PORTLAND GENERAL ELECTRIC COMPANY

TROJAN NUCLEAR PLANT

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QUALITY RELATED

Revision 2*

ADMINISTRATIVE ORDER - AO-4-7

Procedures Generation Package for Emergency Operating Procedures (EOPs)

APPROVED BY ________ DATE 1/13/86

PURPOSE

This order outlines the method to be used to develop and implement new or revised Emergency Operating Procedures (EOPs). This procedure is applicable beginning with EOPs that are based on Revision 1 to the Westinghouse Owners Group (WOG) Emergency Response Guidelines.

REFERENCES

1. NUREG-0899, Guidelines For the Preparation of EOPs, August 1982.
2. INPO 82-013, EOP Implementation Assistance Program.
3. INPO 82-016, EOP Implementation Guideline.
4. INPO 82-017, EOP Writing Guideline.
5. INPO 83-004, EOP Verification Guideline.
6. INPO 83-006, EOP Validation Guideline.
7. INPO 83-007, EOP Generation Package Guideline.
8. WOG Emergency Response Guidelines Executive Volume Administration and Application, Revision 1, September 1983.
9. Draft Safety Evaluation for Trojan Nuclear Plant Procedures Generation Package, June 1985.

*This procedure has been extensively revised.

ORDERS

I. INTRODUCTION

The Trojan Procedures Generation Package for EOPs has been developed to provide administrative and technical guidance on the preparation and implementation of EOPs. It is applicable to the preparation of new EOPs and the revision of old EOPs. Anyone involved in EOP preparation should be familiar with the Procedure Generation Package to ensure its concepts are consistently applied.

The Procedures Generation Package describes methods for the preparation, validation/verification, training, and revision of Trojan EOPs. It discusses the generic guidelines developed for Westinghouse plants and Trojan's program to develop Plant-specific procedures from these guidelines. The package details the format and writing principles to be utilized in preparing Trojan EOPs. A sample EOP is included as Appendix B to demonstrate the format and style adopted for use.

The Procedures Generation Package is issued by the Plant General Manager. Any proposed revisions to the guide will be treated in accordance with applicable Trojan Administrative Orders and will be implemented with the approval of the Trojan Plant General Manager without prior NRC approval. A copy of any substantiative revision shall be transmitted to the Manager, Nuclear Safety and Regulation after implementation for a determination as to whether submittal to the NRC is required.

This order contains the following sections:

II. WESTINGHOUSE OWNERS GROUP GENERIC EMERGENCY RESPONSE GUIDELINE PROGRAM

As a result of NUREG-0737 requirements to upgrade emergency operating procedures, the Westinghouse Owners Group (WOG) initiated a program to develop generic Emergency Response Guidelines. The output of this program is a set of Emergency Response Guidelines, related background information, analytical bases, and training information. The program output is intended to provide the basis for development of new plant-specific emergency operating procedures by utilities with Westinghouse plants.

A guideline structure which encompasses two distinct types of procedures has been defined. The overall guideline set is called the Emergency Response Guidelines (ERGs) and is composed of the following:

- Optimal Recovery Guidelines.

- Critical Safety Function Status Trees and Functional Restoration Guidelines.

The Optimal Recovery Guidelines are event-specific and provide guidance in recovering from a broad spectrum of predefined event sequences including both design-basis events and events which go beyond the design basis.

The Functional Restoration Guidelines are intended for use with the Critical Safety Function Status Trees. Together they provide a systematic means for addressing challenges to plant critical safety functions. The Critical Safety Function Status Trees provide a method of systematically monitoring the status of selected functions:

A. Subcriticality (S).

B. Core Cooling (C).

C. Heat Sink (H).

D. RCS Integrity (P).

E. Containment Integrity (Z).

F. RCS Inventory (I).

If, through monitoring the status trees, a safety function is found to be under challenge, the user is directed to the appropriate Functional Restoration Guideline. Use of the Functional Restoration Guidelines is independent of initiating event or plant state.

The availability of both types of guidelines ensures procedural coverage for virtually any plant upset condition, including nondiagnosed events, multiple-failure conditions, and failures subsequent to initial event diagnosis. If diagnosis of the event is possible, the Optimal Recovery Guidelines specify actions for plant recovery. During recovery from a known event, the critical safety functions can be continually monitored to assure continued plant safety. If a challenge to a critical safety function occurs during the recovery, the status trees will direct use of a specific Function Restoration Guideline to restore the challenged safety function.

The Westinghouse Emergency Response Guidelines have been constructed to be generic and applicable to all Westinghouse-designed commercial PWR plants.

When certain areas of guidelines required definition of specific plant design features, the Westinghouse standard 4-loop, 3425-MWt plant design was used. The guidelines address major steps in the emergency response and provide a framework for the preparation of detailed, plant-specific emergency procedures. As a check on their accuracy and usefulness, the guidelines were subjected to an extensive verification and validation program at a Westinghouse plant simulator.

III. TROJAN EOP PROGRAM

The development of Emergency Operating Procedures is a dynamic process. Although approved procedures are always in place, they are constantly subject to change as a result of improved analytical techniques, operating experience, system changes, etc. There is also a competing need to maintain continuity in the EOPs so that operators are not continually subjected to a retraining process. Thus, the EOP program must balance these needs by providing a measure of continuity while providing for change. To achieve these ends, a method is prescribed for developing both new and revised EOPs, using a consistent set of guidelines. A method for maintaining the EOPs, together with their supporting documentation and proposed changes, is also described.

Trojan EOPs will be modeled after and closely parallel the generic WOG guidelines. Emergency Instructions, Event Specific Emergency Instructions, and Emergency Contingency Actions will be developed from the WOG Optimal Recovery Guidelines. Critical Safety Function Status Trees and Functional Restoration Instructions will parallel those developed by the WOG.

A. EOP Development

Trojan EOPs will be developed using the principles from the format guidelines in Section IV and appropriate technical guidelines. Knowledge gained from previous operational experience and human factors considerations will be incorporated into the procedures. In some instances, the EOPs will also include actions based upon specific licensing commitments that have been made to the NRC.

The Trojan technical guidelines will be made up of two sources. The first source is the WOG generic technical guidelines. The second source is a documented comparison of the significant design differences between Trojan and the reference plant used to develop the WOG guidelines. The comparison identifies instances where Trojan EOP steps may need to differ from the WOG guideline steps to comply with the intent of the step. It is not necessary to physically incorporate the Trojan-specific items into the WOG guidelines prior to actual EOP writing.

In writing an EOP from its WOG guideline, it is not necessary to utilize the exact same wording or ordering of information as the generic guidelines. Nor is it necessary that action steps be conducted exactly as listed in the generic guidelines. Equivalent actions that accomplish the purpose or intent of the generic guideline steps are considered to follow the generic guideline. In cases where the guidelines are not followed due to plant specific differences, prior operational experience, etc., the exceptions will be justified and documented as described in Section III.B.

Conversion of a WOG guideline into a Trojan procedure typically involves expanding the WOG guideline steps to include more details and plant specific information. The format and writing conventions from Section IV of this document are utilized to aid in converting a guideline to a procedure. The sample EOP of Appendix B will be a useful aid in constructing a new proecedure.

