CAROLINA POWER & LIGHT COMPANY

H. B. ROBINSON SEG PLANT

EMERGENCY OPERATING PROCEDURE WRITER'S GUIDE

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1.0 PURPOSE

The purpose of this document is to provide administrative and technical guidance on the preparation of Emergency Operating Procedures (EOPs) for the H. B. Robinson Nuclear Power Plant (HBR). This writer's guide applies to the writing of all EOPs. The information contained in the EOPs should be compatible with the information contained in other plant procedures that support the EOPs.

2.0 REFERENCES

2.1 NUREG-0660, August 1980, "NRC Action Plan Developed as a Result of the TMI-2 Accident," Vols. 1 and 2.

2.2 NUREG-0737, November 1980, "Clarification of The TMI Action Plan Requirements."

2.3 NUREG-0737, Supplement 1, December 17, 1983, "Requirements for Emergency Response Capability."

2.4 NUREG-0899, August 1982, "Guidelines for the Preparation of Emergency Operating Procedures."

2.5 INPO 82-017, July 1982, "Emergency Operating Procedures Writing Guideline."

2.6 Westinghouse Owners Group Emergency Response Guidelines, Revision 1.

2.7 AP-004, "Development, Review and Approval of Procedures, Revisions and Changes."

3.0 RESPONSIBILITIES

The Operating Supervisor - Unit 2 is responsible to the Manager-Operations and Maintenance for ensuring that Emergency Operating Procedures are written in accordance with the instructions in this procedure.

4.0 DEFINITIONS/ABBREVIATIONS

4.1 CRITICAL SAFETY FUNCTION STATUS TREES (CSFST)

The Critical Safety Function Status Trees are HBR specific status trees developed to provide the operator with a systematic and explicit means for determining the safety status of the plant following a reactor trip or safety injection independent of the instructions provided by the other EOPs.

4.2 EMERGENCY RESPONSE GUIDELINES (ERGs)

The Emergency Response Guidelines have been prepared by the Westinghouse Owners Group (WOG) on a generic basis for a selected reference plant. The guidelines provide a symptom based approach to mitigate the consequences of emergency events. The Emergency Response Guidelines are based upon the requirements of NUREG-0660, Item I.C.1 and clarified in Item I.C.1 of NUREG-0737.

4.3 EMERGENCY RESPONSE GUIDELINES BACKGROUND DOCUMENT

The Background Document has been prepared by the Westinghouse Owners Group (WOG) as a support document for the Emergency Response Guidelines. The Background Document includes the following information:

1. Introduction to the transient
2. Description of transient
3. Recovery/Restoration technique
4. Detailed description of guideline steps
5. Frequent questions and answers on the transient
6. Supporting figures, tables, calculational methods, etc.

4.4 END PATH PROCEDURES (EPPs)

The End Path Procedures are HBR specific procedures developed to provide the operator the necessary event specific instructions following the diagnosis and initial mitigating instructions contained in the Path Procedures. The End Path Procedures are entered when the operator is directed by the particular Path Procedure or another End Path Procedure.

4.5 FUNCTION RESTORATION PROCEDURES (FRPs)

The Function Restoration Procedures are HBR specific procedures developed to describe general operating actions necessary to respond to challenges to the plant critical safety functions. These procedures are normally entered via the Critical Safety Function Status Trees, although in certain cases it is possible to enter them directly from the Path Procedures or End Path Procedures. The Function Restoration Procedures provide instructions for maintaining the plant in a safe state without regard to initiating event or combinations of subsequent failures.

4.6 PATH PROCEDURES (PATH)

The Path Procedures are HBR specific procedures developed to provide the operator with guidance to effectively recover the plant from emergency conditions and return it to a safe state from which repair or return to power can be accomplished.

4.7 PATH PROCEDURE GUIDES

The Path Procedure Guides support and provide the written basis for the Path Procedures. The Path Procedure Guides are written in the dual-column format.

4.8 ERG/EOP TRANSITION DOCUMENT

The ERG/EOP Transition Document consists of the following three(3) parts:

a. List of the differences between the ERG Low Pressure reference plant and H. B. Robinson

b. Step Deviation Forms

c. Derivations for the instrument values used in the HBR EOPs

5.0 EOP NETWORK ORGANIZATION AND FORMAT

5.1 GENERAL STRUCTURE OF EOP NETWORK

The EOP network is based on the Westinghouse Owner's Group Emergency Response Guidelines (ERGs). The ERGs are a symptom based procedure network which was developed as an integrated procedure network. The following items explain the use of the EOP network as an integrated network.

1. The EOPs are an integrated procedure network with a common entry point based on either a Reactor Trip or Safety Injection. Once entering the EOP network, all further procedure transitions within the EOPs will be specifically directed. The EOP network prioritizes the operator actions and eliminates the situation where different EOPs must be implemented concurrently.

2. The EOP network will direct the operator to different procedures depending on the event in progress (i.e., LOCA, SGTR, Spurious SI). Since different events will cause different procedure transitions to be made, the delineation of immediate and subsequent actions is not made.

3. Automatic actions for different events are covered by different methods depending on when in the overall transient the automatic actions might occur. Since the EOPs are an integrated procedure network which prioritizes the operators actions, the operator will be directed to check the automatic actions when appropriate.

4. The Westinghouse Owner's Group Emergency Response Guidelines identify three (3) procedures as having immediate actions. The three (3) generic procedures are:

   a. E-0, "Reactor Trip or Safety Injection"
   b. ECA-0.0, "Loss of All AC Power"
   c. FR-S.1, "Response to Nuclear Power Generation/ATWS"

   All the actions identified generically as immediate actions are contained on the PATH-1 Procedure. All these actions are readily available to the operator on the flowpath procedure and are not identified as immediate operator actions.

5. Many of the operator actions provided in the EOPs imply continuous performance (continuous steps) throughout the remainder of the guideline. This intent is conveyed by the use of appropriate action verbs such as monitor, maintain, or control.

6. The EOP network will make use of a Foldout Page Procedure as an unique procedure applicable only to the EOP's. The foldout pages of the Foldout Page Procedures will contain those actions which can be performed at any time after the point where they are referenced in the applicable EOP procedure. Each action item on the foldout page will be numbered sequentially. The Foldout Page Procedure will always be the last procedure of the EPP's. The foldout page will be titled "FOLDOUT" followed by a single letter designator. The format of the foldout page will be single column (vs. dual-column). Each foldout page will be on a separate 11" x 17" page.

5.2 PATH PROCEDURE AND CRITICAL SAFETY FUNCTION STATUS TREE ORGANIZATION AND FORMAT

5.2.1 Designation and Numbering

Each Path Procedure and the Critical Safety Function Status Trees shall be uniquely identified (see Attachment 6.2). This identification permits easy administration of the process of procedure preparation, review, revision, distribution and operator use. The Path Procedures and the Critical Safety Function Status Trees will be labeled with its associated designator in the upper left area (see Attachment 6.2).

