U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

OFFICE OF NUCLEAR REACTOR REGULATION

13.5.2.1 OPERATING AND EMERGENCY OPERATING PROCEDURES

REVIEW RESPONSIBILITIES

Primary - Equipment and Human Performance Branch (IEHB)

Secondary - Reactor Systems Branch (SRXB), Plant Systems Branch (SPLB)

I. AREAS OF REVIEW

The staff reviews the applicant's plan for development and implementation of operating procedures as described in the applicant's safety analysis report (SAR). This section of the SAR should describe the operating procedures that will be used by the operating organization (plant staff) to ensure that routine operating, off-normal, and emergency activities are conducted in a safe manner. It is not expected that detailed written procedures will be included in the SAR. It is recognized that development of detailed procedures and associated training materials may be beyond the scope of the application (e.g., for design certification) and then would be the responsibility of a combined license (COL) applicant referencing the certified design. The SAR should provide descriptions of the content and development process for procedures as detailed below, including preliminary schedules for preparation of procedures.

A. Procedure Classification

The SAR or other submittal should describe the different classifications of procedures the operators will use in the control room and locally in the plant for plant operations. The group within the operating organization having the responsibility for maintaining the procedures should be identified and the general format and content of the different classifications should be described. It is not necessary that each applicant's procedures conform precisely to the same classification since the objective is to ensure that procedures will be available to the plant staff to accomplish the functions contained in the

listing of Regulatory Guide 1.33. For example, some licensees prefer a classification of abnormal operating procedures, whereas others may use off-normal condition procedures. Examples of classifications follow:

1. System Procedures. Procedures that provide instructions for energizing, filling, venting, draining, starting up, shutting down, changing modes of operation, returning to service following testing (if not contained in the applicable testing procedure), and other instructions appropriate for operation of systems important to safety.

2. General Plant Procedures. Procedures that provide instructions for the integrated operations of the plant, e.g., startup, shutting down, shutdown, power operation and load changing, process monitoring, and fuel handling.

3. Off-Normal Condition Procedures. Procedures that specify operator actions for restoring an operating variable to its normal controlled value when it departs from its normal range or to restore normal operating conditions following a transient. Such actions are invoked following an operator observation or an annunciator alarm indicating a condition which, if not corrected, could degenerate into a condition requiring action under an emergency operating procedure (EOP).

4. Emergency Operating Procedures. Procedures that direct actions necessary for the operators to mitigate the consequences of transients and accidents that cause plant parameters to exceed reactor protection system or engineered safety features actuation setpoints.

5. Alarm Procedures. Procedures that guide operator actions for responding to plant alarms.

B. Operating Procedure Program

The SAR or other submittal should describe the applicant's program for developing the operating procedures (A.1-5 above). The staff will review the applicant's program for development and implementation of the operating procedures.

C. Emergency Operating Procedure Program

The SAR or other submittal (e.g., the procedures generation package [PGP]) should describe the applicant's program for developing emergency operating procedures (A.4 above) as well as the required content of the EOPs. The staff will review the applicant's program for development and implementation of the EOPs.

The procedure development program, as described in the PGP for EOPs, should be submitted to the NRC at least 3 months prior to the date the applicant plans to begin formal operator training on the EOPs. The PGP should include:

1. Plant-specific technical guidelines (P-STGs), which are guidelines based on analysis of transients and accidents that are specific to the applicant's plant design and operating philosophy. The submitted documentation of the P-STGs will provide the basis for, and include a reference to, generic guidelines, if used.

For plants not referencing generic guidelines, this section of the submittal should contain the action steps necessary to mitigate transients and accidents in a sequence that allows mitigation without first having diagnosed the specific event, along with all supporting analyses, to meet the requirements of TMI Action Plan Item I.C.1 (NUREG-0737 and Supplement 1 to NUREG-0737).

For plants referencing generic guidelines, the submitted documentation should include (1) a description of the process used to develop plant-specific guidelines from the generic guidelines, (2) identification of significant deviations from the generic guidelines (including identification of additional equipment beyond that identified in the generic guidelines), along with all necessary engineering evaluations or analyses to support the adequacy of each deviation, and (3) a description of the process used for identifying operator information and control requirements. Examples of significant safety deviations are provided in Subsection 3.3.2 to Appendix A to this Standard Review Plan (SRP) section.

2. A plant-specific writer's guide (P-SWG) that details the specific methods to be used by the applicant in preparing EOPs based on P-STGs.

3. A description of the program for verification and validation (V&V) of EOPs.

4. A description of the program for training operators on EOPs.

D. Review Interfaces

IEHB coordinates evaluations by other branches that involve the review of operating procedures as defined in A, above. If an applicant references or provides unreviewed technical guidelines as the basis for the plant-specific EOPs, IEHB will conduct an initial review of the guidelines. Assistance from other technical review branches will be obtained as necessary to perform a thorough review of the safety-significant deviations.

If unapproved guidelines incorporate significant technical changes from approved guidelines, SRXB may request technical review by the SPLB. SRXB and SPLB will develop requests for additional information, if necessary, and will provide safety evaluation (SE) input to IEHB.

II. ACCEPTANCE CRITERIA

Section 13.5.2.1 of the SAR provides additional evidence of the applicant's technical qualifications, and forms a basis for a key part of the regulatory inspection program. Acceptance is based on meeting the relevant requirements of 10 CFR 50.34 as indicated below. Additional guidelines listed in this subsection provide guidance to applicants for meeting basic requirements.

A. Operating Procedure Schedule

A generally acceptable target date for completion of operating procedures is about 6 months before fuel loading to allow adequate time for plant staff familiarization and to allow NRC staff adequate time to develop operator license examinations. The PGP for EOPs must be submitted not later than 3 months prior to the date formal operator training on EOPs is to begin.

B. Control Room and Plant Procedures

The regulations and staff guidelines applicable to operating procedures to be used in the control room and locally in the plant are as follows:

1. 10 CFR 50.34(a)(6) and (10) and 10 CFR 50.34(b)(6)(iv) and (v).

2. 10 CFR Part 50, Appendix B, Criteria V and VI, establish criteria for development, approval, and control of procedures for all activities affecting quality.