During the procedure development phase, the EOP writer will incorporate human factor principles to structure procedure steps most efficiently. These principles include verification that control room and plant hardware are available, use the same designation, use the same units of measurement, and operate as specified in the procedures. While these items will also be checked during the validation process described in Section V, they should be considered at the earliest stages of procedure development.

The WOG guideline background information identifies the characteristics of instrumentation needed to implement the EOPs. PGE-1043, "Accident Monitoring Instrumentation Review for the Trojan Nuclear Plant", describes the program which ensures the availability of instrumentation to monitor variables and systems following an accident. This document should be referenced during the EOP writing process for characteristics of the required instrumentation.

After development by this process, EOPs will be further evaluated via a verification and validation sequence. This process (described in Section V) performs a detailed examination of the EOPs to ensure that the concepts of the WOG Guidelines and Procedures Generation Package have been incorporated and that the procedure fulfills its purpose. Training on new EOPs (described in Section VI) will also be conducted to ensure plant operators can effectively use the EOPs to mitigate the consequences of an accident.

Development of an EOP in the manner described here provides assurance that the procedure is technically correct, is administratively sound and can be performed as written in the Trojan Control Room.

B. EOP Development Documentation

The Trojan EOP development program is designed to address the requirements of Reference 1 with guidance from References 2-9. The principle NRC objective in EOP review has been to minimize the amount of plant specific procedure review and approval by concentrating their staff review efforts on the generic WOG guidelines. Therefore, any significant deviation which changes the intent of the WOG guidelines could constitute an unreviewed safety question under 10CFR50.59, requiring specific NRC approval prior to implementation. All Trojan EOP deviations from the WOG Guidelines shall be identified, including deviations in both step sequencing and step content. Technical justification of all deviations must be provided. Justification involves an explanation of the reason for the deviation and an indication of the safety significance if applicable. The justification should ensure that the actions proposed for the Trojan procedure produces results equivalent to those of the WOG Guidelines. While many minor deviations have been made and justified, there are no significant procedure deviations requiring NRC approval in the Trojan EOPs upgraded to the WOG Revision 1 Guidelines.

In order to prevent having safety-related deviations which alter the intent of the WOG Guidelines and to minimize other differences between Trojan EOPs and the WOG guidelines, Trojan EOPs will be carefully written to correspond to the WOG Guidelines to the extent that design and operational differences allow. This correspondence will be ensured by maintaining an updated set of the following five support documents:

1. Trojan - WOG Reference Plant Comparison.

   This is a comparison made to identify the differences between the Trojan plant design and the reference plant design used to generate the WOG Guidelines. These design differences justify certain minor differences in the Trojan procedures from the WOG Guidelines and will be documented in Appendix C.

2. Step Sequencing Comparison.

   This document compares the ordering of each step in the WOG Guidelines with the sequence of steps in the Trojan procedures. Each Trojan procedure must be verified to be within the step sequence variation allowed in the WOG Guideline background documents. Any differences must be justified and verified to be insignificant. Documentation shall be provided on Appendix D.

3. Step Verification Document.

   This document compares each Trojan procedure step with the corresponding WOG guideline step to verify compatibility of

step content. Again, justification must be offered for any differences, typically resulting from operating experience or design differences. All step comparisons shall be documented on Appendix E.

4. Step Background Document.

In this document, a purpose and basis for each step, note, and caution in every Trojan EOP is provided. This helps ensure that there are no steps which do not belong in the procedure. It also helps prevent removal of procedure steps in subsequent revisions due to inadequately documented justification for each step. The background information also enhances the training process described in Section VI. Step background documentation shall be provided on Appendix F.

5. Values and Setpoints Document.

Every value or setpoint used in Trojan EOPs must be justified by a reference or calculation. Proper conversion of WOG Guideline footnotes into Trojan values must be ensured by documenting on Appendix G the following information: footnote requirement for each process variable, corresponding Trojan value, instruments used, references/calculations, and procedures in which each footnote is used. Trojan setpoints not specifically addressed by WOG guideline footnotes shall be documented on Appendix H.

IV. FORMAT AND WRITING PRINCIPLES

The style and format of a procedure can have significant impact on how useful it is when needed in an emergency. A procedure that is confusing or hard to follow can severely hamper an operator responding in a stressful situation. Likewise, a well-written procedure that is clearly written and simple to follow can be a valuable operator aid. Thus, it is important that a standard format be adopted and consistently used for all EOPs and that good writing practices be defined and followed.

Trojan EOP format is patterned after that described in the Writers Guide and Users Guide sections of Reference 8. This reference should be consulted for additional general instruction on format and writing principles.

A. EOP Designation and Numbering

EOPs are procedures that govern the plant operation during emergency conditions and specify operator actions to return the plant to a stable condition. The EOPs are made up of Emergency Instructions (EIs), Event Specific Emergency Instructions (ESs), Emergency Contingency Actions (ECAs), and Function Restoration Instructions (FRs).

EIs (including their ES subprocedures) and ECAs are event-specific (ie, they assume the operator has identified the casualty). FRs are nonevent-specific and are based on protecting certain critical safety functions. EOP designations are discussed further in AO-4-1, Plant Operating Manual Description.

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

1. Procedure Identification.

   The first page of every EOP shall contain the following minimum information:

   - Descriptive Title.

   - Procedure Number.

   - Revision Number.

   - Approval Signature and Date.

   - Number of Pages.

   This information serves to identify the procedure, identify the authorized revision, and define the scope of the procedure.

2. Procedure Numbering.

   Emergency Operating Procedures shall be labeled with the following designators:

   EI - Emergency Instructions

   ES - Event Specific Emergency Instructions

   ECA - Emergency Contingency Actions

   FR - Functional Restoration Instructions

   A sequential number (or letter in the case of FRs) will follow the designator to uniquely identify each procedure. The sequential numbers reflect four major categories:

   0 - Non-Accident
   1 - Loss of Reactor Coolant
   2 - Loss of Secondary Coolant
   3 - Steam Generator Tube Rupture

Subprocedures or related procedures will be designated by the use of decimals. Example:

EI-3 - Steam Generator Tube Rupture

ES-3.1 - Post SGTR Cooldown Using Backfill

3. Revision Numbering and Designation.

The revision number of an EOP is indicated on every page. To identify revisions to the text, a change bar located in the left margin alongside the text change will be used to indicate a change in the left column. A bar in the right margin will indicate a text change in the right column.

4. Page Identification and Numbering.

Each page of the procedure will be identified by (1) the procedure designator and number, (2) the revision number, and (3) the page number specified as "Page ____ of ____". This information will be located at the bottom right-hand side of each page.

5. Table of Contents.

A table of contents will be utilized to provide quick reference to the EOPs. All EOPs and their subprocedures will be identified by number, title, and relative location.

B. Format

A unique format will be used for Trojan EOPs from that used in normal operating procedures. This format is intended to help the operator quickly move from step to step with minimum confusion and need to become entangled in nonapplicable contingency steps. The format adopted for use is demonstrated in Appendix B.