5.2.2 Revision and Authorization

Each Path Procedure and the Critical Safety Function Status Trees shall include the current revision number, approval date and authorized signatures. This information shall be located at the upper right of each path procedure (see Attachment 6.2).

5.2.3 Symbols and Format

1. Path Procedures will utilize standard logic symbols arranged in a "decision tree" path consisting of diagnostic information, initial mitigating actions, actions to direct the operator to the appropriate EPP or FRP, and to initiate monitoring of the Critical Safety Function Status Trees. Attachment 6.3 illustrates the construction of symbols.

2. The Critical Safety Function Status Trees will also utilize a "decision tree" path which will contain diagnostic information to assess the plant safety status and direct the operator to the appropriate FRP.

5.2.4 Decision Symbol

This symbol will contain a question which the operator is to answer YES or NO. The question shall pertain to a plant parameter, setpoint, switch position, or system condition.

5.2.5 Action Symbol

This symbol will contain a specific action or verification to be performed by the operator.

5.2.6 Note/Caution/Information Symbol

This symbol will contain information to assist the operators in diagnosing plant conditions or it may contain caution statements. The caution symbol will be placed before the Decision or Action Symbol to which it applies.

5.2.7 Arrow Symbols

Arrows will be used to direct the operator between Path Procedures or to an End Path Procedure (EPP) or to a Function Restoration Procedure (FRP). Arrows will be used as shown in Attachment 6.3.

5.2.8 Connecting Lines

All lines are equally important and there shall be one basic line width used to guide the operator. The operator should follow this line always entering the symbols at the top and exiting the symbols at the sides or bottom. No lines shall cross or intersect except where two or more enter the same symbol.

5.2.9 Entry Condition

The entry conditions for the entire EOP network will be one of the following:

1. "ANY REACTOR TRIP OR SAFETY INJECTION ACTUATION" or

2. "ANY CONDITION REQUIRING REACTOR TRIP OR SAFETY INJECTION ACTUATION."

Once the entry condition is met, the operator will enter the PATH-1 Procedure. The entry into PATH-2 and initiation of Critical Safety Function Status Tree monitoring will be controlled in PATH-1.

5.2.10 Preparing and Mounting Path Procedures and Critical Safety Function Status Trees

1. Symbols and connecting lines will be professionally drawn using standard drafting instruments.

2. The Path Procedures and the Critical Safety Function Status Trees to be used in the control room may be appropriately mounted for ease of use.

5.2.11 Revisions to Path Procedures and Critical Safety Function Status Trees

The Path Procedures and the Critical Safety Function Status Trees are considered procedures and are controlled per AP-004. Handwritten changes to the Path Procedures and Critical Safety Function Status Trees are allowed until they can be redrafted provided the change is approved per AP-004. The current revision of each Path Procedure and Critical Safety Function Status Trees shall be maintained in the plant vault in an easily reproducible form.

5.3 END PATH AND FUNCTION RESTORATION PROCEDURE ORGANIZATION AND FORMAT

5.3.1 Cover Page

Every End Path Procedure (EPP) and Function Restoration Procedure (FRP) shall have a cover page (see Attachment 6.1). The primary purposes of this cover page are to identify the procedure and to identify the authorized revision. The cover page will contain the following minimum information:

1. The full name of the plant
2. The Volume and Part of the POM
3. The procedure type
4. The procedure number
5. The procedure title
6. The latest revision number which applies to any part of the procedure
7. The signature, date, and title of person recommending the procedure or revision
8. Signature, date, and title of person approving the procedure or revision

5.3.2 List of Effective Pages

Each End Path Procedure and Function Restoration Procedure will contain a List of Effective Pages as an aid to procedure validation. The List of Effective Pages will list each page of the procedure versus the current revision number for that page. Consecutive pages bearing the same revision number may be grouped together.

Example:

LIST OF EFFECTIVE PAGES

EFFECTIVE PAGES	REVISION NO.
Cover Page	1
LEP	1
7 through 9	0
10 through 45	1

The List of Effective Pages will immediately follow the Cover Page.

5.3.3 Procedure Body

The body of the End Path Procedures (EPPs) and Function Restoration Procedure (FRPs) will be structured to include the following sections:

1. Purpose

2. Entry Condition

3. Operator Actions

5.3.4 Procedure Identification

Proper identification of procedures is necessary to avoid errors in selection and implementation. Complete identification of a procedure includes its title, number and type as defined as follows:

1. Procedure Title

   a. Each procedure will be given a title which accurately reflects its intended purpose. Within this constraint, procedure titles should be kept as short and concise as possible.

   b. The procedure's title will be repeated at the top of each successive page beginning with page 3.

2. Procedure Numbers

   Each procedure will be assigned a unique and permanent number within its associated book or volume of the Plant Operating Manual. Whenever a procedure is deleted, the associated procedure number should not be reassigned. If reassignment is made, consideration should be given to user retraining to avoid confusion or error.

3. Procedure Type

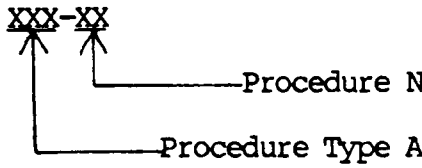
   The procedure type will be the title (or abbreviation) End Path Procedure (EPP) or Function Restoration Procedure (FRP).

5.3.5 Page Identification

Beginning with Page 2, the bottom of each page of each procedure will bear the procedure designation, current revision number and page number.

1. Procedure Designation

This will be a 2-part designation in the format:



- o End Path Procedure - EPP
- o Function Restoration Procedure - FRP

Examples:

a. EPP-5 - designates the fifth in a series of EOP End Path Procedures.

b. FRP-H.3 - designates the third in a series of EOP Function Restoration Procedures addressing a Loss of Heat Sink (H).

2. Revision Number

This information will be supplied in the format:

Rev. XX

Where "XX" is the 1 or 2-digit number of the current revision for the associated page.

3. Page Number

The page number will appear in the format:

Page ____ of ____.

5.3.6 Page Numbering

Each page of each procedure will be numbered sequentially beginning with the Cover Page. The last page of instructions will have the word "END" following the last instruction step. If pages are added to a procedure, a complete renumbering of all pages will be accomplished. Likewise, when pages are deleted by revision, a renumbering of the procedure pages will be accomplished.

5.3.7 Page Format

A dual-column format will be used. The left-hand column is designated for operator actions and the right-hand column is designated for contingency actions to be taken when the expected response is not obtained. A sample page format is presented in Attachment 6.4.

