

SAFETY EVALUATION REGARDING THE
PROCEDURES GENERATION PACKAGE FOR
NINE MILE POINT UNIT 1

1. INTRODUCTION

The "TMI Action Plan" (NUREG-0660 and NUREG-0737) required licensees of operating reactors to reanalyze transients and accidents and to 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," describes the use of a "Procedures Generation Package" (PGP) to prepare EOPs. A PGP is required by Generic Letter 82-33, Supplement 1 to NUREG-0737, "Requirements for Emergency Response Capability." The generic letter requires each licensee to submit 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 of EOPs
- (iv) A description of the training program for the upgraded EOPs.

This report is the review of the Niagara Mohawk Power Corporation (NMPC) submittals describing the development and implementation of EOPs for the Nine Mile Point Unit 1 (NMP1).

The review was conducted to determine the adequacy of the NMPC program for preparing, implementing, and maintaining upgraded EOPs for NMP1. This review was based on NUREG-0800, Subsection 13.5.2, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plant." Section 2 of this report briefly discusses the NMPC submittals, the NRC staff review, and the acceptability of the submittals. Section 3 contains the staff's conclusions.

The staff determined that the procedure generation program for NMP1 has several items that must be satisfactorily addressed before the PGP is acceptable. NMPC should address these items in a revision of the PGP, or justify that revisions are not necessary. This revision and/or justification need not be submitted, but should be retained for subsequent review by the NRC staff. 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 NMP1 administrative procedures and 10 CFR 50.59.

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2. EVALUATION AND FINDINGS

In a letter dated March 1, 1984, from T. E. Lempges (NMPC) to Domenic B. Vassallo, (NRC), NMPC submitted its PGP for NMP1. The PGP contained the following sections:

- Plant-specific Technical Guidelines
- Writer's Guide
- Description of the Verification/Validation Program
- Description of the Training Program

The NRC staff conducted a review of the NMP1 PGP, and identified its findings in a Draft Safety Evaluation Report (DSER) which was forwarded to NMPC in a letter dated September 13, 1985. NMPC responded to the DSER items with a letter from C. V. Mangan (NMPC) to John Zwolinski (NRC), dated April 18, 1986, which included a revised PGP and Revision 1 of the Training Program. Additional information was submitted in a letter dated March 3, 1987, from C. V. Mangan (NMPC), which included a revised Verification Program Plan and a Validation Program Plan. The NRC staff review of the revised NMP1 PGP is documented in the following subsections. The verification and validation program comments are combined in one subsections.

The review of the NMP1 PGP follows:

A. Plant-Specific Technical Guidelines (P-STG)

Because staff evaluation of Revision 4 of the generic technical guidelines is now complete, the P-STG program description should be revised to conform with Revision 4 of the General Electric Boiling Water Reactor Owner's Group (BWROG) Emergency Procedure Guidelines (EPGs). Safety significant deviations from the BWROG Emergency Procedures Guidelines should be documented, justified, and archived for future reference.

B. Writer's Guide

The writer's guide was reviewed to determine if it described acceptable methods for accomplishing the objectives stated in NUREG-0899. The NMP1 writer's guide provides guidelines to be employed in the preparation of EOPs. These guidelines have been established to ensure consistency in the organization, format, style, and content of NMP1 EOPs. The staff identified the following concerns with regard to NMP1's responses to the previous draft safety evaluation:

1. SE Open Item B.3. Section 3.2, page 5, states that "division of the text of a step between two pages should be avoided."



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This section should also indicate to procedure writers that it is preferable to leave blank space at the bottom of a page than to split a step between pages. Further, Section 3.8, page 16, should state that each caution and note should be entirely contained on a single page.

