

PROCEDURES GENERATION PACKAGE
SEQUOYAH NUCLEAR PLANT/WATTS BAR NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY

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Attachment 1, Writers' Guide for Emergency Operating Procedures

I. INTRODUCTION

A. PURPOSE

The purpose of this Procedure Generation Package (PGP) is to describe the emergency operating procedures (EOPs) development at Sequoyah Nuclear Power Plant (SQNP) and Watts Bar Nuclear Power Plant (WBNP). Sequoyah and Watts Bar, Units 1 and 2, are four-loop Westinghouse PWRs.

B. SCOPE

This document was developed in response to Supplement 1 to NUREG-0737, Item 7.2b, page 15.

C. ORGANIZATION

This document consists of the following four parts:

Plant-specific Technical Guideline,

Writers' Guide for EOPs,

EOP Verification and Validation Program (V&V), and

EOP Training Program.

Each part describes the approach to be taken as part of the overall EOP Implementation Plan for Sequoyah and Watts Bar, Units 1 and 2.

11. PLANT-SPECIFIC TECHNICAL GUIDELINE

A. GENERAL

This instruction contains the method that will be used to convert the generic guidelines into EOPs. Additionally, this instruction will specify the personnel who will write the EOPs and the source documents they will use.

Because of the similarity between SQNP/WBNP and the generic plant used in the Westinghouse Owner Group (WOG) guidelines, SQNP/WBNP will use revision 1 of the generic guidelines to develop plant-specific Emergency Operating Procedures (EOPs). SQNP/WBNP contain two major differences from the WOG generic plant. These differences are the upper head injection system and the ice condenser. TVA has requested Westinghouse to evaluate the WOG guidelines taking into account these differences.

B. PERSONNEL

Personnel selection will be based on familiarity with plant operations, knowledge of plant systems, understanding of WOG guideline development and the SQNP/WBNP writers' guide. The Operations and Engineering Sections at SQNP/WBNP will perform the work.

C. SOURCE DOCUMENTS

EOP writers will use the following source documents to prepare EOPs:

- Writers' Guide for EOPs
- WOG generic guidelines and background documents
- UHI/Ice Condenser Changes
- Electrical Drawings
- Flow Drawings
- Administrative Procedures
- Licensing Commitments relating to EOPs
- FSAR
- Derivations for Calculated Mathematical Values Used in EOPs
- Step Deviation Document
- Westinghouse Bulletins and Memos
- System Operating Instructions

D. METHOD

The writer will review the source documents and then construct a draft EOP. Concurrently, the writer will complete the Step Deviation Document. This document (Figure 1) will be used to explain any variance between a WOG step and a SQNP/WBNP step.

The following are additional instructions for writing the EOP and for completing the form.

1. If it is determined that a generic step is compatible with SQNP/WBNP, then the step should be copied into the SQNP/WBNP procedure. Since the Technical basis of the step is explained in the WOG Background Document, there is no need to repeat this on the Step Deviation Document.
2. When a WOG step specifies a numerical value to be calculated, the value will be determined and put into the SQNP/WBNP procedure. The form should indicate where the method of derivation is located.
3. When a WOG step requests plant-specific details or actions to be added to the procedure, add the information to the procedure. However, if the operator actions are highly routine or well within the knowledge of the operator, the specific steps may be deleted. Consideration should be given to the minimum number, qualifications, training, and experience of the operating crew.
4. If the WOG guideline fails to identify or address systems or actions that are unique to SQNP/WBNP, then steps should be included to encompass the necessary actions.
5. If a WOG step specifies an action that cannot be performed at SQNP/WBNP, the step will be deleted or modified.
6. Minor modifications to WOG steps are acceptable without extensive justification provided that the change does not alter the intent of the guideline. Examples of these types of changes are as follows:
 - a. Deletions of level of detail (See item #3 above).
 - b. Deletions of overly obvious actions called for under the RESPONSE NOT OBTAINED column of the WOG guidelines.
 - c. Rewording of WOG steps to conform to standard SQNP/WBNP terminology.
 - d. Rearranging WOG steps to streamline the procedure due to SQNP/WBNP control room design and for the operator convenience.

E. DOCUMENTATION

1. The completed SQNP/WBNP Step Deviation Document will be provided as a source document to assist in the EOP verification process and in the revision, review, and approval process.
2. The completed Step Deviation Document should be maintained in the EOP upgrade program manual.