5.3.8 Step Numbering and Indenting

Instructional steps must be readily identifiable by the user. Step numbering and indenting are both used to assist procedure users in keeping track of step sequence and subordination. The following guidelines apply to numbering and indenting:

1. Roman numberals will not be used in step numbering.

2. The same step numbering and indenting scheme will be applied consistently to all procedures.

3. The acceptable numbering scheme is:
   Alpha-numeric

   1.
      a.
         (1)

4. Numbering and indenting beyond the sublevels of the example above, should not be used. To do so leads to "vertical" reading and loss of continuity. If necessary, procedures should be reorganized to produce an acceptable number of sublevels.

5.3.9 Step Sequencing

High level steps will be presented in the sequence most appropriate for the situation. Instructional steps which can be performed concurrently should be listed in order of relative importance. In substeps, when the sequence of actions is critical, the substeps shall be listed and numbered in the order to be performed. If the order of the substeps is not important, bullets (o) may be used.

5.3.10 Caution Statements

Caution statements are used to alert personnel to possible health hazards, equipment or plant damage, violations of administrative requirements, or undesirable effects on plant status. Caution statements will <u>not</u> contain action steps.

To emphasize and call attention to their presence, cautions will be spaced at least two (2) line spaces above the step to which they apply and at least two (2) line spaces below the preceding step. They will not be in dual column format and will extend across both columns.

Cautions will be highlighted to assist in attracting attention and will include the word CAUTION in capital letters and underlined. Highlighting is a margin-to-margin horizontal line above the word CAUTION and a margin-to-margin horizontal line below the last line of the CAUTION text. The lines may be ruled or a series of symbols such as (*).

Example CAUTION:

****

CAUTION

Alternate water source for AFW pumps will be necessary if CST level is low.

****

5.3.11 Notes

A note provides descriptive or explanatory information intended to aid personnel in performing an instructional step. Notes will not contain action steps.

To emphasize and call attention to their presence, notes will be spaced at least two (2) line spaces above the step to which they apply and at least two (2) line spaces below the preceding step. They will not be in dual column format and will extend across both columns.

Example NOTE:

NOTE

RCPs should be run in order or priority to provide normal pressurizer spray.

5.3.12 Calculations

Mathematical calculations should be avoided in the EOPs. If a value has to be determined in order to perform a procedural step, a chart or graph should be used whenever possible.

5.3.13 Transition to Other Procedures or Steps

Certain conditions require the use of a different procedure or step sequence. Transitions to a different procedure are specified by using the words "go to" followed by the procedure designator, title (in ALL CAPITAL LETTERS) and step number.

Example: Go to EPP-4, REACTOR TRIP RESPONSE, Step 1

Transitions shall not contain a "return" feature (e.g., perform steps 1 through 10 in some other procedure and then return).

Transitions to a different step later in the same procedure are specified in a similar manner except the procedure title and designator are not used.

Example: Go to Step 20

Transitions to an earlier step in the same procedure are specified by using the words "return to".

Example: Return to Step 2

Transitions to a step which is preceded by a CAUTION or NOTE may include special wording (in ALL CAPITAL LETTERS) to emphasize that the CAUTION or NOTE is to be observed.

Example: IF conditions are NOT satisfied, THEN go to Step 22. OBSERVE CAUTION PRIOR TO STEP 22.

5.3.14 Identification of Revised Material

Revised material will be identified with a heavy vertical bar in the right-hand margin opposite the revised text. Vertical bars from any previous revision to the same page will be deleted.

Marking of revisions will not normally apply to:

- Page identification data
- Cover page data
- List of Effective Pages
- Deleted pages

5.4 GENERAL WRITING TECHNIQUES FOR END PATH PROCEDURES AND FUNCTION RESTORATION PROCEDURES

The following section provides a set of standards which will be considered in the preparation of End Path Procedures and Function Restoration Procedures. In considering these guidelines, writers should keep in mind that some are more important than others. The writer should always consider the conditions under which the procedure will be implemented, the time available for its implementation and the possible consequences of errors in implementation. The general appearance of procedural pages contribute significantly to comprehension and the elimination of confusion and error. Information on pages will be displayed with minimum clutter, sufficient spacing between lines and adequate margins. Margins will be sufficient to ensure that binding will not interfere with reading the text and that subsequent reproduction will not cut off any of the procedure content or page identification.

5.4.1 Instrumentation Values

When specifying instrumentation values, an appropriate range, tolerance, or limit will be used rather than a single point value. Avoid the use of carats (>, <, ≥) in specifying these ranges. Instead, use phrases such as "greater than," "less than," and "between." Do not use "equal to."

5.4.2 Identification of Equipment, Controls, and Display

Nomenclature will be used which will assist personnel in quick location or identification of equipment, controls, and displays. Use a consistent system of identification which corresponds precisely with component identifications posted on equipment and control panels. If required, location information may also be included.

5.4.3 Abbreviations and Acronyms

The use of abbreviations should be minimized because they may be confusing to those who are not thoroughly familiar with them. Abbreviations may be used where necessary to save time and space, and when their meaning is unquestionably clear to the intended reader.

Capitalization of abbreviations should be uniform. If the abbreviation is comprised of lowercase letters, it should appear in lowercase in a title or heading. The period should be omitted in abbreviations except in cases where the omission would result in confusion.

An acronym is a type of symbol formed by the initial letter or letters of each of the successive parts or major parts of a compound term. Acronyms may be used if they are defined or commonly used.

Abbreviations and acronyms should not be overused. Their use should be for the benefit of the reader. They can be beneficial by saving reading time and ensuring clarity when space is limited.

5.4.4 Level of Detail

To allow the operator to efficiently execute the action steps in a procedure, all unnecessary detail must be removed. Any information which an operator is required to know (based on his training and experience) should not be included. 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:

1. Use Start and Stop for power-driven rotating equipment.

2. Use Open, Close, Throttle for valves.

3. Use Control to describe a manually maintained process variable (flow, level, temperature, pressure).

4. Use Trip and Close for electrical breakers.

5. Use Place In Standby to refer to equipment when actuation is to be controlled by available (e.g., not reset or blocked) automatic logic circuitry.

5.4.5 Instruction Steps, Left-Hand Column

The left-hand column on the dual-column format will be used for operator instruction steps and expected responses. The following rules are established for this column:

1. Expected responses to operator actions are shown in ALL CAPITAL LETTERS.

2. If a step requires multiple substeps, then each substep will have its own expected response.

3. If only a single task is required by the step, then the step will contain its own EXPECTED RESPONSE.

4. Left-hand column tasks should be specified in sequence as if no contingency actions had to be performed. The user would normally move down the left hand column when the expected response to a particular step is obtained.

5. When the expected response is not obtained, the user is expected to move to the right-hand column for contingency instructions.

5.4.6 Response Not Obtained Column, 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. Contingency actions will be specified for all steps or substeps for which useful alternatives are available. The following rules apply to the right-hand column:

1. Contingency actions should identify directions to override automatic controls and to initiate manually what is normally initiated automatically.