3. The review criteria for procedures in NUREG-0711, Chapter 9, "Element 8 - Procedure Development."

4. NUREG-0737, "Clarification of TMI Action Plan," Item I.C.1, "Guidance for the Evaluation and Development of Procedures for Transients and Accidents." (Emergency Operating Procedures Only)

5. Supplement 1 to NUREG-0737, TMI Action Plan Items I.C.1 and I.C.9, "Requirements for Emergency Response Capability," Item 7, Subsections 7.1 and 7.2, "Upgrade of Emergency Operating Procedures." (Emergency Operating Procedures Only)

6. The guidelines in the Regulatory Position section of Regulatory Guide 1.33.

7. The guidelines of ANSI/ANS 3.2-1982, Section 5.3.

8. Appendix A to Standard Review Plan, Section 13.5.2.1, "Guidelines for the Evaluation of Procedures Generation Packages." (Emergency Operating Procedures Only)

9. Supplement 1 to NUREG-1358, "Lessons Learned from the Special Inspection Program for Emergency Operating Procedures," 1992.

C. Technical Rationale

The technical rationale for application of these acceptance criteria to operating procedures is discussed in the following paragraphs:

1. Compliance with the requirements of 10 CFR 50.34(a)(6) and (10) and 10 CFR 50.34(b)(6)(iv) and (v) requires that the applicant include in the SAR preliminary plans for emergency organization, training, conduct of operations, and coping.

   Sections 50.34(a)(6) and (10) and 50.34(b)(6)(iv) and (v) of 10 CFR are applicable to this SRP section because they specify in general terms the information to be submitted in the SAR regarding the operating procedure program, an important part of the safe conduct of operations for emergency and nonemergency activities.

   Meeting these requirements provides assurance that the conduct of operations at the plant will be formalized with procedures covering normal and emergency activities. The planning and implementation of a procedure program will provide means for correct and standardized performance of activities important to safety.

2. Compliance with the requirements of 10 CFR Part 50, Appendix B, Criteria V and VI, requires that activities affecting quality be prescribed by documented instructions, procedures, and drawings and that measures be established to control issuance of and changes to these documents.

   Criteria V and VI are applicable to this section because they require an applicant to ensure that quality assurance considerations are an integral part of the operating procedure program governing the development of technical procedures, V&V, implementation, and document control relative to the safe operation of the facility under routine, off-normal, and emergency operating conditions.

   Meeting these requirements provides assurance that activities affecting quality will be satisfactorily controlled.

III. REVIEW PROCEDURES

Review of the SAR or other submittal in accordance with this section consists of a detailed comparison of the information submitted with the acceptance criteria of Subsection II above. The SAR review should encompass only the schedules for procedure development and determination that the applicant commits to follow the applicable regulatory guides and standards.

(The following paragraph is applicable to all operating procedures as described in Section I.A above)

Review the applicant's program for the development of operating procedures to ensure the application of accepted human factors principles and practices for the design of the operating procedures. Element 8 of NUREG-0711, "Procedure Development", describes an acceptable method for developing operating procedures which is an integral part of the human factors engineering (HFE) program. The HFE program is described more fully in Chapter 18 of the SRP.

(The following paragraph is applicable to EOPs only)

To supplement the expertise of the reviewer, especially in the human factors area, and to promote consistency among the PGP reviews, Appendix A identifies the subjects which should be considered by the reviewer in the evaluation. However, Appendix A is not a "checklist" and an acceptable PGP need not be address each item of Appendix A.

Normally the PGP review should be conducted prior to the date the applicant plans to begin formal operator training on the EOPs. If this is not possible because of a delayed submittal, perform an acceptance review of the PGP. Specifically, audit the four parts of the PGP to determine if there are any major deficiencies in the EOP program that warrant postponing operator training. If major deficiencies are found, identify the additional information necessary to conduct the complete PGP review to the Licensing Project Manager so that the applicant can be notified prior to the initiation of training.

Review the PGPs to determine if the applicant's program meets the requirements of Generic Letter 82-33. The review consists of the evaluation of the four parts of the PGP: the P-STGs, the P-SWG, the description of the program for V&V, and the description of the training program necessary to support the conclusions described in Subsection IV below. To support this review, Appendix A provides additional review guidance.

Review the P-STGs to determine if acceptable analyses of accidents and transients and development of technical guidelines for operator actions applicable to the plant have been completed, and to determine if an acceptable process for identifying operator information and control needs has been described. The Human Factors Engineering Program Review Model (HFE PRM), as described in NUREG-0711, provides additional guidance on review of applicant procedure development programs. It is expected that most applicants will reference generic technical guidelines.

For an applicant using approved generic technical guidelines as the basis for its P-STGs, the major portion of the review of the technical guidelines has been accomplished generically. Staff SERs approving for use each of the four owners groups' generic technical guidelines have been published and may be supplemented as guidelines are revised. The review of this type of P-STGs should focus on the process described for converting generic technical guidelines into plant-specific procedures to ensure that the safety-significant deviations from the generic guidelines are controlled. The evaluation should include the technical adequacy of the identified plant-specific deviations. Finally, the process should be evaluated for development of the plant-specific information and control requirements necessary to use the EOPs.

The review of identified safety-significant deviations from generic technical guidelines will be conducted to the same level of detail as the generic technical guidelines. Examples of safety-significant deviations are given in Appendix A, Subsection 3.3.2. Assistance from other technical review branches will be obtained as necessary to perform a thorough review of the safety-significant deviations. Only safety-significant deviations need to be reviewed. However, the reviewer will determine that the applicant's program will control this process so that the work is auditable. It is expected that most applicants will control the process by documenting all deviations.

Since B&W plant owners elected to use a lead plant concept rather than generic technical guidelines, each B&W applicant's identified deviations from the lead plant's (Oconee's) guidelines will be reviewed.

For applicants not referencing generic technical guidelines, ensure that the submittal includes analysis of accidents and transients in accordance with the guidance of NUREG-0660, 10 CFR 50.34(f)(2)(ii), and NUREG-0737, Items I.C.1 and I.C.9. To do this, (1) become familiar with the integrated performance of the NSSS and balance-of-plant systems, (2) evaluate the completeness of the accident and transient analyses, (3) evaluate the use of appropriate models, calculational methods, and plant data, (4) consider audit calculations of selected accidents and transients (assistance from other technical review branches required), (5) evaluate the adequacy of the applicant's program to develop guidelines from the analysis of accidents and transients, (6) test the guidelines against scenarios, including multiple failures, and (7) evaluate the information and control needs of the operators to execute the instructions of the guidelines. NUREG-0711 provides guidance on analyses appropriate for human-system interaction requirements. (Refer to Chapter 18 for additional information.)