_____ Rev. _____

Page _____ of _____

STEP DEVIATION DOCUMENT

STEP:

WOG STEP:

JUSTIFICATION OF DIFFERENCES:

WRITER _____ **DATE** _____

Figure 1

III. WRITERS' GUIDE FOR EOPs

A. GENERAL

A writers' guide for EOPs is a plant-specific document that provides instructions on writing EOPs, using good writing principles. In addition to establishing sound writing principles, the guide helps to promote consistency among all EOPs and their revisions, independent of the number of EOP writers.

The writers' guide will be revised, as necessary, based on feedback from operator training, experience, and validation.

B. DOCUMENT DESCRIPTION

Information on the following major items are included in the plant-specific writers' guide for EOPs:

1. EOP Designation and Numbering
2. Format
3. Writing Instruction Steps
4. Foldout Page
5. Status Trees
6. Mechanics of Style
7. Graphs, Charts, Tables and Figures
8. Procedure Revisions

The SQNP/WBNP Writers' Guide for EOPs is based on the INPO EOP writing guideline (INPO 82-017) and the Westinghouse Owners Group writers' guide. The SQNP/WBNP guide is provided as Attachment 1.

IV. EOP VERIFICATION AND VALIDATION PROGRAM

A. GENERAL

This document outlines the process by which SQNP/WBNP upgraded EOPs will be initially verified and validated.

The objectives, specific criteria, methods of Verification and Validation (V&V), personnel and documentation to support the program will be discussed. It is intended that this will be an ongoing program and when significant modifications are made to procedures, a similar validation process will be conducted. In addition to the V&V program, a Control Room Design Review effort will be undertaken to identify human engineering discrepancies.

B. OBJECTIVES

In evaluating each of the objectives, consideration must be given to the human factors aspects. The verification/validation process will address all of the following questions:

1. Are the EOPs technically correct, i.e., do they accurately reflect the technical guidelines and other EOP source documents?
2. Are the EOPs written correctly, i.e., do they accurately reflect the plant-specific writers' guide?
3. Are the EOPs usable, i.e., can they be understood and followed without confusion, delays, and errors?
4. Is there a correspondence between the procedures and the control room/plant hardware, i.e., control equipment/indications that are referenced are available (inside and outside of the control room), use the same designation, use the same units of measurement, and operate as specified in the procedures?
5. Are the language and level of information presented in the EOPs compatible with the minimum number, qualifications, training, and experience of the operating staff?
6. Is there a high level of assurance that the procedures will work, i.e., will the procedures correctly guide the operator in mitigating transients and accidents?

C. RESPONSIBILITIES

The Operations Supervisor will be responsible for the V&V program. The reviewer or review team will be responsible for verifying that the criteria of the objectives are met and that discrepancies are documented. The Plant Operations Review Committee is responsible for final approval of the emergency procedures.

D. METHOD OF VERIFICATION/VALIDATION

It should be noted that to initially establish the validity of the EOPs, to meet the above objectives, the personnel chosen to write the EOPs will be familiar with plant equipment, operations, technical requirements, operator knowledge level, the writers' guide and the technical guideline. This is considered as a factor in the V&V process. Secondly, the generic guidelines were validated on a simulator to determine the effectiveness of the procedure network including technical content, procedure interrelationships, usability, human factor considerations, etc. This too, is considered a factor in this process.

The means by which additional V&V will be performed to meet each objective is as follows:

1. Are EOPs technically correct, i.e., do they accurately reflect the technical guidelines and other EOP source documents?
 - a. The objective may be met by performing a step-by-step tabletop review of the EOP. The reviewer(s) shall be familiar with plant equipment, operations, technical requirements, operator knowledge level, and the technical guidelines. Additionally, the reviewer should not be the writer of the EOP. Using the source documents, the reviewer(s) should address the following concerns:
 - 1) Is the Step Deviation Document accurate and complete?
 - 2) Is correct plant-specific information incorporated into the EOPs, such as valve numbers, numerical values and operator tasks?
 - 3) Have all calculated values been verified?
 - 4) Are licensing commitments satisfied?

2. Are EOPs written correctly, i.e., do they accurately reflect the plant EOP writers' guide?

This objective can be met by performing a table-top review of the EOP. The review will be a direct comparison between the writers' guide and the EOP. The reviewer shall be a person familiar with the Writers' Guide for EOPs and should not be the writer of the EOP.