2. Contingency actions should be numbered consistently with the expected response/action for substeps only. A contingency for a single-task step will not be separately numbered but will appear on the same line as its related step.

3. 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.

4. As a general rule, most transitions to other procedures take place out of the right-hand column. (Deliberate transitions may be made from the left-hand column.)

5. 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 procedure, this rule of usage should be considered in wording subsequent left-hand column instructions.

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

5.4.7 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, logic terms shall be capitalized and the words will be underlined.

The use of AND and OR within the same action shall be avoided. When AND and OR are used together, the logic can be very ambiguous.

Use other logic terms as follows:

1. When attention should be called to combinations of actions or conditions, the word AND will be placed between the description of each condition. The word AND will not be used to join more than two conditions. If three or more conditions need to be joined, a list format shall be used.

2. The word OR will be used when calling attention to alternative combinations of conditions. The use of the word OR will always be in the inclusive sense. To specify the exclusive "OR," the following may be used: "either A OR B but not both."

3. When action steps are contingent upon certain conditions or combinations of conditions, the step will begin with the words IF or WHEN followed by a description of the condition or conditions, a comma, the word THEN, followed by the action to be taken. WHEN is used for an expected condition. IF is used for an unexpected but possible condition.

4. Use of IF NOT should be limited to those cases in which the operator must respond to the second of two possible conditions. IF should be used to specify the first condition.

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

5.4.8 Figures

If needed to clarify operator action instructions, figures shall be added to a procedure. The following rules of construction will apply:

1. Wording on the figure shall be at least as legible (type size and spacing) as the instruction steps in the procedure.

2. Each figure will occupy a complete page and should be uniquely identified by a figure number and title.

3. Figure titles will explain the intent or content of the figure.

4. The figure number and title will be placed at the bottom of the page.

5. If the figure is a graph, all the numbers and wording should be horizontal. By convention, the independent variable is plotted on the horizontal (X) axis. Grid line density should be consistent with the resolution expected from the graph. Any labeling required on the graph should have a white (not graph) background.

6. Figures for a procedure are numbered sequentially and are located immediately after the instruction step pages. Figure pages are numbered as pages of that procedure. Any figures required for an attachment are numbered in sequence with the procedure figures.

7. References to a figure from an action step should use only the figure number and not the title.

5.4.9 Tables

Tables may be used within the text of a procedure to clearly present a large number of separate options. A table will immediately follow the steps or substep which makes use of it. Therefore, it does not require a unique number and title. The following rules apply to construction of tables.

1. Information presented in a table shall be at least as legible (type size and spacing) as the instruction steps in the procedure.

2. Columns and rows of information in a table will be defined by solid lines.

3. Column and row headings shall be presented in ALL CAPITAL LETTERS.

4. Absence of a table element will be indicated by a dash.

5.4.10 Attachments

Supplementary information or detailed instructions which would unnecessarily complicate the flow of a procedure may be placed in an attachment to that procedure. The following rules apply to attachments:

1. Attachments are identified by the title "ATTACHMENT" followed by a single letter designator. This title is centered at the top of a page. Attachments will use a single-column, full-page-width format.

2. Physically, Attachments will be located after any figures belonging to the procedure. Attachment pages are numbered in sequence with normal procedure pages.

5.4.11 Component Identification

Equipment, controls, and displays will be identified in operator language terms. Where similar components are used in both primary and secondary systems, it is always necessary to clarify the location, even if the wording appears redundant.

5.5 MECHANICS OF STYLE

5.5.1 Spelling

All spelling should be consistent with modern usage.

5.5.2 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. The following rules apply:

1. Brackets

   Brackets shall be used to indicate values that should be used if adverse containment conditions are present.

   Example: Verify RCS Subcooling - GREATER THAN 25°F [45°F]

2. Colon

   Use a colon to indicate that a list of items is to follow, for example; Restore cooling flow as follows:

3. Comma

   Use a comma after conditional phrases for clarity and ease of reading. Example: IF level exceeds 50%, THEN start pump . . .

4. Period

   Use a period to indicate the end of complete sentences in right-hand column actions statements, in NOTEs and CAUTIONs, and for indicating the decimal place in numbers.

5. Dash

   Use a dash to separate a required action and its expected response and also to indicate an absence table element.

5.5.3 Capitalization

Capitalization shall be used in the End Path and Function Restoration Procedures for emphasis in the following cases:

1. Logic terms will be capitalized and underlined.

2. Expected responses (left-hand column of instructions) are capitalized.

3. Titles of procedures will be completely capitalized whenever referenced within any procedure.

4. Operator action steps may be capitalized for emphasis.

5. Abbreviations are commonly capitalized.

5.5.4 Vocabulary

Words used in procedures should convey precise understanding to the trained operator. Simple words having few syllables are preferred. These are typical of words in common usage. The following rules apply:

1. Verbs with specific meaning should be used. The verb should exactly define the task expected to be performed by the operator. A list of frequently used verbs is listed in Attachment 6.5.

2. Certain other words are to be avoided simply because they are not adequately defined when used without modification. These include: approximately, rapidly and slowly. The same words become acceptable when some clarification is provided: clarification normally is part of a lower-level substep.

   Example: Rapidly cool down the RCS (Do not exceed 200^{o}F/HR)

5.5.5 Numerical Values

The use of numerical values should be consistent with the following rules:

1. All numerical values presented in the procedures should be consistent with what can be read on the instrument (i.e., consistent with instrument scale and range).

2. The number of significant digits presented should be equal to the reading precision of the operator.

3. Engineering units should always be specified for numerical values for process parameters. They should be the same as those used on the applicable displays.

5.6 TYPING FORMAT

5.6.1 Page Arrangement

- Page margins should be 1 inch on the left-hand side, 1/2 inch on the right-hand side, and 1 inch on the top and bottom.

- Page identification information (refer to Subsection 5.3.5) should be one line space above the bottom of the page.

- The 8-1/2 inch edges should constitute top and bottom of pages and text. Tables and figures shall be readable with the page so arranged. Rotation of printed matter should be avoided for emergency operating procedures. Refer to Subsection 5.6.4 if rotation is absolutely necessary.

5.6.2 Text Arrangement

Block style, as illustrated in Attachment 6.4 is to be used.

1. Section numbers shall begin at the left-hand margin.

2. Double space between headings and respective text.

3. Text will be typed using one-and-a-half line spacing.

5.6.3 Breaking of Words

Breaking of words should be avoided to facilitate operator reading.

5.6.4 Rotation of Pages

If pages need to be rotated, the following rules should be followed:

1. The top of the page with rotated print is the normal left-hand edge.

2. The page margins do not rotate.

3. Page identification and numbering will not be rotated.

5.7 MAINTENANCE OF EOP NETWORK

5.7.1 Plant Specific Changes

1. The plant specific change will be reviewed by the Unit No. 2 Operations Engineer to ensure the change is not generic. If generic, go to step 5.7.3.