1. Page Format.

The EOPs will be written in a two-column, dual-level format. The left-hand column is labeled "Action/Expected Response". Each step consists of a high-level action step which may be followed by indented substeps to detail the method of performing the high-level steps. Expected responses to the action steps are also shown in the left-hand column. The right-hand column is labeled "Response Not Obtained", and contains contingency actions and transitions to other guidelines. When the expected response in the left-hand column is not obtained, the user moves to the right-hand column for contingency instructions.

2. Procedure Organization.

Each procedure will be organized as shown in Appendix B. The first information given is the procedure title and approval data. This is followed by a section containing procedure purpose, a brief description of the intent of the procedure. Next is an entry conditions section, which lists indications or conditions to assist the operator in verifying he is in the appropriate EOP. The entry conditions section is followed by operator action steps. Immediate operator actions, if any, will be designated by a NOTE at the beginning of the procedure. Immediate actions apply to steps which may be performed by the operator, based on his memory, without reference to the written procedure. These steps should be limited to verifications if possible.

Procedure format (page size, margins, blocking, spacing, and general layout) will be as shown in Appendix B and is maintained by the Office Supervisor, If a page needs to be rotated, the top of the page with rotated print is the normal left-hand edge. The page margins, identification, and numbering will not be rotated.

A reference page may be used with an EOP if necessary to provide easy access to important information which is applicable throughout the procedure. The reference page will be printed on the back side of each procedure page for easy reference. The reference page is used to summarize information which the operator should have continuously available.

Support material such as graphs, charts, tables, and figures which cannot be included in the body of a procedure should be presented as attachments at the end of the procedure. Section IV.B.8 provides specific instructions for support mateial.

3. Numbering and Indentation.

Arabic numerals will be used for numbering high-level action steps of each procedure. Detailed action steps will be indented and identified by small letters. If further subdivision is needed, arabic numerals with partial parentheses will be used.

Example:

9. <u>Check if RHR Can Be Placed in Service</u>

    a. Check the following:

        1) RCS temperature - < 350°F.

        2) RCS pressure - < 425 psig.

    b. Place RHR in service using OI-4-1.

Bullets may be used in procedure substeps in place of letters or numbers if the order in which the substeps are performed is not important. Example:

7. Verify Secondary Integrity

   a. Check pressures in all S/Gs.

      o No S/G pressure decreasing in an uncontrolled manner.

      o No S/G completely depressurized.

Parallel construction of steps in each column will be used, with the step numbers appearing on the left-hand side of the page. The numbering scheme lends itself well to use as a place-keeping aid. The operator can cross off the number of each step as it is completed.

C. Writing Instructions

1. Action Step Length and Content.

   a. Action steps should deal with only one idea.

   b. Instructions written in short sentence fragments are preferrable to long, compound, or complex sentences.

   c. Complex evolutions should be prescribed in a series of steps, with each step made as simple as practicable.

   d. An action step should be completed on the same page where it began. However, if one or more CAUTIONS apply to the step, the step should start on the same page as the CAUTIONS and continue on the following page if necessary, to ensure that the CAUTIONS are on the same page as the step they apply to.

   e. Actions required in a particular step should not be expected to be complete before the next step is begun. If a particular step must be completed prior to continuation, this condition must be stated clearly in that step or in a NOTE or CAUTION preceeding the step. It should also be clearly stated if actions steps must be performed at the same time.

   f. The number of action verbs and objects per step should be minimized. A step should normally contain only a single-action verb.

g. Limits should be expressed quantitatively whenever possible.

h. Identification of components and parts should be complete.

i. Expected results of routine tasks need not be stated.

j. Where appropriate, verification steps should be used to determine whether the objective of a task or sequence of actions has been achieved. An example of this is verifying flow following valve lineup changes.

k. 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 action. Operator actions should be related to plant parameters.

l. When additional confirmation of system response is considered necessary, prescribe the backup readings to be made.

m. 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.

n. Describe the system response time associated with performance of the instruction if it would enhance the user's understanding and performance.

o. The unique action words "try", "monitor", "control", and "maintain" denote actions to be performed continuously until directed otherwise.

p. When the action verb in a step has three or more objects (for instance, valves to be operated), the objects should be listed separately from the written text to reduce the potential of overlooking one of the objects. For example, use this format:

   Verify CIS Phase B Valves - CLOSED

   MO-3294 - CLOSED
   MO-3296 - CLOSED
   MO-3300 - CLOSED
   MO-3320 - CLOSED

q. Action steps must be structured so that they can be executed by the minimum shift staffing and minimum control room staffing required by Technical Specifications.

r. Action steps should be consistent with the roles and responsibilities of the operators.

s. Action steps should be structured to minimize physical conflicts between personnel and amount of movement needed to carry out the steps.

t. Action steps should be structured to avoid unintentional duplication of tasks.

u. Action step column structure shall be as follows:

1) Action/Expected Response Column.

The left-hand column of the dual-column format will contain the operator instructional steps. In addition, this column presents indications the operator should expect to receive. This column should contain actions consistent with expected indications vice contingency actions or supplementary information. High-level action steps are underlined and expected responses are capitalized for added emphasis.

2) Response-Not-Obtained Column.

Contingency actions will be presented in the right-hand column of the dual-column format. Contingency actions are operator actions that should be taken in the event a stated condition, event, or task does not represent or achieve the expected result.

Contingency actions should be specified for circumstances in which the expected results or actions might not be achieved. The contingency actions will typically identify directions to override automatic controls, to manually initiate functions which are normally initiated automatically, or directions to go to another procedure.

2. Use of Logic Terms.

The logic terms AND, OR, NOT, IF, IF NOT, WHEN, and THEN are often necessary to describe precisely a set of conditions or sequence of actions. When logic statements are used, the logic terms should be highlighted by capitalization so that all conditions are clear. The following general guidelines apply to the use of logic terms:

a. AND and OR used together can produce an ambiguous logic statement. Avoid using the two logic words within the same action statement when possible.

b. The dual-column format equates to the logic, IF NOT the action in the left-hand column, THEN follow the action specified in the right-hand column.

c. When attention should be called to combinations of conditions, the word AND should be placed between the description of each condition. If four or more conditions need to be joined, consider using a list format.

d. When a number of alternative actions are equally acceptable, those actions should be separately listed and separated by the word OR.

e. The use of OR for conditions should be in the inclusive sense, indicating any or all conditions may be present. For example:

<u>Check If SI Is In Service</u>

• SI pumps - ANY RUNNING

- OR -

• BIT - NOT ISOLATED.

OR should be used in the exclusive sense for alternative actions that are equally acceptable, indicating that only one alternative should be performed. For example:

<u>Go To Appropriate Post-SGTR Cooldown Method</u>

a. Go to ES-3.1, Post-SGTR Cooldown Using Backfill, Step 1.

- OR -

b. Go to ES-3.2, Post-SGTR Cooldown Using SGBD, Step 1.