The P-SWG review will consider the adequacy of the methods of presentation of the technical information in the EOPs to ensure that the EOPs are complete, accurate, consistent, and easy to understand and follow for the intended users (e.g., control room operators, shift supervisors, and auxiliary operators). Review the P-SWGs by evaluating the applicant's methods for meeting the overall writer's guide objectives stated in NUREG-0899 and the objectives of NUREG-0711, Chapter 9, "Procedure Development," and criteria described in Appendix B of NUREG-1358, Supplement 1. Appendix A provides guidance to assist the reviewer in making this evaluation. This guidance is not to be used as a set of strict criteria, but is to be used as an aid in the overall evaluation of the P-SWG. Because strict criteria do not exist for the human factors evaluation, the reviewer must make a professional judgment regarding the adequacy of the applicant's methods as described in the P-SWGs.

Review the V&V and training programs by comparing the program descriptions with the objectives of NUREG-0899 and NUREG-0711.

The level of effort for these PGP reviews will vary significantly. For example, the effort necessary to review the P-STGs will vary depending on the number, complexity, and significance of the plant-specific deviations from the approved generic technical guidelines.

If the review of the PGP does not yield sufficient information to support the conclusions of the Evaluation Findings section, the reviewer should obtain at least one EOP for review. As a product of the PGP program, the EOP or EOPs would then be additional information for judging the program's acceptability and will provide additional information as to how the applicant's EOP development and implementation program should be modified to ensure that it contains sufficient information to assure acceptability of the resulting EOPs.

When the reviewer has determined that each of the criteria of Subsection II has been satisfied based upon the statements made by the applicant in the SAR, the review of Section 13.5.2.1 is complete.

For standard design certification reviews under 10 CFR Part 52, the procedures above should be followed, as modified by the procedures in SRP Section 14.3, to verify that the design set forth in the standard safety analysis report, including inspections, tests, analysis, and

acceptance criteria (ITAAC), site interface requirements, and combined license action items, meets the acceptance criteria given in Subsection II. SRP Section 14.3 (proposed) contains procedures for the review of certified design material (CDM) for the standard design, including the site parameters, interface criteria, and ITAAC.

IV. EVALUATION FINDINGS

The reviewer verifies that the information presented and the review support the following type of conclusion, to be used in the staff's safety evaluation report:

> The applicant's program for operating procedures as described in the SAR is in accordance with 10 CFR 50.34, Regulatory Guide 1.33, and ANSI/ANS 3.2-1982, Section 5.3, and is acceptable. The staff reviewed the applicant's program for development of operating procedures and reached the following conclusions:
>
> 1. With respect to technical guidelines:
>
>   (a) The operating procedures will be based upon acceptable technical-guidance-derived plant design bases, system-based technical requirements and specifications, task analysis results, and critical human actions identified in the HRA/PRA.
>
>   (b) The EOPs will be based upon acceptable technical guidelines derived from approved analyses of transients and accidents.
>
>   (c) Implementation of the applicant's described methods for conducting an analysis of the operator's tasks should result in the identification of the instrumentation and controls necessary to perform the tasks specified in the technical guidelines.
>
> 2. With respect to writer's guidance:
>
>   (a) The writer's guide or guides provides sufficient information to help ensure that operating procedures, including EOPs, developed using technical guidelines will be complete, accurate, consistent, and easy to understand and follow.
>
>   (b) The methods described by the writer's guide appear sufficient to support upgrading of the operating procedures, including EOPs, and to ensure long-term consistency within and among these procedures.
>
> 3. Implementation of the described V&V program provides adequate assurance that the operating procedures, including EOPs, are technically correct and useable, follow the applicable writer's guide correspond to the control room/plant hardware, and are compatible with the minimum number, qualifications, training, and experience of the operating staff.
>
> 4. Implementation of the described training program should result in the operator understanding the philosophy behind the approach to the operating procedures, including EOPs, understanding the mitigative strategy of the EOPs and technical

basis of the operating procedures, having a working knowledge of the technical content of the operating procedures, including EOPs, and having the capability to execute the operating procedures, including EOPs, under operational conditions.

The evaluation findings for this section should also include the following:

1. A statement that the applicant has committed to operate the plant in accordance with written and approved procedures.

2. A brief description of the categories of procedures to be included.

3. A description of the review conducted to ensure that to NUREG-0737, Supplement 1, Item 7, "Upgrade of Emergency Operating Procedures," has been implemented.

For design certification reviews, the findings will also summarize, to the extent that the review is not discussed in other safety evaluation report sections, the staff's evaluation of inspections, tests, analyses, and acceptance criteria (ITAAC), including design acceptance criteria (DAC), site interface requirements, and combined license action items that are relevant to this SRP section.

V. IMPLEMENTATION

The following is intended to provide guidance to applicants and licensees regarding the NRC staff's plans for using this SRP section.

This SRP section will be used by the staff when performing safety evaluations of license applications submitted pursuant to 10 CFR Part 50 or 10 CFR Part 52 and applications for modifications to systems or functions pursuant to 10 CFR 50.59. Except when the applicant proposes an acceptable alternative method for complying with specified portions of the Commissions' regulations, the method described herein will be used by the staff in its evaluation of conformance with the Commission regulations.

The provisions of this SRP section apply to reviews of applications docketed 6 months or more after the date of issuance of this SRP section.

Implementation schedules for conformance to parts of the methods discussed herein are contained in the referenced regulatory guidesand NUREGS.

The staff will use this SRP for judging the acceptability of an applicant's operating procedure program, including the EOP [PGP] program, as described in submittals made in accordance with Supplement 1, NUREG-0737, "Requirements for Emergency Response Capability" (Generic Letter 82-33). The review guidance in this SRP section replaces the review guidance in Generic Letter 82-33.

It is recognized that development of detailed procedures and associated training materials may be beyond the scope of design certification and therefore would be the responsibility of an applicant referencing the certified design.

VI. REFERENCES

1. 10 CFR 50.34, "Contents of Applications; Technical Information."

2. 10 CFR Part 52, “Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants.”

