INTERIM SAFETY EVALUATION
PROCEDURES GENERATION PACKAGE
JAMES A. FITZPATRICK NUCLEAR POWER PLANT

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 Guidelines
(ii) A Writer's Guide
(iii) A description of the program to be used for the validation/verification of EOPs
(iv) A description of the training program for the upgraded EOPS

This report describes the review of New York Power Authority's response to the Generic Letter related to development and implementation of EOPs for the James A. Fitzpatrick Nuclear Power Plant (Section 7 of Generic Letter 82-33).

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 included in the next SRP revision. Section 2 of this report briefly discusses the licensee's submittal, the staff review, 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 procedures generation program for James A. Fitzpatrick Nuclear Power Plant has several items that must be satisfactorily addressed before the PGP is acceptable. 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 subsequent safety evaluation report. 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 and 10 CFR 50.59.

2. EVALUATION AND FINDINGS

In a letter dated June 30, 1983, from J. P. Bayne to D. B. Vassallo, the licensee submitted its PGP. The PGP consists of the following three attachments to the above letter:

- o Administrative Procedure 2.2, "Procedure for Emergency Operating Procedures"
- o Technical Guidelines for Emergency Operating Procedures
- o Emergency Operating Procedure Training Program

A discussion of the Plant-Specific Technical Guidelines (P-STGs), Administrative Procedure 2.2, which contains the writer's guide, the verification program and the validation program, and the description of the training program, follows. The comments on the verification and validation programs are combined.

A. Technical Guidelines for Emergency Operating Procedures (Plant-Specific Technical Guidelines)

The P-STGs were reviewed to determine if they provided acceptable methods to meet the objectives of NUREG-0899. Attachment 1 of the licensee's PGP briefly describes the method wherein they will use generic Emergency Procedure Guidelines (EPGs) and, with appropriate changes, develop EOPs for the James A. Fitzpatrick Nuclear Power Plant.

The Boiling Water Reactor Owners Group (BWROG) EPGs, Revision 3, dated December 8, 1982, was approved by the NRC staff in a letter dated November 23, 1983, from D. Crutchfield to T. Dente of the BWROG.

The licensee's P-STGs were generated from Revision 3 of the EPGs. Because a given plant does not have all of the systems called out in the EPGs, the licensee developed the P-STGs "through a process of deletion and substitution of statements and the substitution of plant specific variables." Although these "deviations" are reflected in the Fitzpatrick P-STGs, they are not specifically identified as such. The submitted documentation should have included (1) a description of the process used to develop plant-specific guidelines from the EPGs, (2) identification of safety significant deviations from the generic guidelines including the identification of additional equipment beyond that identified in the generic guidelines, and (3) a description of the process used for identifying operator information and control requirements.

For item 1 above, the submitted procedure (Attachment 1) calls for identification of deviations ("discrepancies") between the EPGs and P-STGS. Since no such discrepancies were identified in the P-STGs, the staff's review included a step-by-step comparison of the P-STGs with the NRC-approved BWROG EPGs (Revision 3) to identify the

deviations. Based on this review, the staff has several comments and has identified a number of deviations. These deviations must be specified as such and adequately justified, in the P-STGs, before the guidelines can be approved. Furthermore, the deviations identified by the staff should not be considered complete; it is the responsibility of the licensee, in accordance with Part 7.1.4 of their Administrative Procedure 2.2 (Attachment 1) to properly identify and document "discrepancies" between the EPGs and the P-STGs. From the documentation provided it does not appear that this was done. Comments and the deviations identified by the staff are as follows:

General

1. The P-STG should identify safety significant deviations from the EPGs along with a justification for each deviation. At a minimum, the following types of deviations should be identified:

   - o any modification to the mitigative strategy of the generic technical guidelines;
   - o differences in equipment operating criteria;
   - o differences in equipment operating characteristics;
   - o identification of methods and equipment used to address the technical areas of the generic guidelines that are specified as "plant-specific;"
   - o plant-specific setpoints or action levels that are calculated or determined in a manner other than specified in the EPGs;
   - o actions that are taken in addition to those specified in the EPGs and that affect the mitigative strategy;
   - o differences that affect the equipment's ability to adequately provide the necessary mitigative function;
   - o use of different instruments or control parameters than those specified in the EPGs or determining instrumentation and control characteristics in a manner different than, or with a different basis than, that specified in the EPGs.