- OR -

c. Go to ES-3.3, Post-SGTR Cooldown Using Steam Dump, Step 1.

f. Conditional statements should be written so that the description of the condition appears first, followed by the action instruction. WHEN is used for an expected condition. IF is used for an unexpected, but possible condition.

g. IF NOT is used when the operator must respond to the second of two possible conditions. IF is used to specify the first condition.

h. THEN should not be used at the end of an action step to instruct the operator to perform the next step because it runs actions together.

i. All letters of logic terms should be capitalized to lend emphasis.

3. Use of Cautionary Information and Notes.

Cautions are used to alert an operator to conditions that could result in health hazards, or equipment or Plant damage. Cautions should describe the hazardous conditions and consequences of actions.

Notes are a means for providing descriptive or explanatory information intended to aid the operator. Notes can be used to provide additional information without encumbering the instructional steps.

The following guidelines apply to cautions and notes:

a. Cautions should be placed directly ahead of the steps to which they apply, unless they apply to the entire procedure. In this case, place them at the beginning of the procedure.

b. The entire text of a caution or note should be on one page. A caution should normally be on the same page as the first step to which it applies.

c. The words CAUTION and NOTE are capitalized, and the caution or note is framed to lend emphasis. Examples are shown in Appendix B.

d. Information in notes should be presented in the order in which it is needed. If the information is intended to aid in the performance of a step, place it ahead of the step. If it pertains to the results of a step, place it after the step.

e. Notes and cautions should extend across both columns of the dual-column format.

f. Notes and cautions should not normally contain action steps.

4. Calculations.

Mathematical calculations should be avoided in EOPs. If a value has to be determined to perform a procedural step, a chart or graph should be used whenever possible. It may be preferable to provide a chart or graph as an attachment to the procedure.

If a calculation is needed, provide enough space in the procedure for the operator to perform the calculations and record the results. Provide conversion factors or other guidance so that the answer can be obtained in the correct units.

5. Referencing and Branching to Other Procedures or Steps.

Referencing implies that an additional procedure or additional steps will be used as a supplement to the procedure presently being used. Referencing another procedure or excessive backward and forward referencing within the same procedure can be confusing and can lead to skipping of steps, particularly since the referenced steps may not return the operator to the directing step. Referencing should therefore be minimized. When only a few steps need to be referenced, the steps should be stated in the procedure wherever they are needed. When referencing is used, directions should be clear as to when and where the original procedure should be reentered. The words "refer to" are used to direct an operator to perform steps in another procedure. Referencing of another procedure is best utilized when the procedure referenced can be performed in parallel with the existing procedure. In that case, the phrase "refer to...while continuing with this procedure" should be used. If only a portion of another procedure is to be used, the applicable procedure section should be referenced.

Branching signifies that the operator is to exit the procedure presently being used and use another procedure in its entirety. Branching eliminates most of the problems associated with referencing, since the operator does not continually need to move back and forth between procedures. The words "go to" are used to direct an operator to leave one procedure or step and not return unless directed.

6. Component Identification.

Equipment, controls, and displays will be identified in common usage terms. These terms may not always match names engraved on panels but will be complete. Approved abbreviations from Appendix A may also be used in referring to equipment. When needed for clarity, valve numbers should be included with valve names. When specific annunciator alarms are referenced, the title should normally be spelled out exactly as engraved.

7. Level of Detail.

The level of detail of an EOP should be that which a newly trained and licensed operator would desire during an emergency condition. Avoiding too much detail is an important consideration, however, because of the need for timely response and to minimize errors. The EOP action steps are written using a tier approach, with both a higher and lower degree of detail. The upper-level task is followed by subtasks with a higher degree of detail. This approach should satisfy the information needs of both experienced and inexperienced operators. Any information which an operator is required to know based on his traning and experience, such as equipment locations, should not be included.

8. Printed Operator Aids.

When information is presented using graphs, charts, tables, and figures, these aids should be self-explanatory, legible, and readable under the expected conditions of use and within the reading precision of the operator. Printed operator aids can be presented as attachments to EOPs. A reference page may be used with an EOP as described in Section IV.B.2. The reference page is the only operator aid which should be presented on the back side of procedure pages. The following guidelines are established for the use of graphs, figures, and tables:

a. Graphs, tables, and figures which are on a separate page from the procedural text should be presented as attachments at the end of the procedure.

b. Graphs, tables, and figures should be clearly labeled. If not on a separate page from procedural text, they should be clearly separated from the text for easy identification.

c. The axes of graphs should be clearly labeled, including units.

d. An underlined heading should be entered for each column of a table.

D. Writing Style

EOPs should be written in a style that presents information in a simple, familiar, and unambiguous manner. The most familiar and most specific words that accurately convey the intended meaning should be used. EOP steps should be written in short sentences and sentence fragments to keep their content as simple and easily understood as possible.

Punctuation and capitalization should normally conform to standard American English usage. Abbreviations listed in Appendix A may be utilized in EOPs, but should be used sparingly. Units of measure should be familiar to the operator and should relate to those referenced on plant instrumentation without conversion.

The symbols "<" and ">" should be used instead of the words "less than" and "greater than" to eliminate unnecessary words from EOP steps.

Arabic numerals will be used throughout the EOPs unless equipment is commonly referred to by another means. When presenting instrument values, utilize a conservative value within the precision of operator readability vice giving a tolerance band, unless the tolerance band is critical. Acceptance values should be specified in such a way that addition and subtraction by the user is avoided. This can generally be done by stating acceptance values as limits. Examples: 510°F maximum, 300 psig minimum, 580° to 600°F, etc. Avoid using ± to specify acceptance bands. Whenever possible, round off values to an easily readable number for human factor considerations (eg, round off 49.7% pressurizer level to 50%).

V. VALIDATION/VERIFICATION PROGRAM

Prior to EOP implementation, they must undergo a process of validation/verification. This is a process by which the procedures are evaluated against a set of objectives which address whether the procedures are prepared properly and are usable from a technical and human factor standpoint. Elements of the validation and verification process overlap and complement each other significantly. However, each separate process will be described here to clarify how the overall program objectives will be met.

A. Verification

EOP verification is the evaluation performed to confirm the written correctness of the procedure and to ensure that applicable generic and Trojan-specific technical information has been incorporated properly. Discrepancies between the EOPs and their source documents are identified, evaluated, resolved, and documented. The following objectives will be met by the Trojan EOP verification process:

1. The EOPs are technically correct, ie, they accurately reflect the WOG Guidelines and other EOP source documents.

2. The EOPs are written correctly, ie, they accurately reflect this administrative order.

3. A correspondence exists between the procedures and the control room/plant hardware.

4. The language and level of information presented in the EOPs are compatible with the qualifications, training, and experience of the operating staff.

The major thrust of the verification process is maintenance of the five support documents described in Section III.B. These documents are the Trojan-WOG Reference Plant Comparison, Step Sequencing Comparison, Step Verification document, Step Background document, and the Values and Setpoints document. These documents ensure that objective 1) is met and they provide significant input for meeting objectives 2) and 3). See Section III.B for more detailed discussion of these documents.

An independent technical review required to be performed on all new or revised EOPs serves to ensure all four of the above verification objectives are met. The technical review is performed by a person other than the procedure writer who is experienced in the EOP writing or who is a licensed senior reactor operator. The technical review shall be completed and documented in accordance with the requirements of AO-4-4, Plant Operating Manual Changes.