3. NUREG-0660, “NRC Action Plan Developed as a Result of the TMI-2 Accident,” 1980.

4. NUREG-0711, “Human Factors Engineering Program Review Model,” 2002.

5. NUREG-0737, “Clarification of TMI Action Plan Requirements,” 1980.

6. NUREG-0737, Supplement 1, “Requirements for Emergency Response Capability,” 1983 (Generic Letter 82-33, December, 1982).

7. NUREG-0899, “Guidelines for Preparation of Emergency Operating Procedures,” 1982.

8. Generic Letters 83-05, 83-22, 83-23, and 83-31, Staff Safety Evaluation Reports for Generic Technical Guidelines for GE, CE, W, and B&W plants, respectively.

9. Regulatory Guide 1.33, “Quality Assurance Program Requirements (Operation).”

10. Regulatory Guide 1.70, “Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants.”

11. ANSI/ANS 3.2 1982, “Standard for Administrative Controls for Nuclear Power Plants,” American National Standards Institute.

12. NUREG-1358, “Lessons Learned From the Special Inspection Program for Emergency Operating Procedures,” 1989.

13. NUREG-1358, Supplement 1, “Lessons Learned From the Special Inspection Program for Emergency Operating Procedures,” 1992.

Appendix A to SRP Section 13.5.2.1

REVIEW PROCEDURES FOR THE EVALUATION OF PROCEDURES GENERATION PACKAGES

1.0 Background

In August of 1982, NUREG-0899, "Guidelines for the Preparation of Emergency Operating Procedures," was published. This document is designed to "identify the elements necessary for licensees and applicants to prepare and implement Emergency Operating Procedures (EOPs) that will provide the operator with directions to mitigate the consequences of a broad range of accidents and multiple equipment failures." In addition to identifying these elements, the document also outlines the process by which licensees and applicants should develop, implement, and maintain EOPs. To ensure that the elements are addressed in the new or upgraded procedures and that acceptable processes of development, implementation, and maintenance are used, the staff identified a method of review that is intended to provide confidence that EOPs written or upgraded according to a given plant's program would be acceptable. The NRC staff believes that it is more important that licensees and applicants ensure that the process used to generate procedures and the technical basis for the procedures are sound and well documented, than to perform a one-time review of EOPs, with no assurance that future EOP revisions will be technically adequate and consistent with existing EOPs. With this approach, responsibility for the generation and review of the EOPs, as well as future revisions to EOPs, is retained by the licensee.

In NUREG-0899, four aspects of EOP development and implementation are identified as providing an adequate basis for review. These are (1) plant-specific technical guidelines (P-STGs); (2) a plant-specific writer's guide; (3) a description of the program for verification and validation of the EOPs; and (4) a description of the program for training operators on the EOPs. Information on each of these items is to be provided in the procedures generation package (PGP). The PGP for each plant will provide the licensee with a technical and human factors basis for developing its EOPs and for making future revisions to its EOPs.

The formal requirement for submitting this package is provided in Supplement 1 to NUREG-0737, "Requirements for Emergency Response Capability" (Generic Letter No. 82-33).

In 1994, NUREG-0711, "Human Factors Engineering Program Review Model" (HFE PRM), was published. The HFE PRM, described more fully in SRP Chapter 18, contains guidance on reviewing human factors engineering program elements, including procedure development (Chapter 9). The HFE PRM addresses technical procedures, including abnormal and emergency procedures, and seeks to ensure that an "applicant's procedure program will result in procedures that support and guide human interaction with plant systems and control plant-related events and activities." Therefore it is important that human-system interaction issues be considered in the development of all procedures, including all operating procedures (described in I.A of SRP Section 13.5.2.1) to be used within the control room and locally in the plant, including emergency operating procedures (EOPs).

The guidance contained here in SRP Section 13.5.2.1, Appendix A, specifically addresses EOPs. Emergency operating procedures are particularly important for safety in nuclear power plant operation. However, it should be recognized that all technical procedures need to be developed to assist personnel in performing tasks. Elements to consider more broadly can be

found in NUREG-0711. Other documents that may be used as guidance in the review of procedures include those referenced in the References section of this appendix.

The purpose of this document is to provide guidance for reviewers during their evaluation of PGPs. The PGP is expected to contain specific information in each of its four parts. The review guidance below is divided into general objectives and specific review guidelines. The listing of review guidelines represents what the staff believes should be considered by reviewers in determining if the general objectives are met. Because each of the objectives can be adequately addressed in many ways and may be satisfied without addressing each of the review guidelines, it will often be necessary for reviewers to use their expert judgment in determining the acceptability of a particular submittal. The general objectives and supporting documents such as NUREG-0899 and NUREG-1358, Supplement 1, should be used as guidance in making these judgments. The methods provided in NUREG-0899 and in Appendix B to NUREG-1358, Supplement 1, are an acceptable approach for preparing EOPs. It should be recognized, however, that approaches other than those found in these documents may be acceptable, and reviewers will need to use their judgment in determining the adequacy of the PGP.

As described in the SRP, all PGPs will be reviewed by the staff. The review guidelines presented in Subsections 3 through 6 of this appendix provide additional assistance to the reviewers. All applicants have the option of providing a justification for their approach where they disagree with a staff position. When all issues are resolved or when the schedule dictates, the reviewer will prepare a safety evaluation report (SER).

2.0 General Guidance to Reviewers

The guidance that follows is provided to assist the reviewer in using the criteria presented in Subsections 3 through 6 of this appendix.

2.1 Reviewers should be aware that different degrees of objectivity (and thus, subjectivity) may be required in reviewing each of the four parts of the PGP since the parts may differ in detail and approach.

2.2 Reviewers should become very familiar with the general objectives associated with each section of a PGP. The specific review guidelines can serve as the basis for making the subjective evaluations of the general objectives.

2.3 When an objective is not met or a specific response cannot be judged acceptable because of missing information, the reviewer should identify the information that is missing and what is needed to make the PGP acceptable.

2.4 Some items included in a PGP may not be addressed within either the general objectives or the specific review guidelines. These items must be evaluated carefully to ensure that unnecessary or possibly detrimental inclusions do not occur in the EOPs (e.g., an EOP Deficiencies section is not a desirable inclusion in an EOP).

2.5 As stated in the Background section, most of the review guidelines are subjective in nature. The reviewer will have to judge whether the discussion of an item is sufficiently clear, complete, and technically acceptable to achieve the objectives.

