PROCEDURES GENERATION PACKAGE

DIABLO CANYON POWER PLANT

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APPROVED BY

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I. INTRODUCTION

A. PURPOSE

The purpose of this Procedures Generation Package (PGP) is to describe the emergency operating procedures (EOPs) development at the Diablo Canyon Power Plant. Diablo Canyon 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 the Diablo Canyon Power Plant, Units 1 and 2.

II. PLANT-SPECIFIC TECHNICAL GUIDELINE

A. GENERAL

Because of the similarity between DCPP and the generic plant used in the Westinghouse Owner Group (WOG) guidelines, DCPP will use the generic guidelines to develop plant-specific Emergency Operating Procedures (EOPs). This instruction contains a 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.

B. PERSONNEL

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

C. SOURCE DOCUMENTS

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

- Writers' Guide for EOPs
- WOG generic guidelines and background documents
- DCPP Electrical Drawings
- DCPP Piping and Instruments Drawings
- Administrative Procedures
- Licensing Commitments relating to EOPs
- FSAR
- Derivations for Calculated Mathematical Values Used in EOPs
- Plant-specific Technical Guidelines
- Company Operating Orders
- Westinghouse Bulletins and Memos
- Plant System Descriptions
- List of differences between generic plant and DCPP

D. METHOD

The writer will review the source documents and then construct a draft EOP. Concurrently, the writer will complete the DCPP Step Deviation Document (69-10830). This document (Figure 1) will be used to explain any variance between a WOG step and a DCPP 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 DCPP, then the step should be copied into the DCPP 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 DCPP procedure. The form should indicate where the method of derivation is located.

   When a WOG step requests a numerical plant-specific value be inserted and it is a normal operating parameter, the basis does not have to be included on the form.

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 DCPP, then steps should be included to encompass the necessary actions.

5. If a WOG step specifies an action that cannot be performed at DCPP, 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 DCPP terminology.

   d. Rearranging WOG steps to streamline the procedure due to DCPP control room design and for operator convenience.

E. DOCUMENTATION

1. The completed DCPP Step Deviation Document should be entered in the Records Management System and maintained in the EOP upgrade program manual.

2. Additionally, this completed form will be provided as a source document to assist the EOP V & V, Training, Task-Analysis, and Control Room Design Review programs.

FIGURE 1: STEP DEVIATION DOCUMENT

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DCPP EOP STEP DEVIATION DOCUMENT

Procedure No:_____ Rev:_____

Title_____ Prepared by:_____

Date:_____

DCPP STEP NO	WOG STEP NO	JUSTIFICATION OF DIFFERENCE OR BASIS

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

IV EOP VERIFICATION AND VALIDATION PROGRAM

A. GENERAL

This document outlines the process by which DCPP 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. Concurrently with 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 Senior Power Production Engineer (SPPE) and the Requalification Training Coordinator (RTC) of the Operations Department will be responsible for conducting the V&V program at Diablo Canyon. 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 Staff Review Committee is responsible for final approval of the emergency procedures. The general areas of responsibility are as follows:

1. The SPPE will assign a reviewer or review team.

2. The SPPE will interface with the Control Room Design Review Coordinator.

3. The SPPE and RTC will resolve all procedure discrepancies.

4. The SPPE will ensure that all resolutions are incorporated into the procedure, as necessary, including signing the final approval on each EOP V&V record.

5. The RTC will be responsible for compiling discrepancies identified from operator feedback during the EOP training program.

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 DCPP 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 DCPP 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?

The EOPs will be checked on the Zion simulator by DCPP Operations personnel to identify, as much as possible, problems that could exist at DCPP. Errors of omission, commission, and sequencing, along with user uncertainty, will be considered. 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 afraid to perform 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 can performing a plant/control room walk-through. The reviewer(s) shall be familiar with DCPP 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 DCPP Operations personnel write the EOPs, since they are familiar with the above. DCPP EOPs will be checked out on the Zion simulator by DCPP 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, DCPP EOPs will be tested on the Zion simulator.

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 objective are met and discrepancies are documented. Identified discrepancies will be documented on the EOP Verification & 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.