Another independent review of all new or revised EOPs is performed by the Nuclear Safety and Regulation Department (NSRD). The NSRD procedure review condentrates on ensuring that objectives 1) and 3) are met. The results of this review are documented by a memo from NSRD to the Trojan Operations Department.

The above verification process will be performed in its entirety for any EOP change whether it involves a new EOP or a minor EOP revision. Problems identified will be resolved and incorporated into the EOP as applicable.

B. <u>Validation</u>

EOP validation is the evaluation performed to determine that the actions specified in the procedure can be performed by the operator to manage the emergency conditions effectively. The following objectives will be met by the Trojan EOP validation process:

1. The EOPs are usable, ie, they can be understood and followed without confusion, delays, and errors.

2. A correspondence exists between the procedures and the control room/plant hardware.

3. The instructions presented in the EOPs are compatible with the shift manpower, qualifications, training, and experience of the operating staff.

4. A high level of assurance exists that the procedures will work, ie, the procedures guide the operator in mitigating transients and accidents.

The WOG Emergency Response Guideline development program provides for simulator validation of the generic guidelines. This generic validation program, in conjunction with the Trojan EOP verification process, forms the framework for meeting the above objectives. Simulator validation of Trojan EOPs, Trojan control room walkthroughs, detailed Control Room Design Review (CRDR), NSRD procedure review, and Trojan EOP Job and Task Analysis all supplement the generic WOG validation program to meet the above objectives. The extent that the above methods are used depend on the significance of the EOP changes as determined by the Operations Supervisor. He will ensure that the above objectives are met by the validation methods chosen. In general, a major change such as EOP upgrade to revision 1 of the WOG Guidelines requires use of all of the above methods.

A simulator validation exercise will be performed for new EOPs or significant additions/deviations from WOG Guidelines prior to implementation at the discretion of the Operations Supervisor. Simulator validation alone will ensure that all four validation objectives are either fully or partially met. The simulator exercise consists of accident scenarios which should be constructed to ensure a majority of the EOPs are exercised. Single, sequential, and concurrent failures must be included in the scenarios and documented on Appendix I. Expected procedure transitions based on the scenario should be predicted by the simulator validation director prior to the exercise. Expected transitions can be compared with actual transitions to identify potential problems. Accident scenario results must be representative of the generic WOG simulator validation results to take credit for the extensive conclusions of generic validation. EOPs which are not exercised during the accident scenarios must undergo a walk-through or talk-through at the simulator to ensure all EOPs are included in the simulator validation.

The simulator validation team should consist of two groups - an observation team and an operations team. The observation team should include a validation director (procedure writer or licensed SRO) and a human factors expert to record comments. The operations team should include one licensed SRO, two licensed ROs, and one STA. No more than the minimum operating staff required by Technical Specifications may be included on the operations team. The validation criteria in Appendix J should be used by all participants to prompt comments and suggested improvements. All comments and resolutions must be documented on Appendix K.

A Trojan control room walkthrough should be performed for those procedures which cannot be fully exercised due to the limitations of the simulator. An example of this case includes the "Loss of All AC Power" procedures. Minor procedure changes which do not warrant a complete simulator exercise may also be subjected to a control room walkthrough at the discretion of the Operations Supervisor. The control room walkthrough should ensure that all validation objectives are met with input from Appendix J. Walkthrough documentation must be provided on Appendix K.

A detailed control room design review (CRDR) should be performed for all new EOPs. This review is performed to ensure objective 2) is met by verifying the procedures reflect actual control room/plant hardware, instruments, controls, indications, and use the same designation and units of measurement. The CRDR may include control room walkthroughs as described above and may supplement or replace those walkthroughs at the discretion of the Operations Supervisor. This process is more fully described in PGE-1041, "Detailed Control Room Design Review Summary Report". CRDR documentation will normally be provided by NSRD.

The Training Department should conduct a job and task analysis of new EOPs in accordance with the Training Administration Manual to ensure the operators are adequately qualified and trained to carry out the actions of the EOPs. This helps ensure that objective 3) is met. The job and task analysis does not need to be fully completed prior to EOP implementation.

Any deficiencies found in an EOP during the validation process must be documented and resolved to the satisfaction of the Operations Supervisor prior to implementration. If major rework of the EOP is required, it shall be subjected to the validation process again at the discretion of the Operations Supervisor.

VI. TRAINING PROGRAM

It is imperative that operators be fully cognizant of the content of EOPs. This section describes the methods that will be used to ensure each operator remains up to date when new EOPs are introduced and old EOPs are changed. Operator knowledge and performance will be evaluated following EOP training and appropriate followup training will be conducted in deficient areas as described in the Training Administration Manual.

The goals of the EOP training program are as follows:

1. Enable the operators to understand the structure of the EOPs.

2. Enable the operators to understand the technical bases of the EOPs.

3. Enable the operators to have a working knowledge of the technical content of the EOPs.

4. Enable the operators to use the EOPs under operational conditions.

A. New EOPs

New EOPs are defined as EOPs which have significantly changed as determined by the Operations Supervisor. For example, the package of EOPs upgraded to the WOG Revision 1 Guidelines are considered new EOPs. Operator training on new EOPs should be completed prior to their implementation. The scope of training required for new EOPs will be determined by the Operations Supervisor and Training Supervisor based on the magnitude of changes in the new EOPs to ensure the above objectives are met.

The training program for the new EOPs will be composed of a combination of the following:

- Classroom training
- Simulator exercises
- Operator self-study
- Control room walkthroughs
- Crew talk-throughs

New EOPs will be presented to all licensed operators in the classroom during the continuous retraining program described in the Training Administration Manual. Study material should include the procedure background information and related technical information to ensure the principles behind the procedures are clearly understood. Classroom instruction should also include the philosophy behind the EOPs, procedure usage, and terminology unique to EOPs.

All licensed operators will exercise a majority of new EOPs at a generic simulator. Accident scenarios will encompass a wide variety of transients and as a minimum will include those described in the Training Administration Manual. Operators will perform as a team and will be trained in the roles they would be expected to take in case of an actual emergency. Additional training can be conducted where the members of a crew alternate responsibilities to enhance understanding of other roles and improve control room communications. Scenarios will be discussed following the simulator exercise to critique operator actions and discuss potential differences in actual plant response due to the limitations of the generic simulator.

All operators will review new EOPs on a self-study basis in accordance with AO-3-4, Plant Operating Manual Revision Notification.

Control room walkthroughs and/or crew talk-throughs can be performed on new EOPs as a substitute for or supplement to simulator exercises. Walkthroughs and talk-throughs may be used when generic simulator exercises and classroom instruction are inadquate to meet all objectives of the training program.

B. EOP Changes

Training for all EOP changes will be conducted and documented in accordance with AO-3-4, Plant Operating Manual Revision Notification. This consists of self-study of the EOP changes by all operators. The classroom retraining program and annual simulator training described in the Training Administration Manual supplements operator self-study of minor changes. For major EOP changes, the Operations Supervisor may direct that training be conducted consistent with that required for new EOPs.