3. Are EOPs usable, i.e., can they be understood and followed without confusion, delays and errors?

Operations personnel will conduct simulator exercises for the Westinghouse recommended test sequences for V&V. If the simulator cannot model certain aspects of the Westinghouse test sequences, then a control room or simulator walk-through will be performed in lieu of the simulator exercise. The simulator crew and observer(s) will attempt to identify problems where the user:

- a. Allows a limit to be exceeded.
- b. Fails to detect a key signal or parameter.
- c. Does not perform an action or step. This also includes action required to take place at some time later based on continuous monitoring of a parameter.
- d. Performs an action not in the procedure.
- e. Selects the wrong procedure.
- f. Performs an action out of sequence.
- g. Has to re-read procedure steps (readability).
- h. Takes excessive time to complete an action. This also includes action required to take place at some time later based on continuous monitoring of a parameter.
- i. Fails to perform actions at the required time.
- j. Fails to observe cautions or notes.
- k. Has difficulty making transitions from one procedure to the next.
- l. Is confused or uncertain about performance of an action.

Feedback received during EOP operator training will be used to improve EOP usability.

4. Is there a parallel between the procedures and the control room/plant hardware?

This objective can be met by performing a plant/control room walk-through. The reviewer(s) shall be familiar with SQNP/WBNP equipment and operations. The reviewer(s) should verify the following for plant equipment specified in the EOP:

- a. Equipment is available for operator use.
- b. Equipment is identified properly.
- c. Actual units of measure and the range of indicators/recorders correspond to values specified in the EOP.

5. Are the language and level of information presented in the EOP compatible with the minimum number, qualifications, training, and experience of the operating staff?

This objective can be satisfied by having the Operations and Engineering Sections write the EOPs, since they are familiar with the above. SQNP/WBNP EOPs will be checked out on the simulator by Operations personnel prior to operator training, and during EOP training sessions, the operator will be able to supply additional feedback to identify problems.

6. Is there a high level of assurance that the procedures will work, i.e., do the procedures guide the operator in mitigating transients and accidents?

The generic guidelines are backed up with computer analysis and, as stated earlier, were verified on a simulator. Additionally, SQNP/WBNP EOPs will be tested on the simulator, control room or simulator walk-through, or table-top review.

E. DISCREPANCY DETECTION

The purpose of the V&V program is to detect discrepancies. A reviewer or review team will be assigned to address each objective listed above. It will be the responsibility of the reviewer or review team to ensure that the criteria of the objectives are met and discrepancies are documented. Identified discrepancies will be documented on the EOP Verification and Validation Record (Figure 2). The reviewer(s) should also make recommendations to resolve discrepancies when appropriate.

F. DISCREPANCY RESOLUTION

When a discrepancy is identified, a resolution will be developed to satisfy the discrepancy. The solution to some discrepancies may involve correcting the procedure, while others may be addressed by increasing the level of operator training. The resolution will be written on the EOP Verification & Validation Record. The verification of the EOP is not complete until the discrepancies have been resolved. The operations supervisor, or his representative shall have final approval of the disposition of each discrepancy.

G. DOCUMENTATION

The EOP Verification & Validation Record should be maintained in the EOP upgrade program manual.

EOP VERIFICATION & VALIDATION RECORD

Procedure No: _____

Title: _____

Rev. No. _____

Rev. Date _____

Reviewer _____

Review Date: _____

Final Approval _____

Page 1 of _____

STEP NO.	DISCREPANCIES AND RECOMMENDATIONS	FINAL RESOLUTIONS
-------------	--------------------------------------	----------------------

Figure 2

STEP NO.	DISCREPANCIES AND RECOMMENDATIONS	FINAL RESOLUTIONS
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Figure 3

V. EOP TRAINING PROGRAM

A. GENERAL

The EOP training program will be developed to support implementation of the EOPs. The EOP writer interfaces with the Power Operations Training Center to ensure a supportive program.

B. PROGRAM DESCRIPTION

When developing the EOP training program, the following major items will be considered:

- what type of operator training should be provided (initial, refresher)
- what method of operator training should be followed
- what operator knowledge and skill level is desired
- what procedure tasks exist that require operator decision-making
- what training material is needed to support EOP training requirements
- what current operator licensing requirements exist
- what method should be provided for operator feedback into the training program and EOP development
- what will be the effect on current plant operation while training operators on EOPs not yet in place at the plant.

This description outlines the approach to be used to train licensed operators on EOPs and to ensure the operators are informed and knowledgeable of future changes to the EOPs.

C. TRAINING PROGRAM GOALS

The initial, overall training goals for the EOP training program are as follows:

- to enable the operators to understand the structure of the EOPs
- to enable the operators to understand the technical bases of the EOPs
- to enable the operators to have a working knowledge of the technical content of the EOPs
- to enable the operators to use the EOPs under operational conditions

Training program objectives designed to meet these goals will be developed for each lesson plan.