G. DOCUMENTATION

1. The EOP Verification & Validation Record will be entered in the Records Management System.

2. Additionally, this record should be maintained in the EOP Upgrade Program Manual.

FIGURE 2: EOP VERIFICATION & VALIDATION RECORD

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EOP VERIFICATION & VALIDATION RECORD

Procedure No:_____ Title:_____

Rev. No._____ Draft Date_____

Scope of V & V_____

Reviewer_____ Review Date:_____

Final Approval_____

STEP NO.	MEETS OBJECTIVES (YES/NO)	DISCREPANCIES AND RECOMMENDATIONS	FINAL RESOLUTIONS

V. EOP TRAINING PROGRAM

As part of the pre-implementation process, the licensed operators at Diablo Canyon Power Plant will receive training on all the plant-specific Emergency Operating Procedures generated from the WOG emergency response guidelines. To maximize the effectiveness of the procedure training, the training will be conducted in two separate phases. Phase I will be Initial Training, and will encompass classroom instruction and control room walk-throughs. Initial training is tentatively scheduled to begin in late October 1983. After the initial training is complete, the procedures will be implemented. Shortly after the completion of the Diablo Canyon simulator, which is scheduled to be operational in mid-July 1984, Phase II will commence. Phase II will consist of classroom and simulator sessions.

A. Phase I - INITIAL TRAINING

A series of classroom and control room walk-through sessions will be conducted during the license operators' initial training of emergency procedures.

1. Classroom Training

   a. Training on the Writers' Guide for EOPs will be conducted to ensure that the operators have an understanding of how the procedures are to be used.

   b. The emergency procedures will be grouped, as much as possible, by their interrelationships with one another to maintain a smooth transition between each procedure.

   c. As a minimum, the following information will be discussed in each procedure:

      1) The logic behind the development of the emergency procedure will be explained to ensure that the licensed operators understand the scope of the procedure and the plant conditions that would require use of the procedure.

      2) A flowchart describing each step in the emergency procedure will be used to provide an understanding of the process used to develop each procedure.

      3) The objectives of the procedure will be stressed. Understanding the objectives of each EOP will provide the operators with the knowledge to better cope with situations that deviate from the initial assumptions for which the procedure was written.

4) Each step of the emergency procedure will be discussed. As each step is presented, the Westinghouse Emergency Response Guideline background document and the DCPP Step Deviation Document will be used to explain, if required, the technical bases for each step. In discussing the steps, the instructor can verify the operator's ability to perform the steps and ensure that the procedure has been written to the appropriate level of detail. This process will be factored into the V&V of the procedures. If a problem is noted with the procedure, a V&V record form will be used to document the discrepancy.

2. Control Room Walk-Throughs

a. Control room walk-throughs will be conducted on emergency procedures which have been validated on the Zion simulator.

b. During the walk-throughs, the team concept will be stressed, i.e., each shift operating crew will walk through the procedure as a Control Room Crew.

c. Scenarios will be generated to enable the licensed operators to make decisions concerning which procedure to use, which paths within the procedure to follow during various failures, and how to make the transition to different procedures.

B. PHASE II - SIMULATOR TRAINING

A series of classroom and simulator sessions will be conducted to train operators on the new emergency procedures.

1. Classroom Session

A classroom session will be held to brief the operators on the evolutions which will be conducted on the simulator and to review the basic steps of the procedures which have not yet been used by them on the simulator.

2. Simulator Session

With the use of scenarios, operators will be given symptoms or events which will allow them to use procedures that were previously discussed during the classroom session, as well as procedures which have previously been used on the simulator. Once again, the operators and instructors will be given the opportunity to provide constructive feedback in validating the procedures.

C. LONG-TERM TRAINING

The annual requalification program will be revised to incorporate use of the new emergency procedures during annual simulator training. Additionally, significant modifications to the new emergency procedures will be discussed in the requalification program to ensure that licensed operators are kept current with the latest revisions.

ATTACHMENT 1

DCPP WRITERS' GUIDE FOR EOPs

WRITERS' GUIDE FOR EMERGENCY OPERATING PROCEDURES

SCOPE

The purpose of this procedure is to provide administrative and technical guidance on the preparation of Emergency Operating Procedures (EOPs).

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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.

WRITERS' GUIDE FOR EMERGENCY OPERATING PROCEDURES

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 (EC-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 EP E, using the same number as designated by the generic guideline.

         Example: EP E-0

      2) Subprocedures to these design basis event procedures should be designated as follows:

         Example: EP E-0.1, EP E-1.1, etc.

      3) Function Restoration procedures should be designated EP FR, using the same alphanumeric system used by the generic guideline.

         Example: EP FR-S.1, EP FR-H.3, etc.