2. If the plant specific change is not generic, the Unit No. 2 Operations Engineer processes the change per AP-004 and updates the ERG/EOP Transition Document.

5.7.2 Generic Changes to Emergency Response Guidelines (ERGs) Initiated by WOG

1. The Unit No. 2 Operations Engineer is responsible. He ensures the controlled copies of the WOG ERGs are updated. Controlled copies are located in the Plant Vault, Unit 2 Control Room, and Unit 2 Operations Engineering Staff.

2. The Unit 2 Operations Engineer also forwards a copy of the change to the WOG ERG set to the training staff.

3. The Unit No. 2 Operations Engineer processes the change to the plant specific EOPs per AP-004 and updates the ERG/EOP Transition Document.

5.7.3 Generic Changes to Emergency Response Guidelines (ERGs) Initiated by Plant

1. No changes are made to plant specific set until WOG has reviewed and acted on potential generic change.

2. The Unit No. 2 Operations Engineer submits the proposed generic change to the WOG in accordance with the WOG ERG Maintenance Program.

3. If the WOG determines proposed change is a generic change to the ERGs and so issues, the Unit No. 2 Operations Engineer processes change per Step 5.7.2.

4. If the WOG determines the proposed change is not generic, then the Unit No. 2 Operations Engineer shall re-review the proposed change and determine if it should be implemented as plant specific in accordance with step 5.7.1.

5.8 VERIFICATION AND VALIDATION PROGRAM FOR FUTURE CHANGES TO THE HBR EOPS

1. The Unit 2 Operations Engineer is responsible.

2. Verification and Validation (V&V) is required when a change to a HBR EOP procedure alters the intent of the procedure.

3. The V&V program should demonstrate the following objectives are satisfied:

   a. That the EOPs are technically correct, i.e., they accurately reflect the WOG Emergency Response Guidelines.

   b. That EOPs are written correctly, i.e., they accurately reflect the HBR Emergency Operating Procedure Writers' Guide.

   c. That EOPs are usable, i.e., they can be understood and followed without confusion, delays, and errors.

   d. That there is 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.

   e. That the language and level of information presented in the EOPs compatible with the minimum number, qualifications, training, and experience of the operating staff.

   f. That there is a high level of assurance that the procedures will work, i.e., the procedures correctly guide the operator in mitigating transients and accidents.

4. The V&V program should make use of one or a combination of the following methods:

    1. Simulator
    2. Table-Top
    3. Control Room Walk Through

5. The personnel involved in the V&V program should be Licensed Operators, Shift Technical Advisors, and Unit 2 Operations Engineering Staff.

6.0 ATTACHMENTS

6.1 COVER PAGE

6.2 PATH PROCEDURE EXAMPLE

6.3 PATH SYMBOLS

6.4 PAGE FORMAT

6.5 SAMPLE ACTION VERB LIST

CAROLINA POWER & LIGHT COMPANY

H. B. ROBINSON SEG PLANT

PLANT OPERATING MANUAL

VOLUME 3

PART 1

OPERATIONS MANAGEMENT MANUAL

OMM-13

EMERGENCY OPERATING PROCEDURE WRITER'S GUIDE

REVISION 0

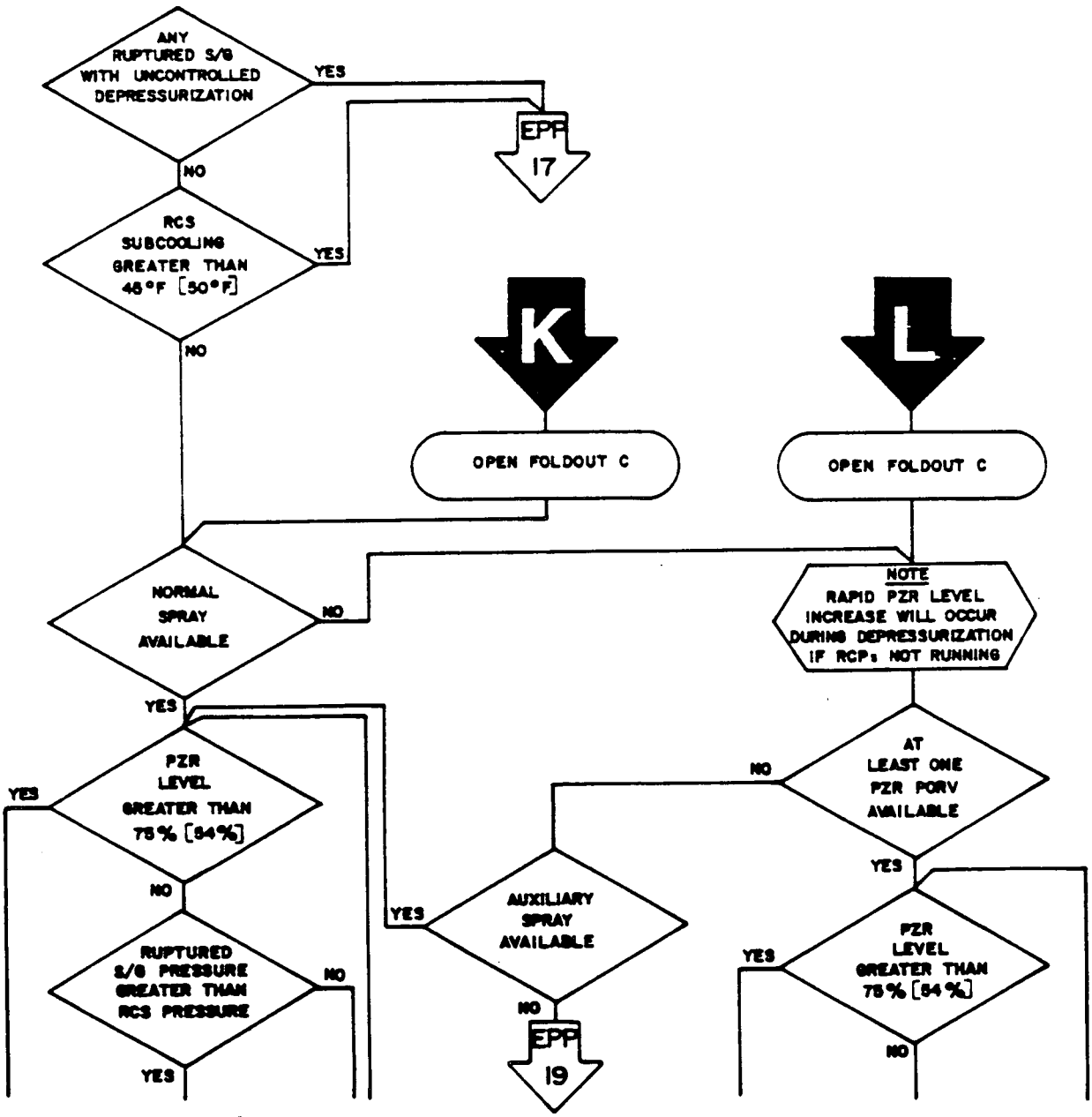
Effective Date _____

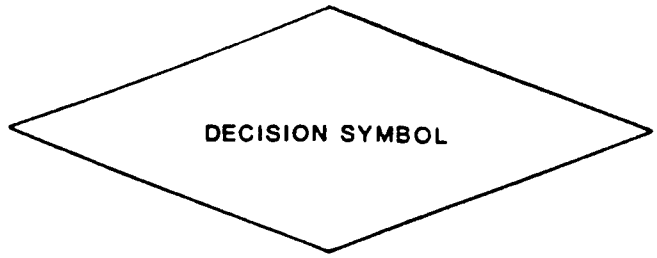
RECOMMENDED BY: _____ _____
Unit 2 - Operating Supervisor Date

