Enclosure 2

March 14, 1984

EMERGENCY OPERATING PROCEDURES

GENERATION PACKAGE

CALVERT CLIFFS NUCLEAR POWER PLANT

UNITS 1 & 2

CALVERT CLIFFS INSTRUCTION 310
EMERGENCY OPERATING PROCEDURE WRITER'S GUIDE

ATTACHMENTS: (1) Page Format
(2) Cover Sheet
(3) Verb List
(4) Acceptable Acronyms
(5) EOP Deviation Sheet
(6) List of Effective Pages

I. INTRODUCTION

The purpose of this instruction is to provide administrative guidance on the preparation and control of Emergency Operating Procedures (EOP's). EOP's are procedures that direct operator actions necessary to mitigate the consequences of transients and emergencies that cause plant parameters to exceed Reactor Protective System (RPS) setpoints or Engineered Safety Feature Actuation System (ESFAS) setpoints.

The procedures are designed to allow the operator to place and maintain the plant in a stable condition following a reactor trip by requiring:

A. An immediate assessment of critical safety functions;

B. The performance of immediate actions to restore these safety functions within satisfactory bounds;

C. An approach to event analysis; and

D. The use of an event-based procedure if diagnosis is successful or, failing event diagnosis, the use of a symptom-based functional recovery procedure that does not require knowledge of the specific event.

This instruction is to be used in conjunction with the EOP Verification/Validation Plan and the EOP Training Plan to ensure technical correctness and operational

validity of EOP revisions and to provide for adequate operator familiarity prior to implementation of EOP revisions.

II. GENERAL REQUIREMENTS

The following requirements shall be incorporated within the Emergency Operating Procedures.

A. The Combustion Engineering (CE) generic emergency procedures guidelines (CEN152) shall be used as the basis for EOP development. Additional information (FSAR, Technical Specifications, old EOPs, Architect/Engineer Technical Documentation, etc.) will be incorporated and/or referenced as appropriate.

B. Deviations from the generic emergency procedures guidelines shall be documented. This documentation, as a minimum, shall involve a description of the deviation and appropriate justification.

C. Future revisions or supplements to the generic emergency procedure guidelines shall be incorporated as appropriate into the new EOPs in accordance with General Requirements A and B, above.

D. Human factors considerations will be incorporated in the presentation of technical details for the purpose of optimizing operator performance.

E. Emergency Operating Procedure verification and validation shall be consistent with methods provided in the "Emergency Operating Procedures Verification Guidelines," INPO 83-004 of March 1983 and "Emergency Operating Procedure Validation Guidelines," INPO 83-006 of July 1983.

F. A functional recovery procedure capable of establishing safety function restoration requirements during multiple equipment failures, unidentified accidents, or situations where an inappropriate event oriented procedure has been applied shall be provided within the EOP system.

G. EOPs shall ensure safety functions are monitored periodically. If event oriented procedures are in use, safety function monitoring will be performed concurrently.

III. INTEGRATION OF TECHNICAL INFORMATION

A. Generic Emergency Procedure Guidelines (EPGs) prepared and validated by Combustion Engineering will be used as the basis for EOP development. These technical guidelines perform the following functions:

1. Identify the equipment or systems to be operated,
2. List the steps necessary to mitigate the consequences of transients and accidents, and
3. Restore the safety functions.

They represent the translation of engineering data derived from transient and accident analysis into a sound engineering basis for the development of EOPs.

B. The EPGs will be implemented via the process described in section IV of this procedure. Information from plant documents, internal operating experience, industry operating experience, improved or new safety analysis calculations, as well as, revisions to the original EPGs shall be included where appropriate as an improvement in existing procedures or as an improvement in the basis for actions already required.

IV. TRANSLATION OF EMERGENCY GUIDELINES TO PLANT SPECIFIC EMERGENCY OPERATING PROCEDURES

A. The following areas will be addressed ingenerating the Calvert Cliffs plant specific Emergency Operating Procedures:

1. Scope
2. Initial Indication
3. Precautions

4. Immediate Actions
5. Recovery Actions
6. Discussion Section

B. The source material described in Attachment (7) will be used to establish plant specific entry conditions and exit conditions (where appropriate) for each procedure. In addition, the source material will be used to classify the event with particular reference to initiating event and location (i.e., within or outside containment). Next, this plant specific information will be compared with the scope and initial conditions of the generic procedure to ensure a common starting point. Any discontinuities or deviations from the generic guidelines will be formally documented and resolved using bases or source documentation. It is possible that a few issues may require additional engineering analysis. The substantiated deviations will then be incorporated into the plant specific procedures. From the foregoing review the entry conditions for each Emergency Operating Procedure will be determined. Support or bases documentation appropriate to the "SCOPE" section will form part of the discussion section of the procedure.

C. The INITIAL INDICATION contained in CEN 152 will be verified against plant specific indication and a list will be prepared using a combination of expert judgement and source documentation for inclusion in the EOP. This included list of initial indications will be limited to the most important and reliable parameters. However, a comprehensive list of initial indications will be contained in the discussion section. The generic list of initial indications will be reviewed and modified to include plant specific indications, alarms and equipment responses using source documentation to compile the list. The comprehensive listing of initial indications contained in the discussion section will be divided into groups according to safety function.

D. The generic guidelines will be reviewed to identify safety issues which, in turn, will be organized per Section VIII.B.4 of this instruction. General Precautions will be contained in the discussion section of each EOP together with an explanation of why the precaution exists. Specific PRECAUTIONS will be contained in the body of the EOP although an explanation of their basis will appear in the appropriate discussion section. Cautions relating to specific actions or the operation of specific equipment or components will appear immediately prior to the action to which they refer. The identification of plant specific safety concerns will be accomplished by review of the source material. Equipment and personnel safety concerns both nuclear and non-nuclear will be included in this process.