2. Attachment 1, AP 2.2, Item 7.1.4, is not clear on how "problems" are resolved; "The checklist is returned to the water [sic] for resolutions of problems."

3. Provide a description of the process for using the EPGs and background information to identify control room operator tasks and information and control needs. This process can be described in either the revised PGP or in the Detailed Control Room Design Review (DCRDR) program plan with appropriate cross referencing.

Specific (pages and numbers reference P-STGs)

1. Page 14, RC/P-1 Graph
   Caution #18 reference should be Caution #8 (Ref. Generic Guideline RC-5)
2. Page 16, RC/P-3
   Part of last bullet is relevant to the first two bullets and is thus improperly placed - "depressurize the RPV and maintain coolant rate below 100°F/hr." This should be placed on separate line.
3. Page 17, RC/Q-4
   Why is the CRD system the only system identified for boron injection as the alternative to SLC?
4. Page 22, DW/T-3
   Discuss the bases for the drywell spray flow rate restriction of less than 1800 gpm and the derivation of the drywell spray initiation pressure limit.
5. Page 23, PC/P-3
   The word "pressure" was left out between "chamber" and "exceeds."
6. Page 25, PC/P-6
   Where is plot associated with Limit? (as per guideline)
7. Page 26, SP/L
   Do you have SPMS? If so, why don't you include appropriate steps?

8. Page 28, SP/L-3.2
   As Mark I containment, other parts of step should be included as per guideline.
9. Page 30, Operator Actions
   Actions in the EPGs isolate only HVAC. Actions in the P-STGs imply more than HVAC is isolated.
10. Page 32, Table 1
    Under Secondary Containment Parameter/Location, why has refuel floor been left out?
11. Page 37, C1-1
    Why is the fire system not included in alternate injection systems?
12. Page 44, C5-6.3, and Pages 46 and 47, C6-3.1, C6-3.2, and C6-5.3
    In C5-6.3, 50 psig is referenced as the "minimum SRV Re-opening Pressure." In C6-3.1, 3.2 and C6-5.3, 50 psig is referenced as the "Minimum RPV Flooding Pressure." Based on the generic guidelines it would appear that the minimum RPV flooding pressure should be higher than the minimum SRV re-opening pressure. Please clarify.

With satisfactory resolution of the above items, the licensee's P-STGs will provide an adequate technical basis for developing EOPs.

B. Fitzpatrick Writer's Guide for Emergency Operating Procedures (writer's guide)
The writer's guide was reviewed to determine if it provided acceptable methods to meet the objectives of NUREG-0899. The licensee described a process that will use the P-STGs and the writer's guide to develop EOPs. The EOPs will use a single-column format and will be divided into the following four sections: Title, Symptoms, Automatic Actions and Operator Actions. The writer's guide is to be used throughout the EOP development process to assure that the procedural steps are presented in a clear, definitive manner that

adheres to human factors principles for written material presentation. Our review of the writer's guide identified the following concerns:

1. Information should be presented in procedures so that interruptions in its flow are minimal. To achieve this, each procedure should be written so that an action step, a warning (caution), or a note should be completed on the page where it began. This guidance should be included in the writer's guide.

2. Placekeeping aids can assist the operators in keeping track of their position within a procedure. They are of particular importance when performing concurrent steps or procedures and in situations where the user's attention may be diverted. Thus, the writer's guide should be revised to specify some type of placekeeping aid.

3. It is important that an operator be able to quickly access the relevant EOPs or portions of the EOPs. The writer's guide should address the accessibility of the EOPs and their various parts and sections. See NUREG-0899, Subsection 6.1.4, for additional guidance.

4. The writer's guide should include guidance for units of measure for use in instructional steps, and they should be the same as the rules for the use of units of measure in tables and figures discussed in Subsection 4.9.1, on page 22 of 53.

5. Abbreviations, acronyms and symbols are discussed in Section 5.6 on page 29 of 53. To ensure that these items are recognizable by the operators, a list of acceptable abbreviations, acronyms and symbols should be included in the writer's guide. See NUREG-0899, Subsection 5.6.2, for additional guidance.

6. To minimize confusion, delay, and errors in execution of the EOPs steps, the following concerns should be addressed in the writer's guide: (1) EOPs should be structured so that they can be executed by the minimum shift staffing and minimum control room staffing required by the facility's Technical Specifications, (2) instructions for structuring the EOPs should be consistent with roles and responsibilities of the operators, (3) action steps should be structured so as to minimize the movement of personnel around the control room while carrying out procedural steps, and (4) action steps should be structured to avoid unintentional duplication of tasks. See NUREG-0899, Section 5.8, for additional guidance.