VII. EOP REVISION

The number of revisions to the EOPs should be minimized to avoid the need for operator retraining and to minimize the possibility of confusion. When required, EOP revisions will be initiated in accordance with applicable Trojan Administrative Orders.

EOP change recommendations will be screened by the Operations Supervisor to determine the urgency of the change. If deemed necessary, the change will be implemented promptly. Changes of a nonurgent nature (minor action step changes, minor improvement in wording or format, corrections, spelling, etc.) should be consolidated and implemented on an annual basis. A corrections copy of each EOP will be maintained by the Operations Engineer for this purpose. If urgent revisions are required at any point, proposed minor changes can be incorporated at the same time. The EOP development documentation described in Section III.B shall be updated following any revision.

Suggested changes will be encouraged from all sources and promptly evaluated to ensure EOPs are maintained as useful and up-to-date as possible. The following sources are examples of inputs used for revision of EOPs:

A. WOG ERG revisions.

B. WOG ERG feedback items.

C. Plant/control room design changes.

D. Industry events.

E. Operational experience.

F. Simulator training feedback.

G. Clasroom training feedback.

H. Two-year technical reviews.

I. Instrument accuracy changes.

J. Technical Specification changes.

K. Human factors reviews.

APPENDIX A

Standard List of Abbreviations For Control Board Labels and Procedures

Abbreviation	Definition
ABDT	Auxiliary Building Drain Tank
ABP	As-Built Package
ABS	Auxiliary Building Sump
ABPS	Auxiliary Building Passageway Sump
AC	Alternating Current
A/C	Air Compressor
ACB	Air Circuit Breaker
ACC	Accumulator
ACO	Assistant Control Operator
AFB	Auxiliary Fuel Building
AFD	Axial Flux Difference
AFP	Auxiliary Feed Pump
AFW	Auxiliary Feedwater
AGA	Automatic Gas Analyzer
ALT	Alternate
AMP	Ampere
ANI	American Nuclear Insurers
ANS	American Nuclear Society
ANSI	American National Standards Institute
AO	Administrative Order/Auxiliary Operator
ARI	All Rods In
ARM	Area Radiation Monitor
ARO	All Rods Out
ASME	Americal Society of Mechanical Engineers
AST	Assistant Shift Supervisor
AT	Accumulator Tank
ATWS	Anticipated Transient Without Scram
BA	Boric Acid
BAE	Boric Acid Evaporator
BAST	Boric Acid Storage Tank
BATPP	Boric Acid Transfer Pump
BCW	Bearing Cooling Water
BFR	Before
BIST	Boron Injection Surge Tank
BIT	Boron Injection Tank
BOL	Beginning of Life
BKR	Breaker
BLDG	Building
BNG	Bearing
BPRA	Burnable Poison Rod Assembly

Abbreviation	Definition
BTV	Bleeder Trip Valve
BURP	Containment Pressure Reduction via the Hydrogen Vent System
BYP	Bypass
CAC	Containment Air Cooler
CAL	Calibration
CAS	Central Alarm Station
CCP	Centrifugal Charging Pump
CCW	Component Cooling Water
C/D	Cooldown
CHG	Charge/Charging
CHWDT	Chemical Waste Drain Tank
CIS	Containment Isolation Signal
CIV	Combined Intercept Valve
CKT	Circuit
CL	Cold Leg
CLNG	Cooling
CNDSR	Condenser
CNTRL	Control
CO	Control Operator
COM	Common
COND	Condensate
CONN	Connect
CONT	Containment
CR	Control Room
CRDM	Control Rod Drive Mechanism
CRDS	Control Rod Drive Shaft
CROCTRM	Control Room Operating Curves and Tables Reference Manual
CRT	Cathode Ray Tube (T.V. Screen)
CS	Containment Spray
C/S	Control Switch
CSAS	Containment Spray Actuation Signal
CSD	Cold Shutdown
CSF	Critical Safety Function
CSFST	Critical Safety Function Status Tree
CSR	Cable Spreading Room
CST	Condensate Storage Tank
CV	Control Valve
CVCS	Chemical and Volume Control System
CVIS	Containment Ventilation Isolation Signal
CWRT	Clean Waste Receiver Tank
ΔT or Delta-T	Delta Temperature
ΔP or Delta-P	Delta Pressure
DBA	Design Basis Accident
dB	Decibel

Abbreviation	Definition
DBE	Design Basis Earthquake
DC	Direct Current
DCP	Detailed Construction Package
DCN	Design Change Notice
DEMIN	Demineralizer
D&DS	Discharge and Dilution Structure
DDT	Diesel Day Tank
DFO	Diesel Fuel Oil
DISCH	Discharge
DRPI	Digital Rod Position Indication
DRW	Dirty Radioactive Waste
DTO	Danger Tagged Out
DWDT	Dirty Waste Drain Tank
DWMT	Dirty Waste Monitor Tank
DWST	Demin Water Storage Tank
EBOP	Emergency Bearing Oil Pump
ECA	Emergency Contingency Action
ECC	Eccentricity
ECCS	Emergency Core Cooling System
ECP	Estimated Critical Position
ECR	Emergency Coolant Recirculation
EDG	Emergency Diesel Generator
EHC	Electro Hydraulic Control System
EI	Emergency Instruction
ELD	Extraction Line Drain
EMGY	Emergency
EOL	End of Life
EOP	Emergency Operating Procedure
EP	Emergency Procedure
EPRI	Electric Power Research Institute
EQUIP	Equipment
ER	Event Report
ERG	Emergency Response Guideline
ES	Event Specific Emergency Instruction
ESF	Engineered Safeguards Features
ETS	Environmental Technical Specifications
EX	Excess
EXH	Exhaust
FCN	Field Change Notice
FCV	Flow Control Valve
FD	Feed
FDR	Feeder
FEMA	Federal Emergency Management Agency
FI	Flow Indicator
FIS	Flow Indicating Switch
FIT	Flow Indicating Transmitter

Abbreviation	Definition
F/L	Full Length
FR	Functional Restoration Instruction
FRM	From
FSAR	Final Safety Analysis Report
FT	Flow Transmitter
FW	Feedwater
FWIS	Feedwater Isolation Signal
FWIV	Feedwater Isolation Valve
FWRV	Feedwater Regulating Valve
GAL	Gallon
GPM	Gallons Per Minute
GCH	Gas Collection Header
GOI	General Operating Instruction
H_2	Hydrogen
HX	Heat Exchanger
HCV	Hand Control Valve
HDP	Heater Drain Pump
HDR	Header
HDT	Heater Drain Tank
HED	Human Engineering Deficiency
HEPA	High Efficiency Particulate Air
HFP	Hot Full Power
HL	Hot Leg
HP	High Pressure
HS	Hand Switch
HSB	Hot Standby
HSD	Hot Shutdown
HTR	Heater
H/U	Heatup
HUT	Hold-Up Tank
H&V	Heating and Ventilation
HVAC	Heating, Ventilation and Air Conditioning
HX	Heat Exchanger
HYD	Hydraulic
HZ	Hertz
HZP	Hot Zero Power
IAEA	International Atomic Energy Agency
ICC	Inadequate Core Cooling
IDCN	Interim Design Change Notice
ILRT	Integrated Leak Rate Test
IMB	Inside Missile Barrier
INJ	Injection
INTLK	Interlock
INPO	Institute of Nuclear Power Operations
IR	Intermediate Range
ISI	Inservice Inspection