E. The IMMEDIATE ACTIONS of each EOP will be determined by the event definition which identifies the safety functions at greatest risk. Having identified the critical safety functions, the list will be prioritized and, in turn, the specific success criteria required to assess each safety function will be identified and documented. This work becomes a "Safety Function Status Check" which will then be compared against the plant specific accident analysis and specific issue limitations (for example, PTS, Natural Circulation). Deviations will be documented and resolved. This plant specific status check provides the operator directives to enter or exit the Functional Recovery Procedure. The Safety Function check whether initial, intermediate or final determines how the operator will deal with the incident.

F. Plant specific RECOVERY ACTIONS will be obtained by prioritizing the success paths provided in the generic guidelines in accordance with the previously accomplished Safety Functions prioritization. For each principal success path identified, the associated alternate and extraordinary success paths, where available, will be identified using source material all bracketed

data contained in the Emergency Guidelines will be replaced by plant specific data. The safety function checks together with the specific plant configurations expected to exist, will be identified and compared to ensure the correctness of detailed operator actions. The SAFETY FUNCTION STATUS CHECKS" will be developed as described in Section E above.

G. The DISCUSSION section of the EOP will include a comprehensive list of initial indication ordered to have a direct correspondence to the safety functions to which they refer. Following a brief description of the development of the incident an explanation of the event recovery strategy will be provided. The recovery strategy will be directly linked to the safety function approach and will be driven by the priority and importance of the approriate safety functions. Finally, general precautions to be exercised during the casualty will be listed and their general philosophy explained. This information will be derived via the processes described above and is the documentation of the generic to plant specific translation process.

V. EOP SUPPORT DOCUMENTATION

Support documentation for the Emergency Operating Procedures (EOP) consists of the EOP guidelines, deviation sheets, special calculations, and any referenced technical literature which is used by the EOP writer during initial writing or subsequent revisions of the procedures. This material will be maintained by the Operations unit.

Superseded support documentation will be removed from the active file and placed in the EOP history file. The history file will be maintained by the Operations unit and as a minimum, will consist of:

a. one copy of each superseded revision,

b. superseded Emergency Procedure Guidelines,

c. deviation sheets,

d. superseded calculations, and

e. Calvert Cliffs Operating Manual change reports (Attachment (1) of CCI-300) after the changes are incorporated by revisions.

Records will be controlled in accordance with CCI-304.

VI. CONTROL OF EOPs

EOPs will be controlled in accordance with CCI-300. This CCI includes instructions for the "use of procedures," "changes and revisions," "location," and "periodic review."

VII. EOP SYSTEM STRUCTURE

The EOP System will consist of one function oriented procedure and selected event oriented procedures.

A. Function Oriented Procedure

The function oriented procedure entitled "FUNCTIONAL RECOVERY PROCEDURE" will be used when a plant condition causing a reactor trip cannot be quickly or easily diagnosed by the operator. It may also be used to mitigate accident symptoms for which the operator has initially selected an inappropriate event oriented procedure that does not adequately recover the plant as anticipated.

The "FUNCTIONAL RECOVERY PROCEDURE" will include recovery actions for restoring each of the following safety functions:

1) Reactivity Control
2) Pressure/Inventory Control
3) Vital Auxiliaries
4) RCS and Core Heat Removal
5) Containment Environment
   a) Containment Gas Control
   b) Containment Pressure
   c) Containment Temperature

6) Containment Isolation

7) Radioactivity Control

These safety functions form the set of parameters which, if maintained within acceptable ranges, assure plant and public safety. A "SAFETY FUNCTION STATUS CHECK" is the entry point for the "FUNCTIONAL RECOVERY PROCEDURE" and will provide acceptable values for each safety function and a method for detecting out of specification safety functions. The procedure itself will provide multiple recovery actions to restore these functions.

B. Event Oriented Procedures

Event oriented procedures will be designed to optimize accident recovery when an accurate diagnosis can be made, and when the initial assumptions used in procedure development are valid (i.e., no severe multiple failures or multiple accident scenerios). The following classes of events will be covered in these procedures.

1) Reactor Trip
2) Loss of Forced Circulation
3) Loss of Feedwater
4) Steam Line Break
5) Loss of Coolant Accident
6) Steam Generator Tube Rupture

The entry point for these procedures will be via EOP 1, "REACTOR TRIP." EOP 1 will verify the reactor is shutdown if a trip condition exists, will verify automatic post trip actions occur, and will verify the safety functions meet the acceptance criteria of a "POST TRIP SAFETY FUNCTION STATUS CHECK." The safety function criteria in this check will be chosen to be consistent with the plant conditions which prevail only in the short term after a simple and uncomplicated reactor trip. Thus, if there are other failures which require attention, the criteria in the status check will not be satisfied, signaling that more than a simple reactor trip has occurred. These initial actions will form the immediate actions for EOP system.

If the event symptoms can be diagnosed after the reactor trip actions are completed, the operator will implement the recovery actions from the appropriate event oriented procedure. One of the first of these recovery actions will be to assess the safety functions against specific criteria contained in an event specific "Safety Function Status Check." This check is to verify that all relevant safety functions are being fulfilled as anticipated by engineering analysis and to check on diagnostic accuracy. As such, it provides summarized statement of PLANT SAFETY existing at the time of the status check.

One essential feature of the event oriented procedure is the provision for verifying that operator actions are restoring proper plant conditions and that the safety functions are being handled in the proper priority. This feedback on procedural effectiveness will be accomplished by periodic monitoring of the safety functions using the event specific "Safety Function Status Checks." If the treatment in use is adequately controlling the event, then the treatment is continued. If the treatment is inadequate, either because new information appears that is not covered in the procedure, or because the observed symptoms are not properly responding, then a transfer is made to a more appropriate treatment. In most cases, this more appropriate treatment will be the "FUNCTIONAL RECOVERY PROCEDURE." In this way the EOP system is designed to manage multiple, significant failures, or misdiagnosed or undiagnosed events. Attachment (6) summarizes in flow path form these relationships.