D. INITIAL EOP TRAINING METHODS

The EOP training program is established to instruct operators in the EOPs. It consists of classroom instruction and simulator exercises.

1. Classroom Instruction

Classroom instruction sessions will be conducted. Included in the information presented during this method will be the following:

- the logic behind the development of EOPs
- the process used to develop the EOPs
- the EOPs themselves, including supporting technical and human-factors information

2. Simulator Exercises

Training on the EOPs will be conducted for all licensed operators using scenarios on the SQNP/WBNP control room simulator. The scenarios will be reviewed for applicability on the SQNP/WBNP simulator. Training will be conducted with all operators performing their normal control room functions. Additional training will be conducted where the members of a crew alternate responsibilities. This additional training is important to promote understanding of the other operators' responsibilities in the overall conduct of the actions, and it should lead to enhanced communications within the control room.

E. REFRESHER TRAINING

All licensed operators will perform simulator exercises using the EOPs during refresher training. Scenarios will be developed to ensure that the critical aspects of the EOPs are exercised.

Training on EOPs will be conducted in such a manner that each crew performs the simulator exercise with each operator performing the actions that he normally would be responsible for during an emergency incident. Licensed operators not assigned to a shift will participate in the simulator exercise as part of a control room crew.

The Power Operations Training Center and Operations Staff will participate in the development and execution of refresher training. The training staff is responsible for developing the scenarios, observing and evaluating the simulator exercises, and critiquing the results. Any additional training needs will be determined from the performance of the the operators.

The scenarios will be varied sufficiently to ensure the operators do not develop a set pattern of responses to incidents but are able to respond to the symptoms as they develop.

F. TRAINING ON REVISIONS

Training on minor procedure revisions will be conducted through a program of required readings (self-taught), preshift briefings, or lectures in the requalification program. Training on major revisions will be conducted by the use of classroom instruction or simulator exercises.

G. INPUTS INTO TRAINING PROGRAM CHANGES

1. Supporting Training Material Changes

Changes to supporting training material will be factored into updated lesson plans and operator memos. Some of the supporting material identified to date is as follows:

- WOG EOP
- background information
- associated WCAPs

2. Operator Feedback

Operator feedback resulting from EOP verification, EOP validation, and training critiques will be used to keep the training program and EOPs current and relevant.

H. EVALUATION

An evaluation will be used to ensure that the training program goals have been accomplished.

ATTACHMENT 1
WRITERS' GUIDE FOR EOPs

WRITERS' GUIDE FOR EMERGENCY OPERATING PROCEDURES

SCOPE

The purpose of this procedure is to provide administrative and technical guidance and to specify Human Factors approaches to be used in the preparation of Emergency Operating Procedures (EOPs).

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A. EOP Designation and Numbering

1. Procedure Title
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6. Calculations
7. Emphasis
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7. Hyphens

G. Graphs, Charts, Tables and Figures

H. Procedure Revisions

WRITERS' GUIDE FOR EMERGENCY OPERATING PROCEDURES

PROCEDURE

A. EOP Designation and Numbering

Each EOP shall be uniquely identified. This identification permits easy administration of the process of procedure preparation, review, revision, distribution, and operator use.

1. Procedure Title

- a. Every procedure shall have its own descriptive name that summarizes the scope of that procedure or states the event which it is intended to mitigate.
- b. The title should be consistent with the generic guideline title.

2. Procedure Numbering

- a. EOPs are to be subdivided into 3 categories:
 - 1) Procedures for diagnosis or mitigation of design basis events (E-series).
 - 2) Function Restoration procedures (FR-series) to address or respond to a challenge to a Single Critical Safety Function.
 - 3) Emergency Contingency procedures (ECA-series) to address events that go beyond the design basis events and that are not easily covered in the E-series or which may complicate or reduce the effectiveness of the E-series procedures if included therein.
- b. Alphanumeric Procedure Designators:
 - 1) Design basis event procedures should be designated E.
Example: E-0
 - 2) Subprocedures to these design basis event procedures should be designated as follows:
Example: ES-0.1, ES-1.1, etc.
 - 3) Function Restoration procedures should be designated FR.
Example: FR-S.1, FR-H.3, etc.

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- 4) Emergency contingency procedures should be designated ECA.

Example: ECA-1

- 5) Emergency Contingency subprocedures should be identified by decimals.