Abbreviation	Definition
ISO	Isolation
IST	Inservice Testing
IX	Ion Exchanger
KIP	Key Issue Post
LC	Locked Closed
LCC	Load Control Center
LCO	Limiting Condition for Operation
LCR	License Change Request
LER	License Event Report
LI	Level Indicator
LIS	Level Indicating Switch
LIT	Level Indicating Transmitter
LLRT	Local Leak Rate Test
LN	Line
LO	Locked Open
L/O	Locked Out
LOCA	Loss of Coolant Accident
LOSC	Loss of Secondary Coolant
LP	Low Pressure
LS	Level Switch
LT	Level Transmitter
L.T.	Locked Throttled
LTDN	Letdown
LVL	Level
M	Middle
MCC	Motor Control Center
MFP	Main Feedwater Pump
MFW	Main Feedwater
MG	Motor Generator
MLO	Main Lube Oil
MO	Motor Operated
MON	Monitor
MOV	Motor Operated Valve
MP	Maintenance Procedure
MR	Maintenance Request
MSIV	Main Steam Isolation Valve
MSLI	Main Steam Line Isolation
MSP	Motor Suction Pump
MSR	Moisture Separator Reheater
MSSS	Main Steam Support Structure
M/U	Makeup
MUPP	Makeup Pump
MWe	Megawatt Electric
N_2	Nitrogen
NA	Not Applicable
NAR	Narrow

Abbreviation	Definition
NCR	Non-Conformance Report
N.E.	Northeast
NIS	Nuclear Instrumentation System
NOB	Nuclear Operations Board
NOR	Normal
NPSH	Net Positive Suction Head
NR	Narrow Range
NRC	Nuclear Regulatory Commission
NSSS	Nuclear Steam Supply System
N.W.	Northwest
O_2	Oxygen
OBE	Operating Basis Earthquake
OC	Overcurrent
OCB	Oil Circuit Breaker
ODOE	Oregon Department of Energy
OI	Operating Instruction
OMB	Outside Missile Barrier
ONI	Off-Normal Instruction
OOS	Out of Service
OPΔT	Overpower Delta T
OSC	Operational Support Center
OSP	Oregon State Patrol
OTΔT	Overtemperature Delta T
OWS	Oily Waste Separator
PAARM	Post-Accident Airborne Radiation Monitor
PASS	Post-Accident Sampling System
P&ID	Piping and Instrument Diagram
PCV	P[illegible]re Control Valve
PCB	[illegible] Controlled Circuit Breaker
PDP	Positive Displacement Pump
PEP	Plant Engineering Procedure
PET	Periodic Engineering Test
PI	Pressure Indicator
PIC	Pocket Ionization Chamber
PICT	Periodic Instrument and Control Test
PIS	Pressure Indicating Switch
PIT	Pressure Indicating Transmitter
PMG	Permanent Motor Generator
PMW	Primary Makeup Water
PNL	Panel
POM	Plant Operating Manual
POR	Power-Operated Relief
PORV	Power-Operated Relief Valve
POT	Periodic Operating Test
PP	Pump
PPM	Parts Per Million

Abbreviation	Definition
PRB	Plant Review Board
PRESS	Pressure
PRM or PERM	Process Radiation Monitor or Process and Effluent Monitor
PROT	Protection
PRT	Pressurizer Relief Tank
PR	Power Range
PS	Pressure Switch
PSC	Plant Setpoint Change
PSIA	Pounds Per Square Inch Atmosphere
PSIG	Pounds Per Square Inch Gauge
PT	Pressure Transmitter
PTL	Pull To Lock
PTS	Pressurized Thermal Shock
PWST	Primary Water Storage Tank
PZR	Pressurizer
QA	Quality Assurance
QC	Quality Control
QN	Quality Notice
R	Rem
RCCA	Rod Control Cluster Assembly
RCDT	Reactor Coolant Drain Tank
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RDC	Request for Design Change
RDMG	Rod Drive Motor Generator
RECIRC	Recirculation
RERP	Radiological Emergency Response Plan
RETS	Radiological Effluent Technical Specifications
RFE	Request For Evaluation
RHR	Residual Heat Removal
RIL	Rod Insertion Limit
RNO	Response Not Obtained
RO	Reactor Operator
RPS	Reactor Protection System
RPV	Reactor Pressure Vessel
RTD	Resistance Temperature Detector
RTRN	Return
RTV	Silicone Sealing Compound
RVL	Reactor Vessel Level
RVLIS	Reactor Vessel Level Indicating System
RWE	Radwaste Evaporator
RWP	Radiation Work Permit
RWST	Refueling Water Storage Tank
RX	Reactor
SALP	Systematic Assessment of Licensee Performance

Abbreviation	Definition
SAS	Secondary Alarm Station
SC	Seismic Category
S/D or SD	Shutdown
S.E.	Southeast
SEL	Selector
SEL.	Select
SFP	Spent Fuel Pool
SFPCS	Spent Fuel Pool Cooling System
S/G	Steam Generator
SGBD	Steam Generator Blowdown
SGFP	Steam Generator Feed Pump
SGTR	Steam Generator Tube Rupture
SGWLC	Steam Generator Water Level Control
SI	Safety Injection
SIPP	Safety Injection Pump
SIS	Safety Injection Signal
SL	Seal
SLIS	Steam Line Isolation Signal
SMPL	Sample
SOL	Shaft Oil Pump
SR	Source Range
SRO	Senior Reactor Operator
SRST	Spent Resin Storage Tank
SRW	Solid Radwaste
SS	Shift Supervisor
SSE	Safe Shutdown Earthquake
SSPS	Solid-State Protection System
STA	Shift Technical Advisor
STAT	Stator
STBY	Standby
STG	Stage
STM	Steam
STP	Sewage Treatment Plant
STPT	Setpoint
STS	Standard Technical Specifications
S/U or SU	Startup
SUCT	Suction
SUP	Supply
SUR	Startup Rate
SV	Stop Valve
SW	Service Water
S.W.	Southwest
SWBP	Service Water Booster Pump
SWS	Service Water System, Security Watch Supervisor
SYS	System
T_{AVE}	Average RCS Temperature