VIII. OPTIMIZATION OF OPERATOR PERFORMANCE

The objective of this section is to ensure the information contained in the EOP's is presented in a format and style that facilitates speed of reading and comprehension.

These requirements incorporate human factor concerns and should be used during the initial drafting process and as a checklist for subsequent revisions. Changes to the EOPs should be consistent with these writing guidelines. Attachments (1) through (5) provide examples of the material discussed below.

A. General Requirements

1. Procedure Titles and Numbering

a. Each EOP shall be assigned a number which shall constitute the designator "EOP" followed by a hyphen and a sequential number. (Example: EOP-1)

b. Each EOP shall have a title which shall describe the type of transient to be addressed. (Example: Loss of Coolant Accident)

c. A list of EOP's and their titles is presented in CCI-300.

2. Page Numbering and Identification

a. Each page of the EOP shall be identified by:

(1) The procedure number

(2) The revision number

(3) The page number specified as Page ___ of ___.

b. The page identification shall be entered on three lines in the upper right-hand corner of each page, as shown in Attachment (1).

c. A list of effected pages will be maintained at the end of each EOP.

3. Cover Sheet

a. Each EOP shall have a cover sheet similar to that shown in Attachment (2).

b. The cover sheet shall contain the following information:

(1) Procedure number

(2) Procedure title

(3) Revision number

(4) POSRC meeting number

(5) Signature spaces for originator, reviewer, and Plant Superintendent.

c. The applicable unit is to be signified by a stamp on the cover sheet.

d. The cover sheet shall always be page 1 of the EOP.

4. Procedure Organization

The following section headings should be used in the EOPs as approriate.

a. SCOPE - The intent and applicability of the procedure will be stated for operator association with the INITIAL INDICATIONS. It will provide additional information which cannot be incorporated in the EOP TITLE. Procedure applicability should include the Initial Conditions the EOP writer assumed to exist at the commencement of the event.

b. INITIAL INDICATIONS - The initial indications should include only those alarms, indications, automatic system actions, or other unique symptoms that the operator should use to determine procedure applicability. Every alarm or possible indication need not be listed. Emphasis will be placed on determing specific sets of conditions which uniquely identify the event.

c. PRECAUTIONS - Specific precautions as defined in section VIII.B.4 will be listed in this section.

d. IMMEDIATE ACTIONS - This section will include those actions required to verify the Rx Trip, and to perform an initial "Safety Function Status Check."

e. RECOVERY ACTIONS - These are actions which are designed to take the plant to a stable condition within Technical Specifications.

f. DISCUSSION - The discussion section should contain sections providing the following information:

(1) An extended list of event indications categorized by safety function.

(2) An explanation of the event recovery strategy.

(3) An explanation of the safety function prioritization, relationships between functions that is particular to the event, and a discussion of changes in the safety function prioritization through the course of the event.

(4) General precaution as defined by section VIII.B.4.

5. Other General Requirements

a. Procedures will normally be typed on the word processor.

b. Each unit shall have a separate set of EOPs.

c. The top of page 2 shall have the title of the procedure listed, with all letters capitalized in bold face and underlined four lines from the top.

B. Text Composition

1. General Requirements

a. Mandatory sequence of steps through the third level of indentation is required unless otherwise justified.

b. Limits should be expressed quantitatively whenever possible.

c. For steps involving an action verb relating to three or more objects, the objects should be listed. If more than four items must be listed they should be displayed in subgroups not to exceed four items.

Example:

Close the following valves:

1-SI-1

1-SI-2

1-SI-3

1-SI-4

1-SI-5

d. Evolutions involving a series of actions should be arranged as a series of individual steps.

e. When an automatic actuation signal occurs:

(1) List the setpoint

(2) Request operator verification of actuation signal

(3) Instruct the operator to manually initiate automatic system response on failure of the actuation.

f. When system response dictates the speed of operator action, the limits or the time frame should be specified.

g. Instructions should be written in concise, numbered steps.

h. Cautions or notes may appear within the body of the procedure while background information should appear in the DISSUSSION section or in the basis documentation section of Attachment (5).

2. Contingency Actions and Options

a. A contingency action provides an alternative method for achieving the desired goal. Contingency actions will be included in the event based procedure where appropriate.

b. Options represent available and prioritized alteratives for mitigating specific plant aborations.

3. Logic Terms

a. Logic terms such as AND, OR, IF, NOT, WHEN and THEN are used to describe a set of conditions or sequence of actions. Whenever these logic terms are used, all letters of the logic terms shall be capitalized and underlined.

b. The use of AND or OR within the same action should be avoided.

c. The word AND should be used to join a combination of two conditions only.

d. The word OR should be used when calling attention to alternative combinations of conditions. Unless specified otherwise, the word OR will be used in the inclusive sense (i.e., "A" or "B" or both).

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

f. Avoid the use of double negative wording.

poor example: IF loss of component cooling NOT verified
THEN return to EOP-XX.

good example: IF component cooling operability is verified
THEN return to EOP-XX.

g. The following examples illustrate proper use and formatting of the above guidelines.

(1) Ordering of information: IF the feedwater header breaks,

THEN shut the main feedwater isolation valves (HS-1 and HS-12)

(2) Listing conditionals:

IF any of the following parameters are abnormally high or increasing:
- containment pressure
- containment radiation
- containment sump levels

THEN verify PORV's are shut

(3) Use of the word WHEN:

WHEN pressurizer level reaches XXX inch, THEN stop charging pump

4. Precautions and Cautions

a. General precautions describe Generic Safety issues applicable to all types of transients, or they provide additional information concerning the specific precautions contained in each procedure. These precautions where appropriate will appear in the discussion section of each procedure.

b. Specific precautions describe safety issues relevant to a particular procedure. In some cases these precautions may be generalized forms of Cautions contained within the body of the procedure.

