



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

PROCEDURES GENERATION PACKAGE

GPU NUCLEAR CORPORATION AND
JERSEY CENTRAL POWER & LIGHT COMPANY

OYSTER CREEK NUCLEAR GENERATING STATION

DOCKET NO. 50-219

1.0 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 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," represents the NRC 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 Generic Letter 82-33, "Supplement 1 to NUREG-0737 - Requirements for Emergency Response Capability." 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 of EOPs
- (iv) A description of the training program for the upgraded EOPs.

This report describes the review of the GPU Nuclear Corporation (GPUN) response to the generic letter related to development and implementation of EOPs (Section 7 of Generic Letter 82-33) for Oyster Creek Nuclear Generating Station (OCNGS).

Our review was conducted to determine the adequacy of the GPUN program for preparing and implementing upgraded EOPs for OCNGS. This review was based on NUREG-0800 (formerly NUREG-75/087), Subsection 13.5.2, Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants. Section 2 of this report briefly discusses the GPUN submittal, the NRC 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 procedure generation program for OCNCS has several items that must be satisfactorily addressed before the PGP is acceptable. GPUN should address these items in a revision to the PGP, or provide justification for why such 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 OCNCS administrative procedures and 10 CFR 50.59.

2.0 EVALUATION AND FINDINGS

In a letter dated July 29, 1983 from B. Fiedler (GPUN) to Darrell G. Eisenhut (NRC), GPUN submitted its PGP for OCNCS. The PGP contained an introduction and the following sections:

- Plant-specific Procedure Guidelines
- Verification and Validation Program for EOPs
- Training Program for Symptom Based EOPs

In a letter dated October 31, 1985, from Peter B. Fiedler (GPUN) to John A. Zwolinski (NRC), GPUN submitted the remaining portion of the PGP, the Emergency Operating Procedure Writer's Guide. The NRC staff review of the OCNCS PGP is documented in the following subsections.

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 OCNCS writer's guide is intended to provide administrative and technical guidance on the preparation and maintenance of all EOPs. Our review of the OCNCS writer's guide identified the following concerns:

1. Section 1.2 should explicitly state that the writer's guide will be precisely followed by the EOP writers and used in developing and revising the EOPs.
2. EOPs must be current to be usable. The writer's guide should describe a system that will ensure the EOPs are updated in a timely fashion when changes occur in plant design, in Technical Specifications, in the generic guidelines, in the writer's guide, in the control room, or in other plant procedures that affect EOPs.

3. Although Figure 1 depicts an acceptable cover page, no instructions are provided for the content or format of this information. Section 2.1 should be revised to address the revision date, number of pages, and the review and approval signatures.
4. Placekeeping aids (e.g., a checkoff blank next to an action step) can assist the operators in keeping track of their position within a procedure. These aids are of particular importance when performing concurrent steps or procedures, and in situations where the operator's attention is diverted. Figure 3 uses blank spaces before component listings, but their intent is unclear. The writer's guide should be expanded to include a discussion of some type of placekeeping aid.
5. Section 4.1 should provide guidance on action step wording (e.g., beginning each step with a verb) and limiting the actions to one per step. Note that Attachment 4 of the verification and validation program checks if each instruction is limited to a single action (Item 2).
6. Instructions should be written for various types of action steps that an operator may take to cope with different plant situations. Section 4.1 should therefore address the format of the following types of action steps.
 - a. Steps that are used to verify whether the objective of a task or sequence of actions has been achieved.
 - b. Steps for which a number of alternative actions are equally acceptable.
 - c. Steps of a continuous or periodic nature.
 - d. Steps performed concurrently with other steps.
 - e. Steps which provide a transition to another part of the procedure or to a different procedure.

See NUREG-0899, section 5.7, for additional information.

7. To ensure that the flow of information from procedures to operators is uninterrupted, the writer's guide should add the guideline that action steps, cautions, and notes should be complete on a page and not carried over to the next.
8. To minimize confusion, delay, and errors in execution of EOP steps, the following concerns should be addressed in the writer's guide:

- a. EOPs should be structured so that they can be executed by the minimum control room staffing required by the Technical Specifications.
- b. Instructions for structuring EOPs should be consistent with the roles and responsibilities of the operators.
- c. Action steps should be structured so as to minimize the movements of personnel around the control room while carrying out procedural steps.
- d. Action steps should be structured to avoid unintentional duplication of tasks.
- e. EOPs should be structured so that the control room supervisors will be able to follow staff actions and monitor plant status.

See NUREG-0899, Section 5.8, for additional information.

9. Conditional and logic statements are very important and widely used in EOPs. It is very important that writers understand the meaning of logic terms, and how they are used and combined to make logic statements. Section 4.2 does a fine job of explaining logic terms but should be expanded to include examples of acceptable and unacceptable combinations. See NUREG-0899, Appendix B, for additional information.
10. Notes and cautions provide operators with important supplemental information concerning specific steps or sequences of steps in the EOPs. Section 4.3 should define the emphasis techniques for the distinction between notes and cautions.
11. Section 4.5 explains how to refer the operator to another procedure and how to format that reference. Guidance should also be provided to assist the writer to decide when steps of a referenced procedure are to be included in the EOP rather than cross-referenced.
12. Section 4.6 notes that components, equipment, control panels, etc., that are referenced in EOPs are sometimes seldom used, remotely located, or difficult to locate. The writer's guide should state how to format the location information.
13. Section 4.7 should be revised to provide guidance on the format and content of flowcharts and to define the conditions under which they are to be used.
14. The correct use of punctuation can significantly increase the understandability of procedures. Section 5.2 discusses the use of hyphenation and gives examples of instances where words may

be hyphenated to prevent confusion with other words. Certain rules given in this section, 2.d and 2.f, do not reflect standard English usage, do not appear to make these words less confusing, and should be avoided.