Abbreviation	Definition
TBCW	Turbine Building Cooling Water
T/C or TC	Thermocouple
T_c	RCS Cold Leg Temperature
TGOP	Turning Gear Oil Pump
T_h	RCS Hot Leg Temperature
TNK	Tank
T_{Ref}	RCS Reference Temperature
TSC	Technical Support Center
TSI	Turbine Supervisory Instrumentation
TURB	Turbine
TWMT	Treated Waste Monitor Tank
UC	Undercurrent
UF	Underfrequency
UFSAR	Updated Final Safety Analysis Report
US	Unit Substation
UV	Undervoltage
VAC	Vacuum
VACP	Vital Area Control Point
VCH	Vent Collection Header
VCT	Volume Control Tank
VIC	Visitor Information Center
VLV	Valve
W	Westinghouse
WG	Waste Gas
WGC	Waste Gas Compressor
WGDT	Waste Gas Decay Tank
W/	With
W/O	Without
WPT	Water Pretreatement
WGST	Waste Gas Surge Tank
WOG	Westinghouse Owners Group
WR	Wide-Range
WTR	Water
X-AROUND	Cross-Around
X-CONN	Cross-Connect
XFMR	Transformer
XFR	Transfer

UNCONTROLLED
NOT UPDATED

PORTLAND GENERAL ELECTRIC COMPANY

TROJAN NUCLEAR PLANT

November 15, 1985

QUALITY RELATED

Revision 11*

EMERGENCY INSTRUCTION - EI-2

Faulted Steam Generator Isolation

APPROVED BY WCDue DATE 11/25/85

A. PURPOSE

This procedure provides actions to identify and isolate a faulted steam generator.

B. ENTRY CONDITIONS

This procedure is entered from:

1. EI-0, Reactor Trip, Safety Injection, and Diagnosis, Step 16, with any of the following symptoms.

   a. Any S/G pressure decreasing in an uncontrolled manner.

   b. Any S/G completely depressurized.

2. EI-1, Loss of Reactor or Secondary Coolant, Step 3.

   EI-3, Steam Generator Tube Rupture, Step 7.

   ECA-3.1, SGTR with LOCA - Subcooled Recovery Desired, Step 7.

   ECA-3.2, SGTR with LOCA - Saturated Recovery Desired, Step 3 with the following symptoms and/or conditions.

   a. Any S/G pressure decreasing in an uncontrolled manner.

   b. Any S/G completely depressurized.

   c. Faulted S/G isolation not verified.

*This procedure has been extensively revised.

Faulted Steam Generator Isolation

3. FR-H.5, Reponse to S/G Low Level, Step 3, when the affected S/G is identified as faulted.

4. Other procedures whenever a faulted S/G is identified.

Faulted Steam Generator Isolation

Step	Action/Expected Response	Response Not Obtained
	CAUTION: Initiate the RERP. Carry out RERP actions in parallel with this procedure. In the event of a loss of off-site power, refer to ONI-50 for restoration of power to instrumentation important for accident determination.	
	CAUTION: At least one S/G must be maintained available for RCS cooldown.	
	CAUTION: Any faulted S/G or secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown.	
1	Perform Immediate Action Steps of EI-0, Reactor Trip, Safety Injection, and Diagnosis	
2	Verify Main Steamline Isolation • MSIVs - CLOSED. • MSIV bypasses - CLOSED. • Main steam line drains - CLOSED.	Manually close valves.
3	Verify Secondary Integrity of Any S/G	
	a. Check pressures in all S/Gs - ANY STABLE or INCREASING.	a. IF all S/G pressures decreasing in an uncontrolled manner, THEN go to ECA-2.1, Uncontrolled Depressurization of All Steam Generators, Step 1.

Faulted Steam Generator Isolation

Step	Action/Expected Response	Response Not Obtained
4	<u>Identify Faulted S/Gs</u>	
	a. Check pressures in all S/Gs. 1) Any pressure decreasing in an uncontrolled manner. - OR - 2) Any S/G completely depressurized.	a. Search for initiating break. • Main steamlines. • Main feedlines. • Other secondary piping. Go to Step 6.
5	<u>Isolate Faulted S/Gs</u> a. Isolate main feedline. b. Isolate AFW to affected S/G. c. Close steam supply valve to turbine AFP from affected S/G. d. Verify affected S/G PORVs - CLOSED. e. Isolate other secondary piping from affected S/G.	Manually close valves. IF valves can NOT be closed, THEN dispatch an operator to locally close valves or block valves.
	CAUTION: WHEN CST level decreases to 70%, STOP one AFP <u>AND</u> PLACE the AFP control switch in PTL. Verify adequate AFW flow as specified in this procedure. Run only one AFP between 70% and 9% CST level.	
6	<u>Check CST Level - > 9%</u>	Switch to alternate supply to AFW pumps by opening SW cross-connects MO-3045A/B.

Faulted Steam Generator Isolation

Step	Action/Expected Response	Response Not Obtained
7	Check Secondary Radiation	
	a. Request periodic activity samples on all S/Gs.	
	b. Verify secondary radiation monitors - UNISOLATED.	b. Manually open valves.
	c. Check secondary radiation. 1) PRM-6 - NORMAL. 2) PRM-10 - NORMAL. 3) PRM-16 - NORMAL.	c. Go to EI-3, Steam Generator, Tube Rupture, Step 1.
8	Go to EI-1, Loss of Reactor or Secondary Coolant, Step 1	

APPENDIX C

MAJOR TROJAN/WOG REFERENCE PLANT DESIGN DIFFERENCES

WOG REFERENCE PLANT	TROJAN

APPENDIX D

________________ STEP SEQUENCING
(Procedure #)

STEP TITLE	GUIDELINE	PROCEDURE

Justification of Differences:

APPENDIX E

_____________ STEP VERIFICATION
(Procedure #)

Guideline Step/Note/Caution

Procedure Step/Note/Caution

Justification of Differences

APPENDIX F

______________ BACKGROUND INFORMATION
(Procedure #)

Step/Note/Caution

PURPOSE:

BASIS:

APPENDIX G

WOG GUIDELINE FOOTNOTES

____
(process variable)

1. Requirements

2. Values

3. Instruments

4. References/Calculations

5. Used In Procedures

APPENDIX H

TROJAN SETPOINTS

Item	Value Required	Value	References

APPENDIX I

SIMULATOR TEST SCENARIO OUTLINE

Scenario #

Purpose

Initial Conditions

Description

Expected Procedure Transitions

APPENDIX J

EOP VALIDATION CRITERIA

1. Does each step contain sufficient information?
2. Are alternative actions explicit (use of OR)?
3. Are contingency actions sufficient (RNO)?
4. Are procedures easily identified?
5. Are transitions easily made within a procedure or to another procedure?
6. Are CAUTIONS and NOTES easily recognized and understood?
7. Are internal procedure loops easily performed?
8. Are the LOGICAL statements easily understood (IF - THEN)?
9. Is the reference page easy to use?
10. Are the values on figures and tables easy to determine?
11. Are CSF status trees easy to monitor to control procedure (FR) implementation?
12. Is the procedure easy to read?
13. Can procedure action steps be performed with the minimum shift compliment of eight operators?
14. Can procedure action steps be performed within designated time intervals?
15. Are the procedure entry conditions appropriate for the plant symptoms?
16. Do EOP action steps correspond to actual control room and plant hardware?
17. Are units of measurement used in the procedure the same as that on control room meters?

APPENDIX K

EOP COMMENT/CRITIQUE SHEET

SCENARIO #______________

EOP #	STEP	COMENT/SUGGESTED RESOLUTION	FINAL RESOLUTION