Example: ECA-1.1

3. Page Numbering

- a. Each page of the EOP will be numbered near the top center of the page as in accordance with the plant administrative instructions.

Example: Page 3 of 4

- b. Each page will be numbered consecutively at the bottom center of the page.

B. Format:

1. Procedure Organization

- a. Each EOP will have a Cover Sheet to summarize the procedure intent and state either entry symptoms or means of entry.
- b. Operator Actions comprise the bulk of each procedure and present the actual step-by-step guidance.
- c. A Foldout Page summarizes information that is continually required for operator guidance. A single foldout page should be used for each E-series and ECA-series procedure.

2. Page Format

- a. All pages of the EOPs will use the same page structure except the foldout page which is discussed on the next page.

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- b. The pages for presentation of operator action steps will use a two-column format. The left-hand column is designated for operator actions, and the right-hand column is designated for contingency actions when the expected response is not obtained.
- c. The Foldout Page is intended to summarize only that information which an operator should have continuously available, so page content will vary by procedure.
- d. Each page will be uniquely identified and numbered in accordance with plant administrative instructions.

Example: SQNP
E-2 - Unit 1 or 2
Page 3 of 4
Rev. 0

- e. The top heading and the bottom page number will define the borders of the page and will ensure that information is not lost during reproduction.

3. Instructional Step Numbering

- a. Procedure steps will be numbered as follows:

Example: 1 High-Level Step

a. Substep

- b. Substeps are lettered sequentially according to expected order of performance.
- c. This same numbering scheme is to be used in both the right and left columns of the procedures.

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C. Writing Instructional Steps:

1. Step Length and Content

Instruction steps will be concise and precise. Conciseness denotes brevity; preciseness means exactly defined. Thus, instruction should be short and exact. General rules to be used for step length and content are as follows;

- a. Instruction steps should deal with only one idea.
- b. Short, simple sentences should be used in preference to long, compound, or complex sentences.
- c. Complex procedures should be described in a series of steps, with each step made as simple as practicable.
- d. All steps are assumed to be performed in sequence unless stated otherwise in a preceding NOTE.
- e. Actions required in a particular step should not be expected to be complete before the next step is begun unless specifically so stated.
- f. The objective of operator actions should be specifically stated. This includes identification of exactly what is to be done and to what. If a step contains three or more action items, they should be listed rather than embedded in the sentence.
- g. Plant parameters which are presented by instrumentation available in the control room should be specifically identified (Refer to F.5).
- h. Identification of components and parts should be complete (Refer to C.9).
- i. Instruction content should be written to communicate to the user. Consideration should be given to the minimum number, qualifications, training, and experience of the operating crew.
- j. Expected results of routine tasks need not be stated.
- k. When actions are required based on receipt of an annunciated alarm, list the setpoint of the alarm for ease of verification.

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- l. When requiring resetting or restoration of an alarm or trip, list the expected results immediately following the resetting or restoration if it would be beneficial to the operator.
 - m. When considered beneficial to the user for proper understanding and performance, describe the system response time associated with performance of the instruction.
 - n. When system response dictates a time frame within which the instruction must be accomplished, prescribe such time frame. If possible, however, avoid using time to initiate operator actions. Operator actions should be related to plant parameters.
2. Instruction Steps, Left-Hand Column

The left-hand column of the two-column format will be used for operator instruction steps and expected responses. The following rules of construction apply:

- a. High-level steps are those steps that tell the user "what" to do. Substeps of the high level step may be used to tell the user "how" to accomplish the high-level step.
- b. If only a single task is required by the step, then the high-level step contains its own **EXPECTED RESPONSE**.
- c. Left-hand column tasks should be specified in sequence as if they could be performed in that manner. The user would normally move down the left-hand column when the expected response to a particular step is obtained.
- d. When the expected response is not obtained, the user is expected to move to the right-hand column for contingency instruction.
- e. All procedures should end with a transition to either another EOP or to some normal plant procedure.
- f. Any immediate operator steps should be identified.