7. Action steps need to be written for a variety of situations. The writer's guide should address the formatting of the following types of action steps: (1) verification steps which are used to determine whether the objective of a task or sequence of actions has been achieved, (2) steps which are repeatedly performed, (3) steps for which a number of alternative actions are equally acceptable, and (4) steps performed concurrently with other steps. See NUREG-0899, Section 5.7, for additional guidance.

8. Section 4.2 on pages 18 and 19 of 53 contains a good discussion on the use of logic terms. Logic statements could be confusing if the statements are not written in a consistent format. Therefore, this section should be expanded to specify the format and include an example of how these logic statements should be written. See NUREG-0899, Subsection 5.6.10 and Appendix B, for additional guidance.

9. Subsection 3.2.b on page 16 of 53 discusses the content of the entry conditions, which are to be placed in the Symptoms section of the EOP. However, the format of the Symptoms section also

needs to be specified. The format used in Figure 2 on page 15 of 53 is in paragraph form, which could be confusing to the operators if there are a large number of entry conditions and symptoms. This subsection should be expanded to specify that a list of type of format should be used to present the symptoms and entry conditions in the EOPs.

10. Use of equipment and control label information in the EOPs should be applied consistently. The writer's guide should identify the specific information to be included and the format for presenting the equipment and control label information.

11. Section 2.4 on page 14 of 53 states that each page of the procedure will be identified by the procedure title designator and number, the revision number, and the page number. The example of Page Format, on page 15 of 53, includes the title of the EOP. If the licensee intends to include the title on each page of the EOP, the writer's guide should be changed to so specify.

12. The left and right hand margins are discussed in Section 6.2 on page 30 of 53. This section should be expanded to include a specification for the top and bottom margins.

13. The methods of reproduction are described in Section 7 on page 33 of 53. Since copies of the EOPs should be complete (contain all of the information from the original) and legible, the criteria regarding completeness and legibility of the reproduced copies should also be addressed in the writer's guide. See NUREG-0899, Subsection 6.2.2, for additional guidance.

14. The following inconsistencies or errors in the writer's guide should be corrected:

    a. The line spacing in Figure 2 on page 15 of 53 does not correspond with the text in Section 6.3 on page 30 of 53. The spacing in Figure 2 appears to be single line spacing with double line spacing between headings and text. Section 6.3 calls for 3 line spaces between headings and text and 1 1/2 line spaces for the text. The example should be made consistent with the instructions in the writer's guide.

    b. Section 3.2 on page 16 of 53 states that the procedures will have four section headings: TITLE, SYMPTOMS, AUTOMATIC ACTIONS (not applicable in symptom-oriented procedures) and OPERATOR ACTIONS.

        (i) However, the example in Figure 2 on page 15 has TITLE, SYMPTOMS and IMMEDIATE ACTION as the three section headings. The example should be corrected.

        (ii) In Subsection 4.9.3, on page 22 of 53, it is stated that "Section numbering for attachments should be in accordance with Subsection 3.3" This indicates that ATTACHMENTS are meant to be a major section, and should be listed in Section 3.2.

    c. Subsection 4.9.3, on page 22 of 53, states that attachment page numbering is to meet the requirements of Subsection 2.5. This should be corrected to say it is to meet the requirements of Subsection 2.4.

d. The page numbers in the Table of Content for the writer's guide do not match the page numbers in the writer's guide. The Table of Contents should be corrected.

With adequate resolution of the above items, the James A. Fitzpatrick writer's guide should meet the objectives of NUREG-0899 and provide adequate guidance for translating the technical guidelines into EOPs that will be useable, accurate, complete, readable, convenient to use and acceptable to control room operators.