These precautions will be listed in the PRECAUTIONS section preceding the IMMEDIATE ACTIONS.

c. Cautions describe safety issues relevant to a particular step within a procedure. These issues should include such areas as potential Technical Specification Violations, Inadvertent Safety System Actuation, restriction on the use of plant systems, and actions or situations which could result in injury or equipment damage. Cautions should be inserted prior to the applicable step in the EOP and should not be split between pages. Cautions shall not instruct the operator to perform an action.

5. Notes

a. Notes shall only be used to denote essential additional information, which would be of benefit to operators during the procedure implementation.

b. Notes shall not instruct the operator to perform any action.

c. Notes should be inserted prior to the applicable step.

6. Branching to Other Procedures or Steps

When the term "referencing" is used in connection with another procedure, it implies that the referenced procedure will be used as a supplement to the procedure presently being used. This process should be minimized because it can require excessive movement between procedures and/or simultaneous application of several procedures.

When the term branching is used in connection with another procedure, it signifies that the procedure being used is to be exited and the new procedure or a major subsection of the procedure is to be used in its entirety. Branching is an acceptable method of entering another

procedure and minimizes most of the problems associated with referencing.

The following guidelines should be used:

a. Referencing other procedures or operating instructions should be considered when more than six steps must be accomplished.

b. In referencing other procedures, the operator should be instructed to "GO TO _____" with the applicable procedure and step number inserted. If referencing instructions to perform a task, the operator should be instructed to "PERFORM THE (task) IN ACCORDANCE WITH SECTION ___ of ___."
These phrases should be capitalized to act as a marker for returning from the referenced procedure.

c. Branching to other procedures or operating instructions should be used when a complete procedure or independent section of a procedure supercedes the procedure currently in use. Once exited, the original procedure must be reentered from its beginning. Such a phenomena is expected if an incorrect accident diagnosis is made and the operator must return to the Functional Recovery Procedure.

7. Component Identification

a. Equipment, controls, and displays should be identified in common usage terms. These terms may not always match engraved names on panels but will be complete.

b. Valve designations, as listed in the Operating Instructions' valve list, should be used to identify valves.

c. When the engraved names and numbers on panel placards and alarm windows are specifically referred to in the procedure, the engraving should be quoted verbatim.

d. The number should precede the noun name when identifying pumps or valves. (Example: 22 AFW pump, 11 MSIV)

e. Location information for components should be provided only if items are seldom used or may be difficult to locate.

8. Level of Detail

a. When valves need to be operated, the valve number(s) should be used followed by the valve name(s) in parentheses.

b. For handswitches which have standby positions, the verb "Place" should be used to denote the desired position. Positional placements are typically named REMOTE, AUTO, NORMAL, PULL-TO-LOCK. All OPEN and SHUT letters, when associated with a switch position, should be capitalized.

c. Standard practice for detecting abnormal conditions during equipment startup or operation (vibration, flow etc.,) need not be included in EOPs.

9. Operator Aids

a. When information is presented using figures, charts, or tables, these aids must be self-explanatory, and legible under the expected conditions of use and within the reading precision of the operator.

b. Units of measure on tables, figures, and charts, should be given for numerical values that represent observed, measurement data, or calculated results. A virgule (slant line) should be used instead of "per." (Examples: ft/sec, lb/hr)

c. References to tables and figures, titles of tables and figures within text material, and column headings within a table should be capitalized.

d. Figures or tables referenced in the EOP text shall comprise Addendum 1 to the EOP publication and shall be accountable in the List of Effective Pages for each EOP.

C. Mechanics of Style

1. Hyphenation

a. Hyphens should be used in the following circumstances:

(1) In compound numerals from twenty-one to ninety-nine; example: one hundred thirty-four

(2) In fractions; examples: one-half, two-thirds

(3) In compounds with "self"; examples: self-contained, self-lubricated

(4) When misleading or awkward consonants would result by joining the words; example: bell-like

(5) When a letter is linked with a noun; examples: X-ray, O-ring, U-bolt, I-beam

b. When doubt exists, the compound word should be restructured to avoid hyphenation.

2. Punctuation

a. Punctuation should be used only as necessary to aid comprehension. Word order should be selected to require a minimum of punctuation. If extensive punctuation is necessary for clarity, the sentence should be rewritten and possibly made into several sentences.

b. Brackets will normally not be used.

c. A colon should be used to indicate that a list of items is to follow.

Example: Restore cooling flow as follows:

d. A comma should be inserted after conditional phrases for clarity and ease of reading.

Example: WHEN level decreases to 60 inch,

THEN start pump . . . .

e. Parentheses should be used to indicate alternative items in a procedure, instruction, or equipment or valve numbers.

3. Vocabulary

a. Words used in procedures should convey precise understanding to the trained person.

b. Words should be used that are concrete rather than vague, specific rather than general, familiar rather than formal, precise rather than blanket.

c. Define key words which may be ambiguous.

d. Verbs with specific meaning should be used. Examples are listed in Attachment (3).

e. Equipment status should be denoted as follows:

(1) Operable/operability--These words mean that a system, subsystem, train, component, or device is capable of adequately performing its specified function(s) in the intended manner. Implicit in this definition is the assumption that all pertinent instrumentation, controls, normal and emergency electrical power sources, cooling or seal water, lubrication, and other auxiliary equipment required for the system, subsystem, train, component, or

device to perform its function(s) are also capable of performing their related support function(s).

(2) Operating--This word means that a system, subsystem, train, component, or device is in operation and is performing its specified function(s).

(3) Available--This word means that a system, subsystem, train, component, or device is operable and can be used as desired; however, it need not be operating.

4. Numerical Values

a. For numbers less than unity, the decimal point should be preceded by a zero and subsequent numbers should be grouped in threes with a single space between each group of three numbers. Example 0.021 323

b. The number of significant digits should be equal to the number of significant digits available from the display and the reading precision of the operator.

c. Acceptance values should be specified in such a way that addition and subtraction is not required. This can generally be done by stating acceptance values as limits. Examples: 510°F maximum, 300 psig minimum, 580°F to 600°F.

d. Engineering units should always be specified for numerical values of process variables. They should be consistent with those used on the control room displays; for example: psig instead of psi.