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3. Instruction Steps, Right-Hand Column

The right-hand column is used to present contingency actions which are to be taken in the event that a stated condition, event, or task in the left-hand column does not represent or achieve the expected result. The following rules apply to the right-hand column:

- a. Contingency actions should identify directions to override automatic controls and to initiate manually what is normally initiated automatically.
- b. Contingency actions should normally be specified for steps or substeps for which the task requirement might not be satisfied. However, to avoid excessive clutter, it is permissible to delete obvious contingency actions.
- c. Contingency actions should be numbered consistently with the expected response/action for substeps only. A contingency for a single-task high-level step will not be separately numbered but will appear on the same line as its related step.
- d. The user is expected to proceed to the next numbered step or substep in the left-hand column after taking contingency action in the right-hand column.
- e. As a general rule, all contingent transitions to other procedures takes place out of the right-hand column. (Pre-planned transitions may be made from the left-hand column.)
- f. If a contingency action cannot be completed, the user is expected to proceed to the next step or substep in the left-hand column unless specifically instructed otherwise. When writing the procedures, this rule of usage should be considered in wording subsequent left-hand column instructions.
- g. If contingency action must be completed prior to continuing, that instruction must appear explicitly in the right-hand column substep.

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4. Use of Logic Terms

- a. The logic terms AND, OR, NOT, IF, IF NOT, WHEN, and THEN, are to be used to describe precisely a set of conditions or a sequence of actions. Logic terms will be highlighted for emphasis by capitalizing and underlining.
- b. When action steps are contingent upon certain conditions, the step shall begin with the words IF or WHEN followed by a description of those conditions, a comma, the word THEN, and the action to be taken.
- c. IF is used for an unexpected, but possible condition.
- d. WHEN is used for an expected condition.
- e. AND calls attention to combinations of conditions and shall be placed between each condition. If three or more conditions are to be combined, a list format is preferred.
- f. OR implies alternative combinations or conditions. OR means either one, or the other, or both (inclusive).
- g. IF NOT may be used when an operator must respond to the second of two possible conditions. (The right-hand column of the two-column format contains an implicit IF NOT.)

5. Use of Cautionary Information and Notes

- a. Because the present action-step wording is reduced to the minimum essential, certain additional information is sometimes desired, or necessary, and cannot be merely included in training. This non-action information is presented as either a Note or a CAUTION.
- b. CAUTION denotes some potential hazard to personnel or equipment associated with the following instructional step.
- c. Note is used to present advisory or administrative information necessary to support the action instruction.
- d. To distinguish this information from action steps, it will extend across the entire page.

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- e. CAUTION or Note which must be observed prior to the execution of a step shall precede the step. CAUTION or Note applicable after the completion of a step may follow the step.
- f. The word CAUTION or Note should be underlined and printed in large type.
- g. CAUTIONS and Notes should be able to be read completely without interruption by intervening steps or page turning.
- h. CAUTIONS and Notes should be accurate and concise.
- i. As a general rule, neither a CAUTION or Note will be used to replace an instruction/operator action step. However, procedure transitions can be included as non-action information in a Note when absolutely necessary.
- j. Example:
Note: Foldout page should be open.

6. Calculations

- a. Use of formulas or the need for calculations should be minimized.
- b. When calculations are required they should be simple.
- c. Space should be provided to perform to computation and to record the results.
- d. If value has to be determined in order to perform a procedural step, a chart or graph should be used whenever possible.

7. Emphasis

- a. Avoid overuse of underlining and capitalization.
- b. Underlining key words and phrases is permissible, but this practice should be used with discretion. Too much underlining may result in reduced effectiveness; too little underlining may result in key words or phrases not standing out when necessary.

WRITERS' GUIDE FOR EMERGENCY OPERATING PROCEDURES

8. Referencing and Branching to Other Procedures or Steps

- a. Minimize cross-referencing in and out of one procedure to another. When only a few steps are involved in the referencing, the steps should be stated in the procedure whenever they are needed.
- b. When a step directs the operator to another step and that step is preceded by a CAUTION or Note, a warning should be included to tell the user to read the preceding note or caution.
- c. All procedures should end with a transition to another EOP or to some normal plant procedure.
- d. Examples:
 - 1) Go to step 6 and read the preceding CAUTION.
 - 2) Go to ES-0.1, Reactor Trip Response.

9. Component Identification & Location

With respect to identification of components, the following rules are to be followed:

- a. Equipment, controls, and displays will be identified in operator language (common usage terms). These terms may not always match engraved names on panels but will be complete.
- b. When the engraved names and numbers on panel placards and alarm windows are specifically the item of concern in the procedure, the engraving should be quoted verbatim and emphasized by using all capitals.
- c. If the component is seldom used or it is felt that the component would be difficult to find, location information should be given in parenthesis following the identification.