2.6 In some instances the language (i.e., names, titles, etc.) used in the PGPs may be different from that used in this document, although the same subjects or items are being discussed. For example, the format of "decision aids" may be covered under a PGP section with the heading, "Job Performance Aids." Reviewers should be careful that identified PGP deficiencies are not based on semantics.

2.7 In some instances a particular subject may appear not to be addressed in the PGP, when in fact it is addressed in another part of the PGP. For example, the determination of the adequacy of control room instrumentation and controls may not be addressed in the P-STGs, but included as a part of the validation and verification program. Reviewers must therefore become familiar with the general objectives and specific review guidelines as a whole so that these situations can be readily identified.

3.0 Plant-Specific Technical Guidelines

3.1 General Discussion

All licensees and applicants are required to submit P-STGs. These guidelines may be based on (1) generic technical guidelines (prepared by the owners group), or (2) a plant-specific reanalysis of transients and accidents as described in TMI Action Plan Item I.C.1. In either case, the P-STGs should be based on the identification of plant systems and functions, and be supported by an analysis of operator tasks to identify operator information and control needs. Among the four approved generic technical guidelines, operator task information is provided using different levels of detail. If generic technical guidelines are referenced, the need for additional task specification will be different depending upon the level of task information provided by the generic technical guidelines and the nature of deviations from the guidelines.

The information to be submitted in the PGP as P-STGs is dependent on whether or not generic technical guidelines are used, as well as the degree to which plant-specific characteristics (e.g., equipment) are consistent with the plant on which the generic technical guidance is based.

Some of the "deviations" that must be addressed as part of the P-STG submittal are differences between the generic technical guidelines and the P-STGs. This includes differences due to plant initiatives and those identified in the generic guidelines as "plant-specific" items. Only differences that are safety significant, e.g., related to systems functions, or methods, should be reviewed. Subsection 3.3.2 provides examples of other deviations that must also be addressed. Where an applicant does reference NRC-approved generic technical guidelines, the applicant should not submit those guidelines. However, safety-significant deviations from the mitigative strategy should be described. Furthermore, applicants using generic guidelines need not submit the detailed action steps. The process for developing the action steps from the generic guidelines should be described. Applicants not using generic guidelines should submit, as a part of the P-STGs, the action steps necessary to mitigate transients and accidents, and supporting technical analysis and bases. The P-STGs should have an orientation that allows mitigation without event diagnosis. In either case, the applicant should submit a description of how operator information and control needs were derived and used to specify instrumentation and control requirements.

The guidance presented below identifies elements reviewers should consider in determining acceptability of P-STGs.

3.2 General Technical Objectives

The purpose of the review of the technical guidelines submittal is to determine that the following general objectives are adequately addressed. Specific evaluation elements are identified in Subsections 3.3 and 3.4.

3.2.1 The EOPs will be based on acceptable technical guidelines derived from approved analyses of transients and accidents as described in NUREG-0660, Items I.C.1 and I.C.9, as clarified by Item I.C.1 in NUREG-0737 and Supplement 1 to NUREG-0737. The P-STGs, the generic guidelines (if referenced), and supporting documentation provide EOP writers with all the technical information necessary for preparing EOPs which direct operators' actions to mitigate the consequences of transients and accidents without a need to first diagnose an event to maintain the plant in a safe condition (function orientation).

Part of the acceptability of the P-STGs is that the P-STGs are validated by the applicant using methods acceptable to the reviewer (see NUREG-0899, Sections 2.6 and 4.2).

3.2.2 The PGP describes an adequate method to identify information and control needs and to provide a basis for identifying control room instrumentation and controls necessary to perform the tasks specified in the technical guidelines.

3.3 Specific Review Guidelines - Plants Using NRC-Approved Generic Technical Guidelines

To determine that the applicant's PGP adequately accomplishes the above objectives, the reviewer should consider the following:

3.3.1 P-STG development

3.3.1.1 Approved version of generic technical guidelines indicated

3.3.1.2 A description of the process used to translate the generic technical guidelines into the P-STGs

3.3.2 Deviations and additions

3.3.2.1 Identification of safety-significant deviations from the NRC-approved generic technical guidelines. The following are examples of deviations that should be considered:

a. any modification to the mitigative strategy of the generic technical guidelines (e.g., for a Westinghouse plant, depressurizing the RCS following a steam generator tube rupture without first having conducted a limited cooldown in accordance with the guidelines to establish a margin to saturation)

b. differences in equipment operating criteria (e.g., RCP trip criteria, SI injection termination criteria)

c. differences in equipment operating characteristics (i.e., between the plant-specific equipment and that assumed in the generic analyses, such as SI that can be throttled vs. only on/off)

d. identification of methods and equipment used to address the technical areas of the generic guidelines that are specified as "plant-specific"

e. plant-specific setpoints or action levels that are calculated or determined in a manner other than specified in the generic technical guidelines

NOTE: Plant-specific setpoints (e.g., setpoints associated with automatic initiation of ECCS) called for by the generic guidelines need not be included in the P-STG submittal.

f. actions that are taken in addition to those specified in the generic guidelines and that affect the mitigative strategy

1. differences that affect the equipment's ability to adequately provide the necessary mitigative function

2. use of different instruments or control parameters than those specified in the generic technical guidelines or determination of instrumentation and control characteristics in a manner different than, or with a different basis than, that specified in the generic technical guidelines

3.3.2.2 Identification of items not covered by the NRC-approved generic technical guidelines (e.g., plant-specific conditions, equipment, operations, or [bracketed] information from the generic technical guidelines that relate to systems, functions, or methods)

3.3.2.3 Indication that the safety-significant deviations and additions have been identified and technically justified

NOTE: The reviewer has the option of either reviewing the complete P-STGs with associated technical justification or reviewing only the identified deviations from generic technical guidelines, including technical justification consistent with the Generic Letter 82-33 requirements.

3.3.3 Technical adequacy of operator actions (not covered by, or deviations from, the generic technical guidelines)

NOTE: The evaluation of the technical adequacy of operator actions (i.e., that the procedures will work) may be addressed in the validation and verification sections of the PGP (i.e., at the completion of EOP development rather than

during EOP development). The P-STG portion of the PGP should describe how the licensee will determine if the approach taken is effective in mitigating transients and accidents.