5. Abbreviations, Mathematical Symbols, and Acronyms

a. Abbreviations and acronyms listed in Attachment (5) may be used. All other words should be written in full. Consistency should be maintained throughout the procedure.

b. All abbreviations listed in Attachment (4) should be capitalized when used. The period should be omitted in abbreviations except in cases where the omission would result in confusion.

c. Common mathematical symbols (i.e., , , , etc,) should be spelled out.

D. Procedure Format

1. Page Format

a. The contents of each EOP page shall be presented with the spacing and arrangment shown in Attachment (1).

b. All pages shall be 8 1/2 x 11 inch in size and white in color.

c. The 8 1/2 inch edges should constitute top and bottom of page and text. Rotation of pages should be minimized.

2. Heading and Text Arrangement

a. Block style is to be used, as shown in Attachment (1).

b. First level section headings should be typed bold face with full capitals, with underlining.

c. Second level section heading should be placed in initial capitals with underlining.

d. Third level indenting should be used to provide a general description of the action to be taken. The general description will be boxed. If required, the fourth level should be used to provide specific guidance.

EXAMPLE

I. CONTROL ROOM EVACUATION

A. Recovery Actions

1. .....

2. .....

3. Man Auxiliary Shutdown Panel

   a. Check 11 and 12 AFW feedpump speed controllers in minimum position.

   b. Check 11 and 12 AFW turbine flow controllers in the SHUT position.

e. Three line spaces should be allowed between headings and preceding text.

f. Triple line spacing should be allowed between paragraphs.

g. Text should be typed using double spacing.

h. Words should not be broken between lines or pages.

3. Section and Instruction Step Numbering

   a. Sections of the EOP shall be numbered using capital roman numerals. Succeeding portions of each section shall be numbered as follows:

      I.

         A.

            1.

               a.

   b. The use of the a. level of indenting should be used for providing specific instructions for accomplishing the general instruction of Level 1.

4. Cautions and Notes

   a. The applicable heading "NOTE" and "CAUTION" should be capitalized, and centered. Both shall also be underlined.

   b. The text of the note or caution shall be block format, line spaced.

5. Figures

   a. Figures not included in the EOP text will have the appropriate attachment number and title placed on the third and fourth lines below the top of the page, using standard word processor type.

   b. The figure, or its labels, must not encroach on specified page margins.

   c. The figure field should be of sufficient size to offer good readability.

   d. Grid lines of graphs should be at least 1/8-inch apart; numbered grid lines should be emphasized.

   e. Labeling of items within a figure should be accompanied by arrows pointing to the specific item.

   f. The items within a figure should be oriented naturally insofar as possible. However, the dependent variable should be displayed on the vertical axis if possible.

   g. In general, items within the figure should be labeled. Typed labels should use standard word processor type. Handwritten labels should be printed, using all capitals, with letters and numbers at least 1/8-inch high.

   h. All lines in figures should be reproducible.

6. Tables and Charts

   a. The table number and title should be located above the table field and three line spaces below preceding text.

   b. A heading should be entered for each column and centered within the column; the first letter of words in the column headings should be capitalized.

c. Horizontal lines should be placed above and below the column headings; vertical lines, while desirable, are not necessary or required.

d. Tabular headings should be aligned as follows:

(1) Horizontally by related entries

(2) Vertically by decimal point for numerical entries

(3) Vertically by first letter for word entries; however, run-over lines should be indented three spaces

e. Double spacing between horizontal entries suffices to segregate such entries, although horizontal lines may also be used if desire. If used, double horizontal lines should be used above and below the column headings.

f. There should not be a vacant cell in the table. If no entry is necessary, "N.A." should be entered to indicate not applicable.

Meets Quality Assurance Requirements

SUBMITTED: _____ _____
GSOQA

POSRC: _____

APPROVED: _____
Plant Superintendent
Calvert Cliffs Nuclear Power Plant

ATTACHMENT (1)

PAGE FORMAT

I. FIRST LEVEL SECTION HEADINGS - CAPITALIZED AND UNDERLINED

A. Second Level Headings - Underlined and Capitalized

1. TEXT will normally be presented in block form with paragraphs separated by 3 spaces. The test shall be typed using double spacing and words should not be broken between lines or pages.

   a. Specific instruction double spaced.

- NOTE -

Capitalize and underline the word NOTE.

Text will be doubled spaced and in BLOCK format.

- CAUTION -

Capitalize and underline the word CAUTION.

Text will be double spaced and in BLOCK format.

ATTACHMENT (2)

COVER SHEET

EOP-1 REACTOR TRIP

REVISION 50

	Signature	Date
ORIGINATOR:	_____	/ /
REVIEWER:	_____	/ /
POSRC MEETING NO.:	_____	/ /
APPROVED:	_____	/ /

Plant Superintendent
Calvert Cliffs Nuclear Power Plant

VERB LIST

VERB	APPLICATION
ALLOW	To permit a stated condition to be achieved prior to proceeding, for example, "allow discharge pressure to stabilize"
CHECK	To perform a comparison with a procedural requirement "Check shut letdown isolation valve (CVC-515)"
CLOSE	To change the physical position of a device so that it permits passage of electrical current, for example, "Close the salt water pump breaker"
COMPLETE	To accomplish specified procedural requirements, for example, "complete steps A through C of Section III"
DECREASE	Do Not use because of oral communication problems.
ESTABLISH	To make arrangements for a stated condition, for example, "establish AFW flow . . ."
INCREASE	Do Not use because of oral communication problems.
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"
LOWER	Reduction in the absolute value of a parameter, for example PZR pressure.
OPEN	To change the physical position of a mechanical device, such as valve or door to the unobstructed position that permits access or flow, for example, "open the AFW throttle valve (AFW-4511)"
PLACE	To change the physical position of a handswitch with positions for standby conditions, for example, "Place 23 AFW pump handswitch (HS-4540) in AUTO"
RAISE	Increase in the absolute value of a parameter, for example, "Raise the level in 11 BAST"
RECORD	To document specified condition or characteristic, for example, "record discharge pressure"