15. Section 5.4 states that examples of acceptable verbs are listed in Table 1. Table 1 should be expanded to provide a complete listing of acceptable verbs and Section 5.4 should state that only verbs listed in Table 1 are to be used.
16. Abbreviations, letter symbols, and acronyms are discussed in Section 5.6. To ensure that they are used consistently and are recognizable by operators, the following items should be addressed:
 - a. Their use in the EOPs should be consistent with their use in the control room.
 - b. A list of acceptable abbreviations, letter symbols, and acronyms should be included in the writer's guide.
17. Because they will be used in stressful circumstances and under time constraints, it is important that an operator be able to quickly access the relevant EOPs or portions of EOPs. The writer's guide should address the availability and accessibility of EOPs.
18. It is important that the quality of EOP copies (e.g., legibility, completeness, color) approximates the quality of the original procedure to preclude operator difficulty in reading the EOPs. Section 7.0 should be expanded to address this point. See NUREG-0899, Section 6.2.2, for further information.

With adequate resolution of the above items, the OCNGS writer's guide should accomplish the objectives stated 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 OCNGS verification and validation program description consists of a set of relevant definitions, source documents, personnel responsibilities, the verification and validation process, and a set of rather comprehensive checklists to be used in the verification and validation process. Our review of the OCNGS verification and validation program description identified the following concerns:

1. The program description should state that the full complement of EOPs will undergo verification and validation.
2. Attachment 1, the checklist for written corrections, should be provided for review.
3. Particular attention should be paid to deviations from and additions to the generic technical guidelines that are of safety significance during the verification and validation program. The PGP should discuss how the deviations from and additions to the generic guidelines are to be verified and validated.
4. The validation program description states that simulator exercises and control room walk-throughs will be used, but does not state the conditions under which each will be used. The validation program should be revised to address the following:
 - a. The validation program should state that simulator exercises are the preferred validation method. The program should be expanded to include a description of the criteria that will be used to select the scenarios to be run during the validation process. The criteria should be developed on the basis of what is needed to validate the procedures and should ensure that single, sequential, and concurrent failures are included. A review of the capabilities and the limitations of the simulator will then identify what can be validated on the simulator.
 - b. For the parts of the EOPs that cannot be validated on the simulator, the criteria for selecting any additional validation that may be needed and the methods to be used, such as a control room walk-through or a mock-up walk-through should be described.
5. The EOPs will require a certain number of operators to carry out the various activities and steps as specified. The validation program description should indicate that the EOPs will be exercised, during simulator exercises or control room walk-throughs, with the minimum control room staff size required by the facility Technical Specifications.
6. GPUN states the revisions to EOPs will be subject to the verification and validation process. However, the verification and validation program should include the criteria or methods that will be used for determining the need to reverify and revalidate any changes in the EOPs, resultant from either the verification and validation program or from subsequent EOP revision.

7. The verification and validation program should determine whether the instruments and controls that were identified during the task analysis are the ones that are referred to in the EOPs, are available in the control room, readable, and usable. A discussion of this should be included in the PGP. (This task may be done in conjunction with the Control Room Design Review.)

With adequate resolution of the above items, the OCNCS 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 and will guide the operator in mitigating conditions.

D. Training Program

The description of the operator training program on the OCNCS EOPs was reviewed to determine if it described acceptable methods for accomplishing the objectives stated in NUREG-0899. The training program is described as consisting of classroom instruction, directed self-study, BWR simulator practice, and control room mockup/facility walk-throughs. Our review of the OCNCS training program description for EOPs identified the following concerns:

1. The PGP states that a "full-scope" BWR Simulator will be used for training. The training program should address the following:
 - a. Discuss the method to be used to train the operators in areas where the simulator does not react like the plant and in parts of the EOPs that cannot be run on the simulator. Under these situations, walk-throughs should be used for operator training.
 - b. Address the extent that all EOPs will be covered by all operators, particularly if walk-throughs will be used to train aspects of EOPs not taught in the simulator.
 - c. Indicate the use of a wide variety of scenarios, including multiple (simultaneous and sequential) failures, to fully exercise the EOPs on the simulator and in control room walk-throughs, thus exposing the operators to a wide variety of EOP uses.
 - d. Indicate that operators will be trained to use the EOPs as a team and that each operator will be trained in the role that he would be expected to take in an actual emergency.
2. The PGP should include a statement of commitment to train all operators on all EOPs prior to EOP implementation in the control room.

3. The training program lists a set of excellent behavioral learning objectives. In addition to these objectives it is recommended that two others be added. These are:
 - ° Trainees should demonstrate an understanding of the philosophy behind the approach to the EOPs, i.e., their structure and approach to mitigation.
 - ° Trainees should demonstrate an understanding of the mitigation strategy and technical bases of the EOPs.

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

3.0 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 PGP submitted by GPU Nuclear for Oyster Creek Nuclear Generating Station in letters to the NRC, dated July 29, 1983 and October 31, 1985, 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 a reasonable period of time. Future changes to the PGPs and EOPs should be made in accordance with 10 CFR 50.59.

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Dated: November 20, 1989