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10. Level of Detail

- a. Avoid excessive detail for routine operations. Any information which an operator is expected to know (based on training and experience) should not be included. The desired level of detail is one in which enough details are presented so that the operator has all the information he needs, but not so many details that the operator becomes burdened or confused by superficial or redundant information. The Validation and Verification Program will help determine if the level of detail is adequate.
- b. Constructing steps that are concise and precise will aid in reducing the level of detail. Many actuation devices (switches) in the control room are similar, even though the remotely performed functions are not, so certain action verbs listed here are recommended (also refer to part F.4).
 - 1) Use "start/stop" for power-driven rotating equipment.
 - 2) Use "open/close" for valves.
 - 3) Use "open/close" for electrical breakers.
 - 4) Use "place in AUTO" to refer to equipment when actuation is to be controlled by automatic logic circuitry.

D. Foldout Page

1. Only a single foldout page will be supplied for each E-series and ECA-series procedure. The sheet will be numbered as the final page of the last procedure in the series. The foldout page will be titled "FOLDOUT FOR EX SERIES", and will use a single column format (vs. two-column).
2. Each set of operator information will be numbered sequentially and have an explanatory title. The title will be capitalized and underlined for emphasis.

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E. Status Trees

1. **Critical Safety Function Status Trees** will be located in FR-0, Status Trees.
2. The format and content should be consistent with the generic guideline.

F. Mechanics of Style

1. Spelling

Spelling should be consistent with modern usage. When a choice of spelling is offered by a dictionary, the first spelling should be used.

2. Punctuation

Punctuation should be used only as necessary to aid reading and prevent misunderstanding. Word order should be selected to require a minimum of punctuation.

3. Capitalization

Capitalization may be used in the procedure for emphasis in the following cases:

a. Plant Locations

- 1) Capitalize major plant areas or buildings

e.g. Auxiliary Building

b. Systems and Components.

- 1) Capitalize the titles of plant systems

e.g. Residual Heat Removal System

- 2) Capitalize the title of major plant equipment

e.g. Charging Pump

- 3) When words from a title of a system are used but do not reference the system directly, the words should be in lower case.

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- c. Major headings should be fully capitalized.
- d. Fully capitalize nameplate engravings, alarm window engravings, switch or circuit breaker positions and controller modes of operation.
- e. Logic terms should be fully capitalized and underlined.
- f. High level steps in the Expected Response column (left-hand column of instructions) should be capitalized and underlined.
- g. Key expected values for plant parameter should be fully capitalized.
- h. Titles of procedures will be capitalized whenever referenced within any procedure.

4. Vocabulary

Words used in procedures should convey precise understanding to the trained person. The following rules apply.

- a. Use simple words. Simple words are usually short words of few syllables. Simple words are generally common words.
- b. Use common usage if it makes the procedure easier to understand.
- c. Use words that are concrete rather than vague, specific rather than general, familiar rather than formal, precise rather than blanket.
- d. Define key words that may be understood in more than one sense.
- e. Some words have unique meanings. Refer to Table 1 for a glossary of terms.
- f. In some cases, certain other words should be avoided simply because they are not adequately defined when used without modification. These include: rapidly and slowly. The same words become acceptable when some clarification is provided.

Example: Rapidly (up to 100°F/HR) cool down the RCS.

These words can be used without clarification, when the meaning would not present confusion.

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5. Numerical Values

- a. All numerical values presented in the procedures should be consistent with what can be read on instruments in the control room (i.e., consistent with instrument scale and range).
- b. The number of significant digits presented should be equal to the reading precision of the indicator.
- c. Acceptance values should be stated in such a way that any addition or subtraction operations are avoided, if possible. This is done by stating acceptance values as limits. Examples: 2500 psig maximum, 350°F minimum, between 450°F and 500°F. Tolerances can be expressed by stating the nominal value followed by the acceptable range in parenthesis.

Example: 550 (540-560)°F

Avoid: 550°F ± 10°F
- d. Engineering units should always be specified when presenting numerical values for process parameters. They should be the same as those used on the control room displays.
- e. When a generic guideline specifies a numerical value to be calculated, the method of derivation should be documented and verified.
- f. To identify values to be used during adverse containment conditions, the adverse containment values will be enclosed in brackets.

6. Abbreviations, Acronyms and Symbols

- a. Minimize the use of abbreviations. Abbreviations may be used where necessary to save time and space, and when their meaning is unquestionably clear to the intended reader.
- b. When unfamiliar abbreviations and acronyms are used, indicate full meaning when it is first used in the procedure.
- c. Periods should be omitted from acronyms and abbreviations.
- d. The plural of an acronym should have no apostrophe (i.e., RCPs).
- e. Refer to Table 2 for approved list.