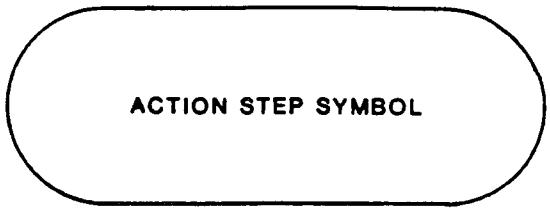
APPROVED BY: _____ _____
Manager - Operations and Maintenance Date

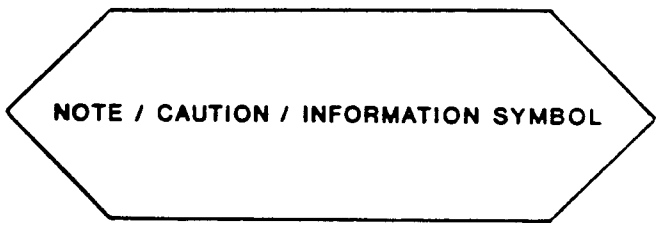
PATH-1

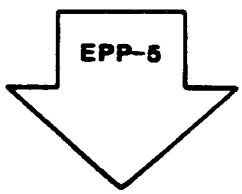
H.B. ROBINSON STEAM ELECTRIC PLANT UNIT # 2		
REVISION		RECOMMENDED BY
NO.	DATE	OPERATING SUPERVISOR UNIT # 2 — DATE
		APPROVED BY
		MANAGER - OPERATIONS AND MAINTENANCE — DATE



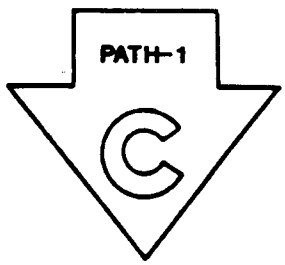




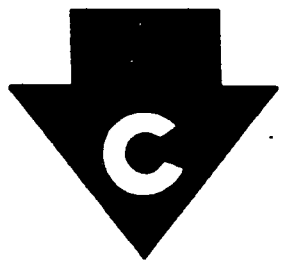




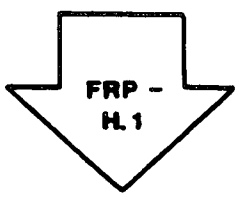
PATH-TO-ENDPATH ARROW



PATH-TO-PATH
EXIT ARROW



PATH ENTRY
POINT ARROW



PATH-TO-FUNCTION
RESTORATION ARROW

POST-SGTR COOLDOWN USING BACKFILL

1.0 PURPOSE

This procedure provides actions to cooldown and depressurize the plant to cold shutdown conditions following a steam generator tube rupture. This recovery method depressurizes the ruptured S/G by drawing it through the ruptured tube into the RCS.

2.0 ENTRY CONDITIONS

1. PATH-2.

2. EPP-13, "POST-SGTR COOLDOWN USING BLOWDOWN," step 11 when blowdown is not available and the backfill method of cooldown is selected.

3.0 OPERATOR ACTIONS

NOTE: IF at any time it is determined that the backfill method of cooldown is not desired, THEN go to EPP-13, "POST-SGTR COOLDOWN USING BLOWDOWN," step 1, OR EPP-14, "POST-SGTR COOLDOWN USING STEAM DUMP," step 1, in this preferred order.

Instructions	Response Not Obtained
1. Open Foldout B	
2. Turn on PZR Heaters As Necessary To Saturate Water At Ruptured S/G Pressure.	

SAMPLE ACTION VERB LIST

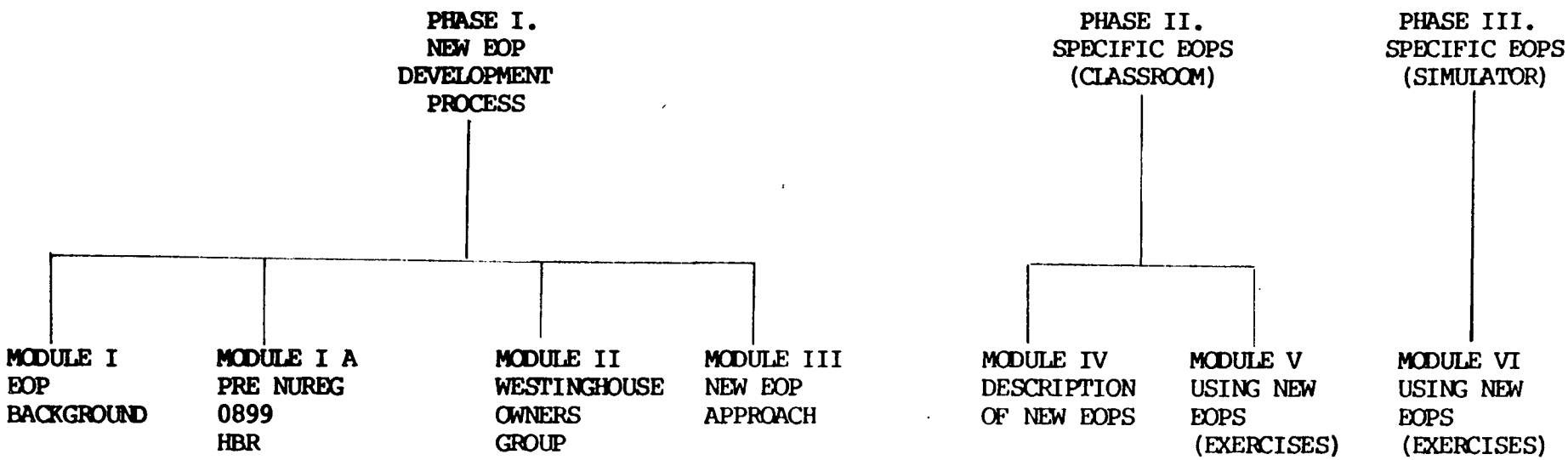
Verb	Meaning/Application
Actuate	To put into action or motion; commonly used to refer to automated, multi-faceted operations, for example, "ACTUATE Phase A."
Adjust	To regulate or bring to a more satisfactory state, for example, "ADJUST charging pump speed, as necessary."
Align	To place a system in proper or desired configuration for an intended purpose, for example, "ALIGN the system for normal charging."
Allow	To permit a stated condition to be achieved prior to proceeding, for example, "allow discharge pressure to stabilize."
Block	To inhibit an automatic actuation. Example: "Block SI actuation."
Check	To perform a physical action which determines the state of a variable or status of equipment without directing a change in status such as "check for satisfactory lube oil level."
Close	To change the physical position of a mechanical device to the closed position so that it prevents fluid flow or permits passage of electric current, for example, "close valve HCV-142."
Complete	To accomplish specific procedural requirements, for example, "complete valve check-off list "A", "complete data report QA-1," "complete steps 7 through 9 of Section III."
Continue	To go on with a particular process, for example, "Continue with this procedure."
Control	To manually operate equipment as necessary to satisfy procedure requirements. Example: "Control pressurizer level."
Determine	To calculate or evaluate using formulae or graphs, for example, "Determine maximum venting time."
Energize	To supply electrical energy to (something); commonly used to describe an electrical bus or other dedicated electrical path, for example, "Energize ac emergency busses."
Establish	To make arrangements for a stated condition, for example, "establish communication with control room."
Evaluate	To examine and decide; commonly used in reference to plant conditions and operations, for example, "Evaluate conditions."
Equalize	To make the value of a given parameter equal to the value of another parameter, for example, "Equalize charging and letdown flow."
Initiate	To begin a process, for example, "Initiate flow to all S/Gs."