WRITERS' GUIDE FOR EMERGENCY OPERATING PROCEDURES

4) Emergency contingency procedures should be designated EP EC, using the same number used by the generic guideline.

Example: EP EC-1

5) Emergency Contingency subprocedures should be identified by decimals.

Example: EP EC-1.1

3. Page Numbering

a. EOPs pages will be identified per standard DCPP policy.

Example: Page____of____

b. Appendices pages should be numbered as part of the procedure whereas attachments are not.

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 (Figure 1).

b. Operator Actions comprise the bulk of each procedure and present the actual step-by-step guidance (Figure 2).

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 EC-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. This page structure employs a preprinted border to ensure that all margins are correctly maintained.

b. The pages for presentation of operator action steps will use a two-column format within the preprinted border. 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 does not use the bordered-page format. It is intended to summarize only that information which an operator should have continuously available, so page content will vary by procedure.

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. If the order of substep performance is not important, then the substeps are designated by bullets (●).

c. This same numbering scheme is to be used in both the right and left columns of the procedures.

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. For substeps see item B.3.b, above.

e. Actions required in a particular step should not be expected to be complete before the next step is begun. If assigned tasks are short, then the expected action will probably be completed prior to continuing. However, if an assigned task is very lengthy, additional steps may be performed prior to completion. If a particular task must be completed prior to continuation, this condition must be stated clearly in that step or substep.

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 basedon receipt of an annunciated alarm, list the setpoint of the alarm for ease of verification.

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.

WRITERS' GUIDE FOR EMERGENCY OPERATING PROCEDURES

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 use 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 by circling the associated step number.

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 a contingency action must be completed prior to continuing, that instruction must appear explicitly in the right-hand column substep.

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 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 following action instruction.

d. To distinguish this information from action steps, it will extend across the entire page and will immediately precede the step to which it applies.

e. Multiple statements included under a single descriptor heading shall be separately identified by noting them with bullets (●).

f. CAUTION statements should be enclosed in boxes (framing) to provide emphasis.

g. The word CAUTION or NOTE should be underlined and printed in large type.

h. CAUTIONS and NOTES should be able to be read completely without interruption by intervening steps or page turning.

i. CAUTIONS and NOTES should be accurate and concise.

j. 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.

k. Examples:

NOTE: Foldout page should be open.

CAUTION: Alternate water sources for AFW pumps will be necessary if CST level is low.

WRITERS' GUIDE FOR EMERGENCY OPERATING PROCEDURES

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 the computation and to record the results.

d. If a 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 capitalizations.

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.

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 EP E-0.1, REACTOR TRIP RESPONSE, Step 1.

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 parentheses following the identification.

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/throttle" 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 EC-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 EOPs", and will use a single column format (vs. two-column).

WRITERS' GUIDE FOR EMERGENCY OPERATING PROCEDURES

2. Each set of operator information will be numbered sequentially and have an explanatory title. The title will be capitalized and underlined for emphasis.

E. Status Trees

1. Critical Safety Function Status Trees will be located in EP 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.

c. Headings

1) Major heading should be fully capitalized.

2) Key words in subsection headings should be 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.

g. Key expected values for plant parameter should be fully capitalized. e.g., RCS Subcooling - GREATER THAN 35°F

h. Titles of procedures will be fully 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.

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 per Administrative Procedure AP C-20 S1.

f. To identify values to be used during adverse containment conditions, use the following example:

PZR level - GREATER THAN 20% [ADVERSE CONTMT 50%]

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.

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 Administrative Procedure E-4 S6 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

WRITERS' GUIDE FOR EMERGENCY OPERATING PROCEDURES

ATTACHMENTS

A. Figure 1 - Cover Sheet Example

B. Figure 2 - Procedure Page Example

C. Table 1 - Glossary

D. Table 2 - Abbreviations, Acronyms & Symbols List for EOPs

PACIFIC GAS AND ELECTRIC COMPANY
DEPARTMENT OF NUCLEAR PLANT OPERATIONS
DIABLO CANYON POWER PLANT UNIT NOS. 1 AND 2

Figure 1: Cover Sheet Example

PG&E Pacific Gas and Electric Company

NUMBER EP E-1
REVISION 0
DATE 6/1/82
PAGE 1 OF 20

DEPARTMENT OF NUCLEAR PLANT OPERATIONS
DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2

TITLE: EMERGENCY PROCEDURE
LOSS OF REACTOR OR SECONDARY COOLANT

APPROVED: _____
PLANT MANAGER DATE

SCOPE

The purpose of this procedure is to provide recovery from a loss of reactor or secondary coolant.