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7. Hyphens

- a. The hyphen should be omitted unless its omission would result in confusion.
- b. Examples for acceptable use of hyphens are:
U-235, N-16, pre-position, twenty-one and one-half.

G. Graphs, Charts, Tables and Figures

1. They should be legible, readable, and easy to use under the expected condition of use.
2. Units of scale and measurement should be readily available and usable to the operator.
3. Titles should be descriptive of contents and use.
4. Printed aids should be compatible with the procedure.

H. Procedure Revisions

Refer to plant administrative instructions for guidance in procedure review and revision control. When making procedure revisions, review related procedures that may also be affected.

REFERENCES

- A. INPO Guidelines 82-017, EOP Writing Guideline
- B. WOG ERG Writers' Guide

ATTACHMENTS

- A. Figure 1 - Procedure Page Example
- B. Table 1 - Glossary
- C. Table 2 - Abbreviations, Acronyms & Symbols List for EOPs

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<u>STEP</u>	<u>ACTION/EXPECTED RESPONSE</u>	<u>RESPONSE NOT OBTAINED</u>
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Figure 1

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TABLE 1: GLOSSARY

Check	To note a condition and compare with some procedure requirement.
Control	To manually or automatically operate equipment as necessary to satisfy procedure requirements.
Ensure	To observe that an <u>expected</u> characteristic or condition exists and, if necessary, to take actions to make the condition occur. Typically the expectation comes from some previous automatic or operator action.
Establish	To make arrangements for a stated condition. Example: Establish normal pressurizer pressure and level control.
Faulted	Used to describe a secondary system component with a feedwater or steam break.
Initiate	To begin a process (Begin is preferred).
Intact	Describes a steam generator which has neither a tube rupture nor is faulted.
Local (Locally)	An action performed by the operator <u>outside the control room.</u>

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TABLE 1 (Continued)

Maintain	To control a given plant parameter to some procedure requirement continuously. Example: Maintain steam generator level in the narrow range.
Manual (Manually)	An action <u>performed by the operator</u> in the control room. (The word is used in contrast to an automatic action, which takes place without operator intervention.)
Monitor	Similar to "check", except implies a repeated function.
Normal	A value of a process parameter experienced during routine plant operations.
Ruptured	Used in describing a steam generator with a tube(s) break.
Stable	In reference to process parameters, it means controllable within some desired range.
Throttle	To operate a valve in an intermediate position to obtain a <u>certain flow rate</u> . (Control is preferred).
Verify	To observe that an <u>expected</u> characteristic or condition exists and, if necessary, to take actions to make the condition occur. Typically the expectation comes from some previous automatic action.

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TABLE 2

ABBREVIATIONS AND ACRONYMS FOR EOPS

AFW	-	auxiliary feedwater
amp	-	ampere
AUTO	-	automatic
Aux	-	auxiliary
Avg	-	average
BA	-	boric acid
BAT	-	boric acid tank
BIT	-	boron injection tank
brk	-	breaker
Bldg	-	building
CCP	-	centrifugal charging pump
CCS	-	component cooling water
CCW	-	condenser circulating water
Chem	-	chemistry
cntmt	-	containment
CRDM	-	control rod drive mechanism
CST	-	condensate storage tank
CVCS	-	chemical and volume control system
ECCS	-	emergency core cooling system
gpm	-	gallons per minute
IR	-	intermediate range
max	-	maximum
MFW	-	main feedwater
min	-	minimum
MSIV	-	main steam isolation valve
MSR	-	moisture separator reheater
MG	-	motor generator

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TABLE 2 (Continued)

ABBREVIATIONS AND ACRONYMS FOR EOPS

NIS	-	nuclear instrumentation system
NR	-	narrow range
PORV	-	power operated relief valve
PR	-	power range
PRT	-	pressurizer relief tank
psig	-	pounds per square inch gauge
pzr	-	pressurizer
RCP	-	reactor coolant pump
RCS	-	reactor coolant system
RHR	-	residual heat removal system
RPI	-	rod position indicator
RTD	-	resistance temperature detector
RVLIS	-	reactor vessel level indication system
RWST	-	refueling water storage tank
SI	-	safety injection
SR	-	source range
S/G	-	steam generator
SGTR	-	steam generator tube rupture
SUR	-	startup rate
T-avg	-	average temperature
Temp	-	temperature
T/C	-	thermocouple
TSC	-	technical support center
VAC	-	volts, alternating current
VCT	-	volume control tank
VDC	-	volts, direct current
Vent	-	ventilation
WR	-	wide range