VERB LIST

VERB	APPLICATION
SHUT	To change the physical position of a mechanical device so that it prevents physical access or flow, for example, "shut the MSR steam source valves"
SET	To physically adjust to a specified value an adjustable feature, for example, "set diesel speed to . . . .'rpm' "
START	To originate motion of an electric or mechanical device directly or by remote control, for example, "start . . . .pump"
STOP	To terminate operation, for example, "stop . . . pump"
THROTTLE	To operate a valve in an intermediate position to obtain a certain flow rate, for example, "throttle the AFW regulating valves . . ."
TRIP	To manually activate a semi-automatic feature, for example, "Trip Unit 2 main turbine. . ."
VERIFY	To confirm an expected condition or characteristic, for example, "Verify that SIAS has actuated"

ACCEPTABLE ACRONYMS

ACRONYM	TERM
AFAS	Auxiliary Feedwater Actuation System
AFW	Auxiliary Feedwater
AOP	Abnormal Operating Procedure
BAST	Boric Acid Storage Tank
CEA	Control Element Assembly
CEDM	Control Element Drive Mechanism
CIS	Containment Isolation Signal
CRS	Containment Radiation Signal
CSAS	Containment Spray Actuation Signal
CST	Condensate Storage Tank
CVCIS	Chemical Volume and Control Isolation Signal
CVCS	Chemical Volume and Control System
CV	Control Valve
DNB	Departure from Nuclerate Boiling
ECCS	Emergency Core Cooling System
EOP	Emergency Operating Procedure
ESFAS	Engineered Safety Features Actuation System
GPM	Gallon/Minute
HPSI	High Pressure Safety Injection
INCA	In Core Calculation
LOCA	Loss of Coolant Accident
LPSI	Low Pressure Safety Injection

ACCEPTABLE ACRONYMS

ACRONYM	TERM
MCC	Motor Control Center
MOV	Motor Operated Valve
MPT	Minimum Pressurization Temperature
MSIV	Main Steam Isolation Valve
MSR	Moisture Separator Reheater
NEOG	Nuclear Engineering Operator Guide
OI	Operating Instruction
OP	Operating Procedure
PDIL	Power Dependent Insertion Limit
PORV	Power Operated Relief Valve
RAS	Recirculation Actuation Signal
RCDT	Reactor Coolant Drain Tank
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RPS	Reactor Protective System
RTD	Resistance Thermocouple Detector
RWT	Refueling Water Tank
S/G	Steam Generator
SGIS	Steam Generator Isolation Signal
SI	Safety Injection

ACCEPTABLE ACRONYMS

ACRONYM	TERM
SIAS	Safety Injection Actuation System
SRW	Service Water
T-COLD	Cold Leg Temperature
T-HOT	Hot Leg Temperature
TM/LP	Thermal Margin/Low Pressure
UV	Undervoltage
VCT	Volume Control Tank
^{o}F	Degrees Fahrenheit
^{o}C	Degrees Centigrade
PSIA	Pounds/square inch, absolute
PSID	Pounds/square inch, differential
PSIG	Pounds/square inch, gauge

ATTACHMENT (5)

EOP DEVIATION SHEET

EOP _____ REV _____ SECTION _____ STEP _____

Deviation from generic guidelines _____ verification finding _____ validation finding _____

Deviation/Finding description: _____

_____

_____

_____

Recommended change: _____

_____

_____

_____

Signature _____

Actual resolution to problem if different from recommended change:

_____

_____

_____

Justification of change: _____

_____

_____

Signature: _____

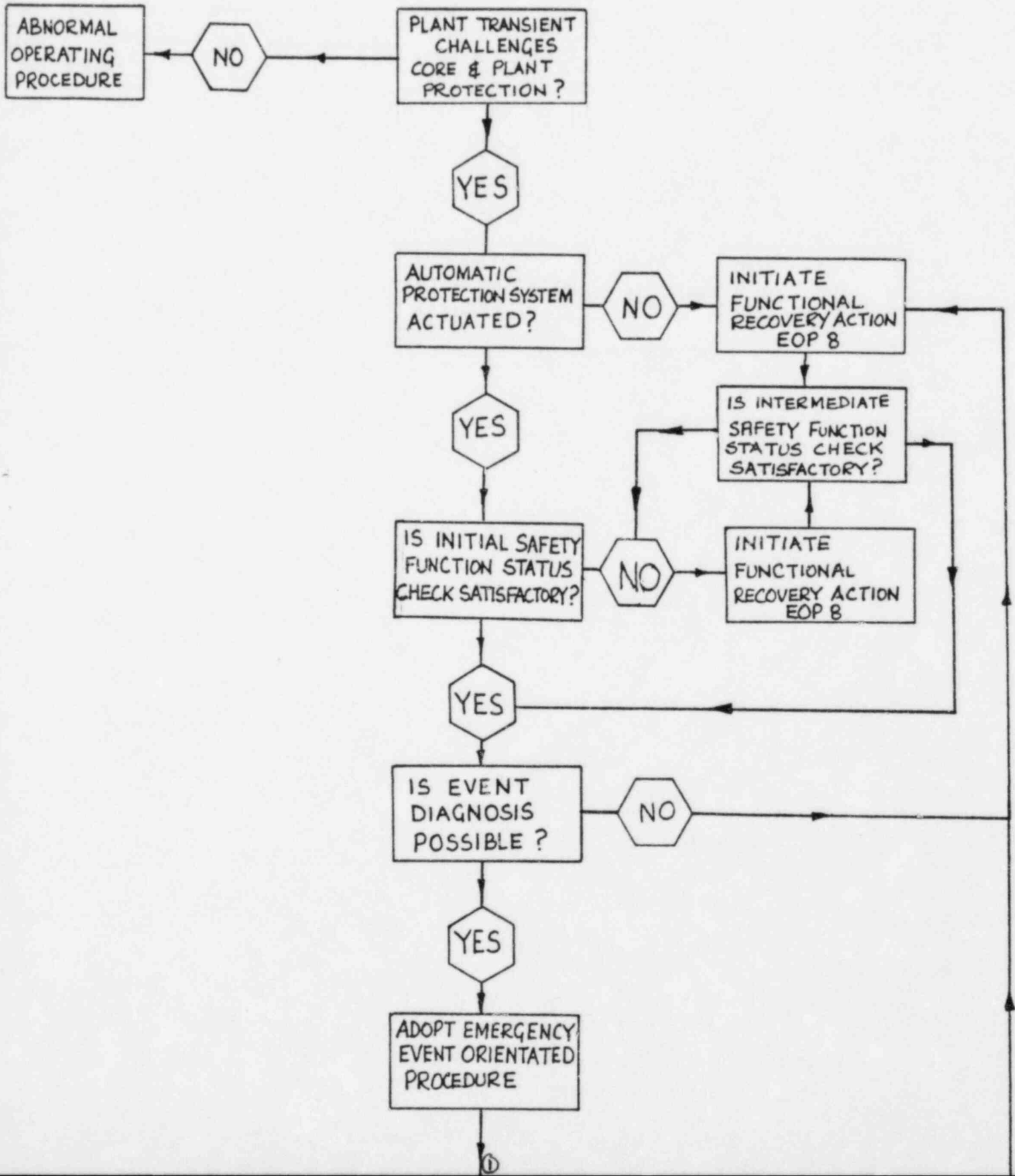
Additional Basis Information: _____

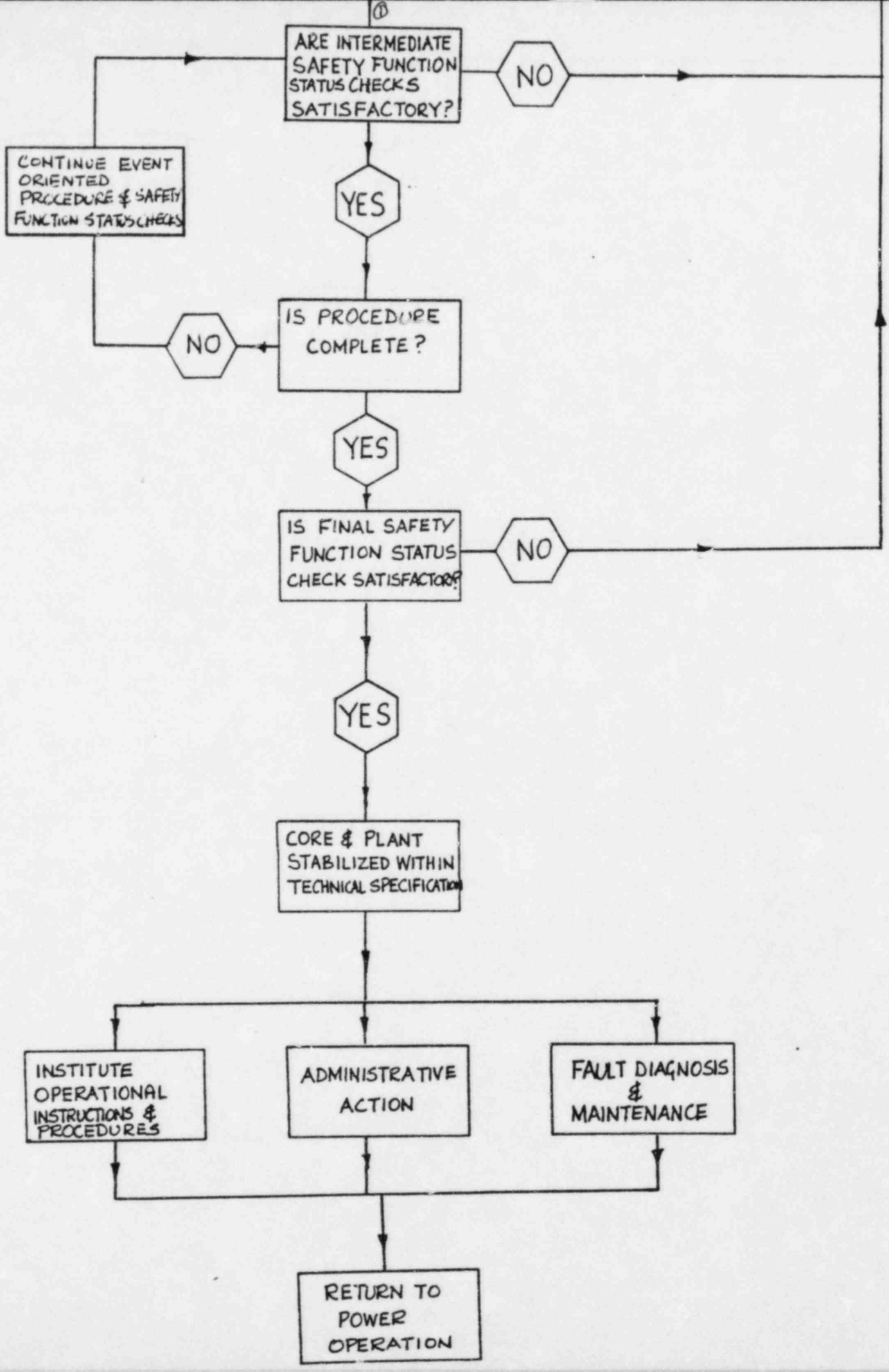
_____

_____

Source: _____

ATTACHMENT (6)