C. Emergency Operating Procedure Verification/Validation

The verification and validation program descriptions were reviewed to determine if adequate methods are described to accomplish the objectives of NUREG-0899. To summarize, the objective of the verification program is to verify the written and technical accuracy of the EOPs. The persons performing the verification conduct a step-by-step review of the EOP using the verification checklists as a guide and to document the evaluation. The review is to determine how well the procedures follow the writer's guide and the technical guidelines. The objective of the validation program is to verify the useability and operational correctness of the EOPs. Validation is accomplished using control room walkthroughs and/or simulator sessions. The control room walkthroughs are conducted using an observer and one or more operators, while the simulator sessions use a normal crew with one or more observers. The validation checklist is used as a guide and to document the evaluation. Our review of the verification and validation programs identified the following concerns:

1. The verification program as outlined in Section 7.3 on page 5 of 53 and in Appendices B and C of the "Procedures for EOPs" contains most of the necessary elements that are required to meet the objectives of NUREG-0899. However, in order to ensure the

technical and human engineering adequacy of the EOPs, the verification and validation programs should specify that the teams performing the verification and validation include both subject matter experts and procedure writers in addition to the reactor operators who are already included in the program. See NUREG-0899, Subsection 3.3.5, for additional guidance.

2. The use of scenarios in the validation process are described in Subsection 7.4.1.1 on page 6 of 53. This subsection should be expanded to specify that the scenarios include multiple (sequential and simultaneous) failures.

3. The discussion of simulator sessions in Subsection 7.4.3.2 indicates that a normal crew of operator will be used. The PGP should indicate that the EOPs will be exercised during plant walkthroughs and simulator events with the minimum control room staff size required by the facility's Technical Specifications.

4. To assure verification/validation of all the EOPs, the program description should include an indication that the full complement of EOPs will be exercised.

5. There are discrepancies between the writer's guide and Appendix B, "EOP Verification Checklist" that should be corrected. These are as follows:

   a. The writer's guide includes instructions on procedure organization and step numbering in Section 3.0, component identification in Section 4.0, and vocabulary, abbreviations and typing instructions in Sections 5.0 and 6.0. These items are not covered in Appendix B.

b. Conversely, Appendix B checklist item 7 deals with listing or specifying the recipient of a communication in the EOP which is not mentioned in the writer's guide, and checklist item 9 asks whether provisions are made for verifying that automatic actions associated with the emergency were actually observed, whereas the writer's guide stated that automatic actions are not applicable in symptom-oriented procedures.

Upon resolution of the above items, the verification and validation programs should provide acceptable methods to accomplish the objectives stated in NUREG-08999 and should provide assurance that the EOPs adequately incorporate the guidance of the writer's guide and the technical guidelines and will guide the operator in mitigating emergency situations.

D. Emergency Operating Procedure Training Program

The licensee's description of the training program (Attachment 3) was reviewed to determine if it adequately addresses the objectives stated in NUREG-0899. The licensee indicates that both simulator and classroom training will be used and that operators will practice using the EOPs for both minor malfunctions and accidents involving multiple failures.

Our review of the training program description identified the following items that should be addressed or expanded in the PGP:

1. The program description should clearly state the training objectives, e.g., trainees should understand the philosophy behind the approach to the EOPs, and how these objectives will be accomplished by the training program.

2. Since the licensee must use a generic simulator for training, discuss the methods to be used to train the operators in areas where the simulator is not like the control room or does not react like the plant, and in parts of the EOPs that cannot be run on the simulator.

3. Indication that operators will be trained as a team to use the EOPs and that each operator is trained in the role that they would be expected to take in case of an actual emergency.

4. Indication that a wide variety of scenarios will be used to fully exercise the EOPs on the simulator (within the constraints of the simulator).

5. Indication that all the EOPs will be exercised in some fashion by all the operators.

6. The description of the training program should include a statement of commitment that all operators will be trained on the revised EOPs prior to their implementation.

7. The description of the training program should state that the operators' knowledge and performance on the EOPs will be evaluated and that appropriate follow-up training will be conducted in deficient areas.

Resolution of the above items should result in a training program that meets the guidance of NUREG-0899 and should provide assurance that the operators are adequately trained on the EOPs prior to implementation.

3. CONCLUSIONS

Based on our review, we conclude that, when the exceptions noted in Section 2 of the SER are adequately addressed, the New York Power Authority PGP for the James A. Fitzpatrick Nuclear Power Plant will meet the requirements of Supplement 1 to NUREG-0737, and provide acceptable methods for accomplishing the objectives of NUREG-0899, for the technical guidelines, writer's guide, verification and validation, and training programs. The PGP should be revised to address the items described in Section 2 and resubmitted. The staff will confirm that the licensee adequately addresses these items and will report its review in a subsequent safety evaluation report. Future changes to the PGP should be made in accordance with 10 CFR 50.59.

This evaluation was performed with the assistance of Battelle Northwest Laboratories' personnel.