Verb	Meaning/Application
Isolate	To close one or more valves in a system for the purpose of separating or setting apart a complete system or a portion of the system from the rest, for example, "ISOLATE instrument air header to the containment."
Inspect	To measure, observe, or evaluate a feature or characteristic for comparison with specified limits; method of inspection should be included, for example, "visually inspect for leaks."
Load	To connect an electrical component or unit to a source of electrical energy, may involve a "start" in certain cases, for example, "Load the SI pump on the ac emergency bus."
Maintain	To keep in an existing state, for example, "MAINTAIN steam generator level in the narrow range."
Minimize	To make as small as possible, for example, "Minimize S/G level in the narrow range."
Monitor	Similar to "check," except implies a repeated function.
Open	To change the physical position of a mechanical device, to the open position so that is allows an unobstructed position which permits access of flow, for example, "open valve CVC-277C," or prevents passage of electrical current.
Operate	To turn on or turn off as necessary to achieve the stated objective, for example, "Operate the pressurizer heaters to increase pressure."
Place	To put in a particular position, for example, "PLACE steam dump in pressure control mode."
Record	To document specified condition or characteristic, for example, "record discharge pressure."
Reduce	To cause a parameter to decrease in value, or example, " REDUCE reactor pressure with auxilliary spray."
Reset	To remove an active output signal from a retentive logic device even with the input signal still present; commonly used in reference to protection/safeguards logics in which the actuating signal is "locked-in." The reset allows equipment energized by the initial signal to be deenergized, for example, "Reset Phase A."
Sample	To take a representative portion for the purpose of examination; commonly used to refer to chemical or radiological examination, for example, "Sample for RCS boron concentration."
Set	To physically adjust to a specified value on adjustable feature, for example, "set diesel speed to . . . rpm."

Verb	Meaning/Application
Start	To energize an electro-mechanical device by manipulation of a start switch or button, for example, "start . . . pump."
Stop	Opposite of start, for example, "stop . . . pump."
Synchronize	To make synchronous in operation, for example, "SYNCHRONIZE the Diesel Generator to the Emergency Bus."
Throttle	To operate a valve in an intermediate position to obtain a certain flow rate, for example, "throttle valve SI-845C to . . ."
Trip	To manually actuate a mechanism. Commonly, "Trip is used to refer to component deactuation. For example, "trip the reactor, trip the breaker, trip the turbine."
Try	To make a continued effort when success may not be immediately obtainable, for example, "try to restore offsite power."
Vent	To permit a gas or liquid confined under pressure to escape at a vent, for example, "vent . . . pump."
Verify	To prove to be true, exact, or accurate by observation of a condition or characteristic for comparison with an original or procedural requirement, for example, "verify discharge pressure."

Attachment 5: Training Program

TRAINING PROGRAM FOR SYMPTOMATIC EMERGENCY OPERATING PROCEDURES



TRAINING PROGRAM FOR SYMPTOMATIC EMERGENCY OPERATING PROCEDURES

PHASE I.
NEW EOP DEVELOPMENT PROCESS

MODULE I.
EOP BACKGROUND

1. ANS 3.2 STANDARDS FOR EOPS REG GUIDE 1.33

2. TMI-2 ACCIDENT (MARCH 28, 1979)

3. ESSEX CORPORATION REVIEW OF TMI

4. POST TMI NRC GUIDANCE: NUREGS 0737 & 0899

5. WESTINGHOUSE OWNERS GROUP

HBR
TRAINING PROGRAM FOR SYMPTOMATIC
EMERGENCY OPERATING PROCEDURES

PHASE I.
NEW EOP DEVELOPMENT
PROCESS

MODULE I A.
PRE NUREG 0899 HBR EMERGENCY OPERATING PROCEDURES

1. REVIEW OF PRE NUREG 0899 EOPS USED BY HBR

2. REVIEW OF PRE NUREG 0899 PHILOSOPHY ON WHAT CONSTITUTED AN EMERGENCY AT HBR

3. DISCUSS SYMPTOMATIC VERSUS EVENT ORIENTED EOPS

4. DISCUSS USE OF CURRENT PRE NUREG 0899 HBR EOPS IN THE EVENT OF MULTIPLE FAILURES

5. DISCUSS DISADVANTAGES OF CURRENT PRE NUREG 0899 HBR EOPS

TRAINING PROGRAM FOR SYMPTOMATIC
EMERGENCY OPERATING PROCEDURES

PHASE I.
NEW EOP DEVELOPMENT
PROCESS

MODULE II.
WESTINGHOUSE OWNERS GROUP EOP GUIDELINES

1. BACKGROUND

2. INTRODUCTION TO GUIDELINES

3. CRITICAL SAFETY FUNCTION (CSF) STATUS TREES

4. FUNCTION RESTORATION GUIDELINES (FRGS)

5. OPTIMAL RECOVERY GUIDELINES (ORGS)

6. EVENT SPECIFIC (ES) GUIDELINES

7. EMERGENCY CONTINGENCY ACTION (ECA) GUIDELINES

8. PRESSURIZED THERMAL SHOCK (PTS)

TRAINING PROGRAM FOR SYMPTOMATIC
EMERGENCY OPERATING PROCEDURES

PHASE I.
NEW EOP DEVELOPMENT
PROCESS

MODULE III.
EOP APPROACH

1. CRITICAL SAFETY FUNCTIONS (CSFS) AND CRITICAL SAFETY FUNCTION STATUS TREES

2. FUNCTION RESTORATION PROCEDURES (FRPS)

3. END PATH PROCEDURES (EPPS)

4. FLOW PATH PROCEDURES (PATH)

5. BACKGROUND REFERENCE DOCUMENT

6. PRESSURIZED THERMAL SHOCK (PTS)

TRAINING PROGRAM FOR SYMPTOMATIC
EMERGENCY OPERATING PROCEDURES

PHASE II.
SPECIFIC EOPS
(CLASSROOM)