3.3.3.1 Description of the verification and validation of operator actions (to determine their technical adequacy)

3.3.4 Applicant's determination of the need for and the adequacy of control room instrumentation and controls for emergency operations

3.3.4.1 Description of the method used to determine information and control needs of the operators (function and task analysis)

NOTE: The determination of the adequacy of control instrumentation and controls may be addressed in the validation and verification sections of the PGP (i.e., at the conclusion of EOP development rather than during EOP development). For the P-STGs, adequacy of control room instrumentation and controls means that the available instrumentation and controls have been evaluated against the information and control needs of the operators and it has been determined that the parameters are correct and that the instrument and control characteristics (e.g., instrument range, units, precision, rate, and setpoints; control type, function, rate, gain, and response) meet the needs identified.

3.3.4.2 Description of the method used to determine if the control room instrumentation and controls meet the information and control needs of the operators

3.4 Specific Review Guidelines - Plants Not Using Generic Guidelines

The review of the P-STGs for plants not referencing generic guidelines will be performed using a methodology similar to that used to evaluate the acceptability of the owners group guidelines. The reviewer should evaluate analyses submitted to support proposed accident recovery strategies, including any analytical models. Improvements in accident recovery techniques should be encouraged; however, in the review of alternate strategies, the reviewer should obtain from the applicant sufficient technical bases to demonstrate that the plant remains within its SAR licensing basis envelope (for licensing basis events).

The reviewer evaluates the effects of, and resulting recovery strategies, for transients and accidents, using the guidance available in NUREG-0737. The P-STG reviewer should consider the following:

3.4.1 Analysis of transients and accidents (consistent with requirements of NUREG-0660 and NUREG-0737)

NOTE: The steps to be taken for this review are contained in the Review Procedures, SRP Section 13.5.2.1.

3.4.2 Validation of technical adequacy of operator actions

NOTE: The evaluation of the technical adequacy of operator actions (i.e., that the procedures will work) may be addressed in the validation and verification sections of the PGP (i.e., at the completion of EOP development rather than after P-STG development). The P-STG portion of the PCP should describe how the applicant will determine if the approach taken is effective in mitigating transients and accidents.

3.4.2.1 Description of the validation or verification of operator actions

3.4.3 Determination of the need for and the adequacy of control room instrumentation and controls for emergency operation

3.4.3.1 Description of the method used to determine information and control needs of the operators

NOTE: The determination of the adequacy of control room instrumentation and controls may be addressed in the validation and verification sections of the PGP (i.e., at the conclusion of EOP development rather than after P-STG development) or in the part of the SAR addressing the human factors engineering of plant systems (SRP Chapter 18). For the P-STGs, adequacy of control room instrumentation and controls means that the available instrumentation and controls have been evaluated against the information and control needs of the operators and it has been determined that the parameters are correct and that the instrument and control characteristics (e.g., instrument range, units, precision, rate, and setpoints; control type, function, rate, gain, and response) meet the needs identified.

3.4.3.2 Description of the method used to determine if the control room instrumentation and controls meet the information and control needs of the operators.

4.0 Review of the Plant-Specific Writer's Guide

4.1 General Discussion

Applicants are required to submit a writer's guide that details the specific methods to be used in preparing EOPs which are based on the P-STGs. NUREG-0899 provides the objectives and purpose of the writer's guide. Appendix B of NUREG-1358, Supplement 1, provides additional criteria useful in developing a writer's guide. Because of the variety of available technical writing style guides and other references pertaining to the presentation of information, the specific information found in the writer's guide is expected to vary considerably among plants. To supplement the human factors expertise of the reviewer, review guidelines are provided that address instructions and guidance expected to be found in writer's guides. In addition, the writer's guide should contain general, philosophical standards and information which would assist the writers in preparing the EOPs.

4.2 General Writer's Guide Objectives

The purpose of the evaluation is to determine if acceptable methods are described for accomplishing the following general objectives.

4.2.1 The writer's guide provides sufficient information for using the P-STGs to develop EOPs , which are useable, accurate, complete, readable, convenient to use, and acceptable to control room personnel.

4.2.2 The writer's guide supports upgrading of the procedures and long-term consistency within and between procedures.

4.3 Specific Review Guidelines

The number in parentheses following each element designates the specific section within NUREG-0899 where the element is addressed.The items with asterisks may appear in a procedure at the discretion of the applicant. If they are used in the EOPs, they should be addressed in the writer's guide and considered in the review. Where a sample procedure is submitted as a part of the writer's guide, the reviewer should verify that any nonrequired element included in the procedure is addressed in the writer's guide.

To determine that the applicant's PGP includes methods which appear adequate to accomplish the above objectives, the reviewer should consider the following:

4.3.1 Organization, content, and format of major sections of the EOPs (5.5)

4.3.1.1 Cover page (5.4.1)

4.3.1.1 Table of contents* (5.4.2)

4.3.1.3 Scope statement (5.4.3)

4.3.1.4 Entry conditions (5.4.4)

4.3.1.5 Automatic actions* (5.4.5)

4.3.1.6 Content and format of operator action steps, including (a) simple action steps, (b) steps which verify an action, (c) steps of continuous or periodic concern/applicability, (d) steps for which a number of alternative actions are equally acceptable, (e) steps performed concurrently with other steps, and (f) steps which lead the operator to the appropriate subsection of the EOPs (5.4.6, 5.4.7, 5.7, 5.8)

4.3.1.7 Figures and tables* (5.4.8 and 5.5.8)

4.3.1.8 Flowcharts and decision aids* (5.4.8 and 5.5.9)

4.3.1.9 EOP page identifying information, including title, procedure number, revision number and date, number of pages, unit designation (if

applicable), facility designation, and location of identifying information in the EOP (5.5.1)

4.3.1.10 Page layout, including margins, line spacing, and steps complete on page (5.5.2)

4.3.1.11 Warnings (or cautions) and notes, including placement, definitions, emphasis and format, and complete on one page (5.3, 5.7.9, 5.7.10)

4.3.1.12 Placekeeping aids (5.5.4)

4.3.1.13 Emphasis techniques (5.5.6)

4.3.1.14 Divisions, headings and numbering of pages and steps (5.5.5)

4.3.2 Writing Style (5.6)

4.3.2.1 A vocabulary list - words to use, with definitions, and words to avoid (5.6.1)

4.3.2.2 A list of abbreviations, acronyms, and symbols, and label consistency between procedures and control room (5.6.2)

4.3.2.3 Sentence structure and limit on actions per step (5.6.3)

4.3.2.4 Punctuation (5.6.4)

4.3.2.5 Capitalization (5.6.5)

4.3.2.6 Units of measure in the action steps and in the tables and figures should be consistent with presentation of information in the control room (5.6.6).

