditions and will use a dual column format for the operator actions. Our review of the writer's guide revealed the following shortcomings:

- (1) There should be a brief statement of scope to describe the general purpose of the EOP. Note that carefully worded titles may be used to accomplish this objective. (See NUREG-0899, Subsection 5.4.3).
- (2) Incorporation of sign-off provisions and checkoff lists into the EOPs is explicitly ruled out in AD-2 (Section 5.3.3., pg. 32-33). However, the EOPs are used under circumstances which could produce significant stress on the operators. Therefore, placekeeping aid(s) should be implemented by the operators to prevent skipping or repeating steps. Use of placekeeping aids, such as checkoff spaces, is one method that helps to facilitate the placekeeping. If aids are not to be used, describe the method(s) to be used by the operators to keep place as the procedures are used.

- (3) Identification of control room equipment is covered in AD-2 (Subsection 4.2.2.g). In addition to the information provided there, the writer's guide should specify that control room equipment be identified in a manner that is easily understood by the operator and consistent with the nomenclature used on the equipment labels and in other procedures. (See NUREG-0899, Subsection 5.6.2.)
- (4) The writer's guide should provide guidance on when to provide location information (for equipment, controls, and displays) and how this information will be presented. (See NUREG-0899, Subsection 5.7.11.)
- (5) The directions for the use of logic terms in AD-2 (Subsection 3.8.3, pg. 15 and 18) provide most of the needed guidance for the use of these terms. However, the format of logic steps employing these terms should be provided in addition to the examples currently presented in the PGP. Also, the examples should be corrected to be consistent with each other and the guidance selected for formatting the steps. This should help ensure consistency and reduce the potential for operator confusion under stress.
- (6) The following items should be included to enhance the useability of the EOPs:
  - (a) The EOPs should be distinctly identifiable from other documents and should provide the operators easy access to any procedure or part of a procedure. (See NUREG-0899, Subsection 6.1.4.)

- (b) The writer's guide should specify that the quality of all reproductions of EOPs be comparable to the originals to ensure readability. (See NUREG-0899, Subsection 6.2.2.)
- (7) The EOP step numbering system should provide information so that operators can quickly determine where they are in relation to the rest of the document. The step numbering system described in AD-2 (pg. 2) could require operators to review the document to obtain the entire step identifier if the subsection extended over one page. One method of accomplishing this goal would be to use a numbering system that allows the complete step identifier to precede to each step or substep. For example, step "a" of Subsection 1.1.1 could be written as 1.1.1.a and Substep (1) could be written as 1.1.1.a(1). This would provide immediate identification of each action step even if the subsection extended over more than one page. (See NUREG-0899, Subsection 5.5.5.)
- (8) Due to the nature of control rooms, control room events, staff capabilities and the turnover in control room shift crews, the EOPs should be structured so that they can be executed by the minimum control room crew as specified in the technical specifications. (See NUREG-0899, Subsection 5.8.1.)

(The following item is provided for information and should be considered when the P-SWG is revised.)

- (9) The guidance for verification steps (AD-2, Subsection 4.2.3, pg. 22-23) is acceptable; however, the reference made to Section 5.0 in Subsection 4.2.3b is unclear. The problem could be resolved by simply listing the procedural categories for which verification steps are required rather than referring the user to another major section of the procedure.

With adequate resolution of the above items, the staff concludes that the Salem writer's guide provides adequate guidance for translating the technical guidelines into EOPs that should be useable, accurate, complete, readable, convenient to use and acceptable to control room operators. The staff will confirm that the licensee adequately addresses these items in the writer's guide, and will report its review in a supplement to the SER.

#### C. Validation/Verification

The descriptions of the licensee's validation/verification programs were reviewed to determine if they acceptably address the objectives stated in NUREG-0899. The verification program described in the PGP has two objectives: 1) to determine that the procedures conform to the format and principles specified in the writer's guide, and 2) to determine that the procedures are technically accurate, consistent with the plant-specific technical guidelines and include all appropriate licensing commitments. The objective of the validation program described in the PGP is to ensure that a trained operating shift can manage emergency events using the EOPs. During our review of the verification/validation program, we identified the following deficiencies:

- (1) The validation program as described in the PGP (pg. 10-15) contains a number of the essential items that are needed for a thorough validation program. However, the following additional items should be include: (See NUREG-0899, Subsection 3.3.5.)



- (a) An indication that the validation will demonstrate that the EOPs can be effectively implemented by the minimum crew staffing required by the technical specifications.
  - (b) The criteria used to choose the scenarios for validation.
  - (c) An indication that all EOPs possible will be exercised on the simulator and that the scenarios to be used will include multiple (simultaneous and sequential) failures.
  - (d) An indication of how the portions of the EOPs which cannot be tested well on the simulator will be validated by some other method (e.g., control room walk-throughs).
- (2) The validation program needs to determine if the information required by the operator, as determined by the task analysis performed for the technical guidelines, is available in the control room. A discussion of this should be included in the validation program. (This element may be done in conjunction with the Control Room Design Review.)
- (3) There should be a description of the method by which differences between units will be taken into account in the validation/verification programs.

Upon resolution of the above items the validation/verification program should be adequate to accomplish the validation/verification objectives stated in NUREG-0899 and should provide assurance that the EOPs adequately incorporate the guidance of the writer's guide and generic technical guidelines. The staff will confirm that the licensee adequately addresses these items in the PGP and will report its review in a supplement to the SER.

D. Training Program

The licensee's description of the operator training program for the EOPs was reviewed to determine if it adequately addresses the objectives of NUREG-0899. The training program described in the PGP is planned to be implemented as a part of the requalification program. The program consists of classroom instruction and simulator training (on the plant-specific simulator) on a shift basis using the team approach to emergency response. Both written and performance evaluations are planned.

The training program description addresses most of the desired objectives, however, the following areas should be addressed:

- (1) For walk-throughs and simulator exercises, the staff needs assurance that a wide variety of scenarios will be used, including multiple (simultaneous and sequential) failures.
- (2) For portions of EOPs that cannot be exercised on the simulator, there needs to be a discussion of the mechanism by which these areas will be covered by some other training methods.

With the inclusion of the above items, the staff concludes that the training program will acceptably address the objectives of NUREG-0899 and should provide assurance that the operators are adequately trained on the EOPs prior to implementation of the EOPs in the control room. The staff will confirm that the licensee adequately addresses these items and will report its review in a supplement to the SER.

### 3. CONCLUSIONS

Based on the review, we conclude that, with the exceptions noted in Section 2 of this SER, the Public Service Electric and Gas Company PGP for Salem 1 and 2 meets the requirements of Supplement 1 to NUREG-0737 and describes acceptable methods for accomplishing the objectives stated in NUREG-0899. The staff therefore has reasonable assurance that EOPs developed and implemented in accordance with the program described in the licensee's PGP should be adequate for control room personnel to effectively mitigate the consequences of a broad range of accidents and multiple failures. Future changes to the PGP having safety significance should be brought to the attention of the NRC and will be reviewed in accordance with 10 CFR 50.59.

This review and evaluation was performed with the assistance of Battelle Pacific Northwest Laboratories personnel.

Principle Reviewer:

W. Kennedy