2. SE Open Item B.4. In certain situations, the advantages placekeeping aids offer operators in keeping track of their positions within EOPs outweigh the disadvantages discussed in NMP1's response to this concern. For example, an EOP may present an operator with a long list of valves to open, such as that included in Step 5.2 of Figure 3, page 15. The writer's guide should be revised to include some type of placekeeping aid in lists.
3. SE Open Item B.5. The following problems regarding logic terms were noted:
 - a. The writer's guide has been revised to include EXCEPT as a logic term. Because the exception follows the action, EXCEPT could lead to errors. For instance, an operator instructed to "close all valves EXCEPT Valve X" might erroneously close every valve before reading the remainder of the step. The writer's guide should be revised to indicate that EXCEPT will not be used in EOPs. Example 1 in Section 3.3.3, page 8, should be revised accordingly.
 - b. Step 5.2 of the revised Figure 3, page 15, incorrectly uses IF without THEN.
4. SE Open Item B.6. Because the writer's guide is intended to aid writers in producing quality procedures and to ensure that procedures are prepared consistently, the writer's guide should provide examples of common types of location information.
5. SE Open Item B.7. It is not sufficient that equally acceptable steps be covered in validation and training; the writer's guide should define equally acceptable steps and describe the format to be used for these steps. An example should be provided.
6. SE Open Item B.9. Validation and verification serves to assess adherence to the guidance provided in the writer's guide and other basis documents. Validation and verification is not a substitute for this guidance. The writer's guide should address the following principles: (1) action steps should be structured to minimize the physical interference of personnel in the control room; (2) actions steps should be structured to avoid unintentional duplication of tasks; (3) action steps should be structured to minimize the movement of personnel in the control room; (4) action steps should be structured to be consistent with the roles and responsibilities of operators; (5) action steps should be structured to enable the control



room supervisor to follow staff actions and monitor plant status; and (6) actions steps should be structured to be executed by the minimum control room staffing required by the Technical Specifications. The degree to which the EOPs conform to this guidance can then be assessed in validation and verification.

7. The writer's guide does not discuss flowcharts. If flowcharts are to be used as part of the EOP set, the writer's guide should provide complete guidance on this topic. See NUREG/CR-5228, "Techniques for Preparing Flowchart-Format Emergency Operating Procedures," for further guidance.
8. The following problems regarding cautions and notes were noted in the revised portions of the writer's guide:
 - a. Section 3.8, page 16, should specify the format for cautions. This format should emphasize cautions so that they are easily distinguished from notes.
 - b. The writer's guide should specify that each caution and note will contain only one topic.
 - c. Section 3.8, page 16, states that notes "may precede or follow the related information, depending on the (nature) of the information provided." The writer's guide should indicate that notes should always precede the steps to which they apply.
9. The following additional problems regarding logic terms were noted:
 - a. Table 1, page 25, states that OR will always be used in the inclusive sense. If priorities cannot be established among equally acceptable alternatives then it becomes necessary to use the exclusive OR. Section 4.4 should discuss the exclusive OR. Section 3.4.5, pages 10-11, should provide an example of the correct use of the exclusive OR.
 - b. The logic terms NOT and IF NOT should be added to Table 1, page 25.
 - c. Section 3.3.3, page 8, states that "lists of conditions or step numbers shall be itemized with lower-case letters." However, the text does not explain how many items constitute a list.
10. The following problems regarding referencing and branching were noted:
 - a. Section 4.6, page 26-27, should discuss the criteria to be used when deciding if the necessary steps should be included in the text of the procedure or if referencing or branching should be used. The length of the referenced segment is one possible criterion.



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- b. The writer's guide should be revised to indicate that specific, unambiguous information will be included in a reference or branch; e.g., the step number, the procedure title, and the procedure number.
 - c. The writer's guide should be revised to include an example of properly formatted reference, i.e., a reference that does not use "Procedure X."
11. The following problems regarding action steps were noted:
- a. The writer's guide should address the definition and format of the following types of action steps and should provide examples: verification steps, nonsequential steps, recurrent steps, time-dependent steps, concurrent steps, and diagnostic steps. See NUREG-0899, Section 5.7, for further information.
 - b. The writer's guide should specify that action steps will be sequenced according to two criteria: technical necessity (which is most important) and the physical layout of the control room.
12. The writer's guide should be revised to provide examples of a properly formatted figure and table.
13. The following problems related to procedure organization were noted:
- a. Because reference to an attachment interrupts the flow of information to operators and may result in confusion or delays, attachments should be used sparingly. The writer's guide should define the criteria use to determine the information that will be included in attachments.
 - b. The writer's guide should be revised to state that attachments will be identified by alpha/numeric indication in the order in which they are referenced in the text; that page identification information for attachments will be consistent with that used for instruction pages; and that the cover page will include the word "attachment," the attachment identifier, and a descriptive title of the attachment. Further, the writer's guide should explain how attachments will be located in the EOPs so that they can be easily identified and accessed by operators.