4.3.2.7 Numerals, including type, use of decimals and significant digits (5.6.7)

4.3.2.8 Tolerances (5.6.8)

4.3.2.9 Formulas and calculations* (5.6.9)

4.3.2.10 Titles/nomenclature of instrumentation and controls (what information to provide in the procedure and in what format) (5.6.2)

4.3.3 Conditional and logic statements, including format, style, emphasis; definition and use of logic terms; and logic terms and sequences to avoid (5.6.10 and Appendix B)

4.3.4 Referencing other procedures, sections of procedures or subprocedures, and specific steps of procedures (5.2.2 and 5.5.7)

4.3.4.1 Content and format of reference (5.2.2)

4.3.4.2 The criteria used to determine when steps of a referenced procedure are to be included in an EOP (to minimize cross-referencing) (5.2.2).

4.3.4.3 Method for identifying sections or subsections (e.g., use of tabbing) (5.5.7 and 6.1.4)

4.3.5 When and how to present location Information (equipment, controls and displays) (5.7.11)

4.3.6 Control Room Staffing and Division of Responsibilities (5.8)

NOTE:This section addresses the need to consider operating crew staffing and responsibilities during the process of developing EOPs to help ensure efficient and effective implementation of EOPs during an emergency. Deficiencies in this regard may be identified by the applicant during validation or verification of the EOPs. Subsection items 4.3.6.1 through 4.3.6.4 may therefore be addressed under validation and verification.

4.3.6.1 Structuring of EOPs to ensure that minimum staffing can execute the EOPs

4.3.6.2 Designating the operators' responsibilities in implementing EOPs (i.e., each operator will know what he or she has to do during an emergency; it is not necessary to specify roles in PGP or EOPs)

4.3.6.3 Sequencing action steps to minimize physical interference between operators

4.3.6.4 Sequencing action steps to avoid their unintentional duplication by operators

4.3.7 Use and maintenance of EOPs, including accessibility and quality of copies (6.0)

4.3.8 Statement of commitment to use writer's guide in developing and revising the EOPs

5.0 Program for Validation and Verification

5.1 General Discussion

All applicants must submit a description of their programs for validating and verifying their EOPs. NUREG-0711, Element 10, Human Factors Verification and Validation, provides additional guidance on the development of a verification and validation program. Both technical and human factors aspects of the EOPs are addressed by validation and verification activities, and submittals may integrate the two aspects under a given evaluation scheme. For these reasons reviewers will have to exercise considerable judgment in their review of the submittals. The evaluation elements for validation and verification were drawn from the six objectives

identified in NUREG-0899 (Subsection 3.3.5.1). These objectives, which are repeated below, should serve as the general basis for determining the acceptability of the validation and verification programs reviewed.

5.2 General Objectives

The purpose of evaluating the validation and verification program is to ensure that the following general objectives are met. A listing of specific evaluation elements is provided in Subsection 5.3.

5.2.1 EOPs are technically correct, i.e., they accurately reflect the technical guidelines.

5.2.2 EOPs are written correctly, i.e., they accurately reflect the plant-specific writer's guide.

5.2.3 EOPs are useable, i.e, they can be understood and followed without confusion, delays, errors, etc.

5.2.4 There is a correspondence between the procedures and the control room/plant hardware, i.e., controls, equipment, and indications that are referenced are available (inside and outside of the control room), use the same designations, use the same units of measurement, and operate as specified in the procedures.

5.2.5 The language and level of information in the EOPs are compatible with the minimum number, qualifications, training, and experience of the operating staff.

5.2.6 There is a high level of assurance that the procedures will work, i.e., the procedures guide the operator in mitigating transients and accidents

5.3 Specific Validation and Verification Review Guidelines

To aid the reviewer in the evaluation of the validation and verification program, the reviewer should consider the following review guidelines:

5.3.1 The applicant should Indicate the methods that will be used to meet each of the objectives (as specified in Subsection 5.2 above) of the validation and verification program; the specific combination of methods for meeting each objective should be identified by the applicant so that the reviewer has assurance that the objectives of the overall validation and verification program are met. In the staff's judgment, the following combination of methods should be used to meet each of the objectives:

5.3.1.1 Whether the EOPs are technically correct (i.e., whether they accurately reflect the technical guidelines) should be evaluated by a combination of the following methods: (a) desk-top review, and (b) seminars, workshops, operating team review, and computer modeling/analysis.

5.3.1.2 Whether the EOPs are written correctly (i.e., whether they accurately reflect the [approved] plant-specific writer's guide) should

be evaluated by a combination of the following methods: (a) desk-top review, and (b) seminars, workshops, and operating team review.

5.3.1.3 Whether there is a correspondence between the procedures and the control room/plant hardware (i.e., controls, equipment, and indications that are referenced are available inside and outside the control room, use the same designations, and the same units of measurement, and operate as specified in the procedures) should be evaluated by a combination of the following methods: (a) seminars, workshops, and operating team review, (b) control room walkthroughs (static), and (c) simulation (if plant-specific) (static).

5.3.1.4 Whether the EOPs are usable (i.e., they can be understood and followed without confusion, delays, errors, etc.) for the given level of qualifications, training, and experience of the control room staff, should be evaluated by a combination of the following methods: (a) seminars, workshops, and operating team review, (b) simulator exercises, and (c) control room walkthroughs (dynamic).

5.3.1.5 Whether the language and level of information presented in the EOPs are compatible with the minimum control room staffing and the qualifications, training, and experience of the control room staff should be evaluated by a combination of the following methods: (a) desk-top review, (b) seminars, workshops, and operating team review, (c) simulator exercises, and (d) control room walkthroughs (dynamic).

5.3.1.6 Whether there is a high level of assurance that the procedures will work (i.e., the procedures guide the operator in mitigating transients and accidents) should be evaluated by a combination of the following methods: (a) desk-top review, (b) seminars, workshops, and operating team review, (c) simulator exercises, and (d) control room walkthroughs (dynamic).