SYMPTOMS OR ENTRY CONDITIONS

1. Transition from EP E-0:
   a. High containment radiation.
   b. High containment pressure.
   c. High containment recirculation sump level.
2. Transition from EP E-2, FAULTED SG ISOLATION
3. Transition from EP EC-3.1, SGTR WITH LOCA
4. Transition from EP FR-C.1, RESPONSE TO INADEQUATE CORE COOLING
5. Transition from EP FR-I.3, RESPONSE TO VOIDS IN REACTOR VESSEL
6. Transition from EP FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK

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Figure 2: Procedure Page Example

DIABLO CANYON POWER PLANT UNIT NO(S) 1 AND 2	NUMBER EP E-0.1 REVISION 0 DATE 6/6/83 PAGE 4 OF 6
TITLE: REACTOR TRIP RESPONSE	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
CAUTION: On natural circulation, RTD bypass temperatures and associated interlocks will be inaccurate.	
7. Verify At Least One RCP Running.	Verify natural circulation from trended values. a. RCS subcooling - GREATER THAN 35°F. b. Steam pressure - STABLE. c. RCS hot leg temperature - STABLE OR SLOWLY DECREASING. d. Core exit TCs - STABLE OR SLOWLY DECREASING. e. RCS cold leg temperature - NEAR SATURATION TEMPERATURE FOR STEAM PRESSURE. IF natural circulation NOT verified, THEN increase dumping steam.
8. Check Intermediate Range Flux:	
a. Flux - BELOW 10^{-10} AMPS	a. Continue with step 9 and WHEN below 10^{-10} AMPS, THEN complete step 8.
b. Verify source range detectors reenergized.	b. Manually reenergize source range detectors.
c. Transfer nuclear recorders to source range scale.	
d. Unblock high flux at shutdown alarm.	

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DIABLO CANYON POWER PLANT UNIT NOS. 1 AND 2

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. Example: Control AFW flow to maintain S/G level...
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>.
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 certain <u>flow rate</u>. (Control is preferred).
Verify	To observe that an <u>expected</u> characteristic or condition exists. Typically the expectation comes from some previous automatic or operator action.

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TABLE 2 (Continued)

ABBREVIATIONS, ACRONYMS AND SYMBOL LIST FOR EOPS

RWST	- refueling water storage tank
SI	- safety injection
SR	- source range
SG	- steam generator
SGTR	- steam generator tube rupture
SUR	- startup rate
TAVG	- average temperature
Temp	- temperature
TC	- thermocouple
TSC	- technical support center
VAC	- volts, alternating current
VB	- vertical board
VCT	- volume control tank
VDC	- volts, direct current
Vent	- ventilation
WR	- wide range

PACIFIC GAS AND ELECTRIC COMPANY
DEPARTMENT OF NUCLEAR PLANT OPERATIONS
DIABLO CANYON POWER PLANT UNIT NOS. 1 AND 2

TABLE 2

ABBREVIATIONS, ACRONYMS AND SYMBOL LIST FOR EOPS

AFW - auxiliary feedwater
AMP - ampere
AUTO - automatic
Aux - auxiliary
Avg - average
BA - boric acid
BAST - boric acid storage tank
BIT - boron injection tank
Bkr - breaker
Bldg - building
BOP - bearing oil pump
CCP - centrifugal charging pump
CCW - component cooling water
CFCU - containment fan cooler units
Chem - chemistry
CONTMT- containment
CRDM - control rod drive mechanism
CST - condensate storage tank
CVCS - chemical and volume control system
CWP - circulating water pump
DRPI - digital rod position indicator
FWST - fire water storage tank
GPM - gallons per minute
H2 - hydrogen
IR - intermediate range
Max - maximum
MFP - main feedwater pump
Min - minimum
MSIV - main steam isolation valve
MSR - moisture separator reheater
MG - motor generator
NIS - nuclear instrumentation system
NR - narrow range
N2 - nitrogen
O2 - oxygen
PORV - power operated relief valve
PR - power range
PRT - pressurizer relief tank
PSIG - pounds per square inch gage
PZR - pressurizer
RCP - reactor coolant pump
RCS - reactor coolant system
RHR - residual heat removal system
RTD - resistance temperature detector
RVLIS - reactor vessel level indication system