MODULE IV.
DESCRIPTION OF NEW EOPS

1. FLOW PATH SYMBOLS

2. GENERAL DESCRIPTION OF FLOW PATH PROCEDURES

3. TECHNIQUE FOR USING FLOW CHART WITH END PATH PROCEDURES AND FUNCTION RESTORATION PROCEDURES

4. DESCRIBE SINGLE FAILURE EMERGENCY RESPONSE USING EOP NETWORK

5. DESCRIBE MULTIPLE FAILURE EMERGENCY RESPONSE USING EOP NETWORK

6. OUTLINE ADVANTAGES OF NEW EOPS OVER OLD EOPS

TRAINING PROGRAM FOR SYMPTOMATIC
EMERGENCY OPERATING PROCEDURES

PHASE II.
SPECIFIC EOPS
(CLASSROOM)

MODULE V.
USING NEW EOPS (EXERCISES)

1. REVIEW EOP NETWORK PHILOSOPHY

2. SELECTIONS FROM THE BELOW LIST OF EVENT FAILURES WILL BE USED TO CONDUCT CLASS WALK-THROUGHS USING THE NEW EOP NETWORK:

   A. SINGLE FAULTS:

      1) SPURIOUS SI

      2) SPURIOUS PHASE A ISOLATION

      3) SPURIOUS REACTOR TRIP

      4) DESIGN BASE ACCIDENT (LOCA)

      5) FEED HEADER BREAK

      6) S/G TUBE RUPTURE

      7) S/G SAFETY VALVE FAILS OPEN

      8) TURBINE GENERATOR LOAD REJECTION

      9) REACTOR COOLANT PUMP TRIP

      10) LOSS OF OFF-SITE ELECTRICAL POWER

      11) NATURAL CIRCULATION COOLDOWN

      12) SMALL/INTERMEDIATE SIZED LOCAS

MODULE V
USING NEW EOPS (CLASSROOM EXERCISE CONTINUED)

B. MULTIPLE FAULTS:

1) TURBINE TRIP WITHOUT REACTOR TRIP

2) LOSS OF ALL A.C.

3) S/G TUBE RUPTURE WITH LOSS OF AFW

4) S/G TUBE RUPTURE WITH ANOTHER S/G SAFETY FAILED OPEN

5) S/G TUBE RUPTURE WITH LOCA

6) S/G MULTIPLE TUBE RUPTURE

7) S/G TUBE RUPTURE WITH LOSS OF ALL AC

8) LOCA WITH SECONDARY DEPRESSURIZATION

9) LOCA WITH LOSS OF ALL AC

10) LOCA WITH LOSS OF AFW

11) SECONDARY DEPRESSURIZATION WITH LOSS OF ALL AC

12) NATURAL CIRCULATION COOLDOWN WITH A REACTOR VESSEL HEAD BUBBLE

13) EXCESSIVE REACTOR COOLANT SYSTEM COOLDOWN

14) SPURIOUS SI FOLLOWED BY LOCA

3. REVIEW AREA OF TROUBLE DISCOVERED DURING CLASSROOM EXERCISES

4. WRITTEN EXAM

TRAINING PROGRAM FOR SYMPTOMATIC
EMERGENCY OPERATING PROCEDURES

PHASE III.
SPECIFIC EOPS
(SIMULATOR)

MODULE VI.
USING NEW EOPS (EXERCISES)

1. REVIEW SIGNIFICANT DIFFERENCES BETWEEN PLANT AND THE SIMULATOR BEING USED FOR TRAINING

2. REVIEW ARRANGEMENT OF THE EOP DOCUMENTS AS THEY ARE TO BE USED IN THE SIMULATOR CONTROL ROOM

3. REVIEW TECHNIQUE THAT WILL BE USED TO MAN THE SIMULATOR, ROTATE SHIFTS, START AND STOP SCENARIOS, AND TO EVALUATE THE EFFECTIVENESS OF THE DEMONSTRATION OF DRILL.

4. SELECTIONS FROM THE BELOW LIST OF PLANT FAULTS ARE USED TO EXERCISE THE TRAINEE IN THE NEW EOP NETWORK:

   A. SINGLE FAULTS:

      1) SPURIOUS SI

      2) SPURIOUS PHASE A ISOLATION

      3) SPURIOUS REACTOR TRIP

      4) DESIGN BASE ACCIDENT (LOCA)

      5) FEED HEADER BREAK

      6) S/G TUBE RUPTURE

      7) S/G SAFETY VALVE FAILS OPEN

      8) TURBINE GENERATOR LOAD REJECTION

      9) REACTOR COOLANT PUMP TRIP

      10) LOSS OF OFF-SITE ELECTRICAL POWER

      11) NATURAL CIRCULATION COOLDOWN

      12) SMALL/INTERMEDIATE SIZED LOCAS

MODULE VI
USING NEW EOPS (SIMULATOR EXERCISES CONTINUED)

B. MULTIPLE FAULTS:

1) TURBINE TRIP WITHOUT REACTOR TRIP

2) LOSS OF ALL A.C.

3) S/G TUBE RUPTURE WITH LOSS OF AFW

4) S/G TUBE RUPTURE WITH ANOTHER S/G SAFETY FAILED OPEN

5) S/G TUBE RUPTURE WITH LOCA

6) S/G MULTIPLE TUBE RUPTURE

7) S/G TUBE RUPTURE WITH LOSS OF ALL AC

8) LOCA WITH SECONDARY DEPRESSURIZATION

9) LOCA WITH LOSS OF ALL AC

10) LOCA WITH LOSS OF AFW

11) SECONDARY DEPRESSURIZATION WITH LOSS OF ALL AC

12) NATURAL CIRCULATION COOLDOWN WITH A REACTOR VESSEL HEAD BUBBLE

13) EXCESSIVE REACTOR COOLANT SYSTEM COOLDOWN

14) SPURIOUS SI FOLLOWED BY LOCA

5. REVIEW OF TROUBLE AREAS DISCOVERED DURING SIMULATOR EXERCISES

6. SUMMARY