5.3.2 Indication that plant operators, subject matter experts, and procedure writers are involved

5.3.3 Identification of the roles played by the participants (i.e., how operators, subject matter experts, etc., will participate in the validation or verification process) (roles should be based on the specific validation or verification objective being addressed)

5.3.4 Use of scenarios

Indication that the full complement of EOPs are exercised, including multiple failures (simultaneous and sequential), and inclusion of criteria for selecting scenarios

NOTE: Where a generic simulator is used, and to some extent, where a plant reference simulator is used, it will not be possible to fully exercise all parts of the EOPs. In these instances, the PGP should describe the method that the licensee will use to ensure that the validation and verification program will cover areas missed in the simulator exercises. The following element is included to address this issue.

5.3.5 Indication that areas not covered by simulator exercises will undergo validation or verification

5.3.6 Description of the plan for correcting and revising EOPs as a result of the validation or verification and for feedback from simulator exercises, control room walkthrough, desk-top reviews, operating team reviews, and operator training to address accuracy, readability, usability, and completeness of the EOPs

5.3.7 Statement of commitment to validate/verify revisions to EOPs, when appropriate, and the conditions under which revisions should be validated/verified

5.3.8 Description of the method by which multiple units will be handled in the validation and verification process to account for unit differences

NOTE: For multiunit sites, the part of the validation and verification process involving control room walkthroughs and use of operators should be carried out for each unit of a multiunit site to the extent that the units differ in terms of instrumentation, controls, equipment (including the availability, design, labeling, or location of equipment), or any other aspect that may impact plant safety.

5.3.9 Indication that the EOPs will be compatible with minimum control room staffing

5.3.10 Description of the plan by which adequacy (in terms of availability, readability and usability) of control room instrumentation and controls will be determined

5.3.11 Description of the plan by which correspondence between EOPs and control room instrumentation and controls will be determined

5.3.12 Where available instrumentation and controls have *not* been evaluated against the information and control needs of the operators as a part of the P-STGs (see Subsections 3.3.4.2 and 3.4.3.2), they should be evaluated as a part of the validation and verification program. The description of the validation and verification program should include the method that will be used to determine the adequacy of control room instrumentation and controls in meeting the information and control needs of the operators (i.e., it has been determined that the parameters are correct and that the instrument and control characteristics [e.g., accuracy, scaling, etc.] meet the needs identified).

NOTE: Since many aspects of validation and verification can be addressed during operator training, it is anticipated that applicants will combine these activities to make more efficient use of simulator time. Where validation or verification is tied to the EOP training program, it is necessary for applicants to distinctly address validation or verification through a formal process which

documents results and provides for feeding this information back into the EOP development process. The PGP should describe this process.

NOTE: Where EOPs are partially validated/verified on a generic simulator, licensees should commit to performing the dynamic portion of the validation and verification of the EOPs if a plant reference simulator becomes available.

6.0 Program for Operator Training on EOPs

6.1 General Discussion

Applicants are to submit descriptions of their planned programs for training operators on EOPs. The purpose of reviewing the EOP training program is to ensure that operators will be trained prior to implementation of the EOPs, and that there is a reasonable assurance that the methods to be used in training are adequate. This determination can be made by verifying that the training program meets the general training objectives identified in Subsection 6.2. To determine that these general objectives are met, the reviewer should consider the specific review guidelines of Subsection 6.3 and of NUREG-0711, Element 9, Training Program Development.

6.2 General EOP Training Program Objectives

The purpose of the evaluation is to determine that the following general objectives are adequately addressed in the training program described by considering the following review guidelines. These guidelines are not intended to represent all the necessary components of an adequate training program, but rather to serve as a basis for assuring the staff that the operators have been trained prior to EOP implementation and that they will be capable of using the EOPs.

6.2.1 Trainees should understand the philosophy behind the approach to the EOPs, i.e., their structure and approach to transient and accident mitigation, including control of safety functions, accident evaluation and diagnosis, and the achievement of safe, stable, or shutdown conditions.

6.2.2 Trainees should understand the mitigation strategy and technical bases of the EOPs, i.e., the function and use of plant systems, subsystems, and components in mitigating transients and accidents.

6.2.3 Trainees should have a working knowledge of the technical content of the EOPs, i.e., they must understand and know how to perform each step in all EOPs to achieve EOP objectives.

6.2.4 Trainees should be capable of executing the EOPs as individuals and teams under operational conditions, i.e., they must be able to carry out an EOP successfully during transients and accidents.

6.3 Specific EOP Training Review Guidelines

The reviewer should consider the following specific review guidelines in evaluating the description of the EOP training program:

6.3.1 Inclusion of training objectives consistent with Subsection 6.2 above

6.3.2 Use of simulator exercises

6.3.2.1 Specification of plant-specific or generic simulation

6.3.2.2 Indication that all EOPs will be exercised by all operators

NOTE:Where a generic simulator is used, and to some extent, where a plant reference simulator is used, it will not be possible to fully exercise all parts of the EOPs. In these instances, the PGP should describe the method that the applicant will use to ensure that the validation and verification program will cover areas missed in the simulator exercises. The following element is included to address this issue.

6.3.2.3 A description of the method for training in areas not covered by simulator exercises

6.3.2.4 Indication of planned operator roles and team work

6.3.2.5 Indication of the use of a wide variety of scenarios (i.e., incorporating multiple simultaneous and sequential failures)

6.3.3 Use of Control Room Walkthrough

6.3.3.1 Indication of walkthrough of all EOPs by all operators

6.3.3.2 Indication of planned operator roles and team work

6.3.3.3 Indication of use of a wide variety of scenarios (i.e., incorporating multiple failures, simultaneous and sequential)

6.3.4 Use of lectures, discussion sessions, and seminars

6.4 Indication that operators will be trained prior to implementation of EOPs

6.5 Indication that operators will be evaluated as part of the training program

7.0 References

NUREG-0711, “Human Factors Engineering Program Review Model,” 1994.

NUREG-0737, “Clarification of TMI Action Plan Requirements,” 1980.

NUREG-0737, Supplement 1, “Requirements for Emergency Response Capability,” 1983.

NUREG-0899, “Guidelines for Preparation of Emergency Operating Procedures,” 1982.

NUREG-1358, “Lessons Learned From the Special Inspection Program for Emergency Operating Procedures,” 1989.

NUREG-1358, Supplement 1, “Lessons Learned From the Special Inspection Program for Emergency Operating Procedures,” 1989.

Regulatory Guide 1.33, “Quality Assurance Program Requirements (Operation).”

ANSI/ANS 3.2-1982, “Standard for Administrative Controls for Nuclear Power Plants,” American National Standards Institute.