- c. Having to rotate pages in the middle of an instruction makes a procedure difficult to follow, increases delays, and may lead to operator error. Section 3.5.6, page 12, should state that page rotation will not be allowed.
14. Section 4.3.9, page 24, states that "calculations should be avoided." The writer's guide should discuss the operator aids that will be used instead of calculations.

With adequate resolution of the above items, the NMP1 writer's guide should accomplish the objectives states in NUREG-0899 and should provide adequate guidance for translating the technical guidelines into EOPs that will be usable, accurate, complete, readable, convenient to use, and acceptable to control room operators.

C. Verification and Validation Program

The description of the verification and validation program was reviewed to determine if it described acceptable methods for accomplishing the objectives stated in NUREG-0899. The verification program plan describes methods for confirming the technical accuracy and written correctness of the procedures. Revision 1 of this document was reviewed. The validation program plan describes methods for confirming the usability and operational correctness of the procedures. Revision 0 of this document was reviewed. The staff identified the following concerns:

1. SE Item C.2, Section 3.5, page 6, of the validation program plan states, "One normal shift of control room operators will be chosen to assist in EOP validation." The validation program should be revised to indicate that, during simulator exercises and control room walkthroughs, EOPs will be exercised with the minimum control room staff required by the Technical Specifications.
2. SE Item C.3, Section 3.2(2), page 4, of the validation program plan indicates that walkthroughs should be used to address any procedure steps that cannot be addressed in the simulator. The validation program plan should be revised to indicate that control room walkthroughs will be used when EOPs cannot be validated in the simulator.
3. SE Item C.4. Although the validation program includes a detailed list of the scenarios that will be used during initial validation, the validation program should include a commitment to use single failures, sequential multiple failures, and simultaneous multiple failures, during future simulator validation.



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4. The validation and verification programs should discuss the types of personnel that will be involved in verification and validation, their qualifications, the criteria for the selection of team members, and the role and responsibilities of each individual.

With adequate resolution of the above items, the NMP1 verification and validation program should accomplish the objectives stated in NUREG-0899 and should provide assurance that the EOPs adequately incorporate the guidance of the writer's guide and the technical guidelines.

D. Training Program

The description of the operator training program on the NMP1 upgraded EOPs was reviewed to determine if it described acceptable methods for accomplishing the objectives stated in NUREG-0899. The staff identified the following concerns:

1. SE Item D.2. Simulator and walkthrough training should occur with both the normal shift complement and Tech Spec minimum staffing.
2. SE Item D.4. Walkthroughs alone are not an adequate substitute for simulator exercise. Control room walkthroughs should be used in those situations where the simulator behaves differently from or does not correspond to the plant.

With adequate resolution of the above items, the NMP1 training program should accomplish the objectives stated in NUREG-0899 and should result in appropriate training for the NMP1 operators on the upgraded EOPs.

3. CONCLUSIONS

The staff concludes that, to adequately address the requirements stated in Generic Letter 82-33 (Supplement 1 to NUREG-0737) and provide acceptable methods for accomplishing the objectives stated in NUREG-0899 in accordance with the guidance provided in the Standard Review Plan NUREG-0800, Section 13.5.2), the revised PGP submitted by Niagara Mohawk Power Corporation for Nine Mile Point Unit 1 in letters from C.V. Mangan to the NRC, dated April 18, 1986 and March 3, 1987, should be revised to address the items described in Section 2 of this report. This revision need not be submitted to the NRC. For items in Section 2 that the licensee deems inappropriate for inclusion in its PGP, it should develop and maintain documented justification. NRR or Region I will confirm that all items described in this report have been adequately resolved by appropriate licensee action or justification in the course of routine or special inspections. Licensee implementation of commitments contained in the PGP may also be reviewed--deviations from commitments may result in enforcement action being taken by the NRC. Therefore, all revisions to the PGP should be reflected in plant EOPs within 180 days of the date of this letter. Future changes to the EOPs should be made in accordance with 10 CFR 50.59.

Dated:

PRINCIPAL CONTRIBUTOR

George W. Lapinski