ARE INTERMEDIATE SAFETY FUNCTION STATUS CHECKS SATISFACTORY?
NO
YES
CONTINUE EVENT ORIENTED PROCEDURE & SAFETY FUNCTION STATUS CHECKS
IS PROCEDURE COMPLETE?
NO
YES
IS FINAL SAFETY FUNCTION STATUS CHECK SATISFACTORY?
NO
YES
CORE & PLANT STABILIZED WITHIN TECHNICAL SPECIFICATION
INSTITUTE OPERATIONAL INSTRUCTIONS & PROCEDURES
ADMINISTRATIVE ACTION
FAULT DIAGNOSIS & MAINTENANCE
RETURN TO POWER OPERATION

ATTACHMENT (7)

1. Baltimore Gas & Electrical Company, Calvert Cliffs Nuclear Power Plant Units 1 and 2 updated Final Safety Analysis Report (Revision 2).
2. Combustion Engineering Inc, Emergency Procedure Guidelines CEN-152.
3. Calvert Cliffs Facility Change Request.
4. Plant Specific Transient Analyses, CEN-128 CE.
5. NRC Documents.
6. Calvert Cliffs Nuclear Power Plant Units 1 and 2 Technical Specifications.
7. Calvert Cliffs Nuclear Power Plant Units 1 and 2 System Descriptions (1-13).
8. Existing Calvert Cliffs Nuclear Power Plant Units 1 and 2 Abnormal Operating Procedures.
9. Existing Calvert Cliffs Nuclear Power Plant Units 1 and 2 Emergency Operating Procedures.
10. Existing Calvert Cliffs Nuclear Power Plant Units 1 and 2 Normal Operating Procedures.
11. Existing Calvert Cliffs Nuclear Power Plant Units 1 and 2 Operating Instructions.
12. Controlled (in date as fitted) OM Series Piping and Instrumentation Drawings Calvert Cliffs Nuclear Power Plant Units 1 and 2.
13. Calvert Cliffs Nuclear Power Plant Units 1 and 2 General Arrangement Drawings (As fitted).
14. Calvert Cliffs Nuclear Power Plant Units 1 and 2 Electrical Wiring and Interconnecting Wiring Diagrams.
15. Calvert Cliffs Nuclear Power Plant Units 1 and 2 Alarm Manual.
16. Calvert Cliffs Nuclear Power Plant Units 1 and 2 Set-Point Manual.
17. Calvert Cliffs Nuclear Power Plant Units 1 and 2 Operating Experience Reports (In plant and Industry experience).

ATTACHMENT (8)

LIST OF EFFECTIVE PAGES

CALVERT CLIFFS EMERGENCY OPERATING PROCEDURE WRITERS GUIDE

PAGE NUMBER	EFFECTIVE CHANGE
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0

ATTACHMENT	EFFECTIVE CHANGE
1	0
2	0
3, Pages 1-2	0
4, Pages 1-3	0
5	0
6, Pages 1-2	0
7	0
8	0

EOP VERIFICATION/VALIDATION PLAN

EOP VERIFICATION/VALIDATION PLAN

I. INTRODUCTION

This document identifies the methods to be used by the Baltimore Gas and Electric Company, in compliance with NRC direction, for the verification and validation of Emergency Operating Procedures (EOP's) at Calvert Cliffs I and II.

II. VERIFICATION PROGRAM

A. The verification program objective is to ensure written correctness and technical accuracy in each EOP. In general, the guidelines provided in the document "Emergency Operating Procedures Verification Guideline," INPO 83-004 of March 1983, will be utilized to accomplish this objective.

B. Procedure verification will occur in two distinct steps. The first step consists of an Individual Review, the second a Group Review.

Individual Review - EOP's will be drafted by a writing group dedicated full-time to that task. Each person in the group will be assigned specific procedures for which he will have verification responsibility. In all cases the functions of writing and verification will be separated so that an independent check of each procedure is obtained in the review process. Consistency between reviews will be achieved by using a verification checklist. This checklist will be derived from the checklist provided in the INPO guideline document and the checklist from NUREG/CR 2005. The objective of the step is to ensure the written correctness of each procedure.

Group Review - The second objective of EOP verification is to ensure technical accuracy. This will be accomplished by bringing the EOP writers together as a group. Within this group the technical expertise will exist to compare each new procedure against the various source documents (Generic

Guidelines, Writer's Guide, FSAR, Technical Specifications, etc). The functions which will be incorporated in this comparison process are as follows:

1. Ensure so single individual's bias effects the new procedure adversely.
2. Ensure the new procedure is technically consistent with the source documents.
3. Record any improvements in EOP writing methodology which should be provided as feedback to the writer's guide.
4. Complete deviation sheets for all verification findings.
5. Document any additional information concerning bases for EOP actions obtained during the verification process.

III. VALIDATION

A. The validation program objective is to ensure the useability and operational correctness of each EOP. In general, the guidelines provided in the document "Emergency Operating Procedures Validation Guidelines," INPO 33-006 of July 1983, will be used to accomplish this objective.

B. The validation of Emergency Operating Procedures will be accomplished by:

1. Step-by-step walkthrough
2. Simulator performance using selected scenarios
3. Feedback from actual performance of EOP's

Step-By-Step - The step-by-step walkthrough will utilize a control room operating team consisting of the minimum number of personnel allowed by Technical Specification 6.2. The observation team will utilize personnel from the writing group, training unit, and the control room. A checkoff sheet derived from the example in the INPO guideline will be used by the observation group to ensure consistency and completeness. The lead observer duties will include direction of the scenario, asking

questions, and noting problems encountered by the operating team. The other observers will note individual operator responses to each step in the procedure in addition to asking questions and noting problem areas. The operating team will walk and talk through the procedure while simulating the actions required by it. A control room mock-up using poster type pictures of the control room or the actual simulator panels (if available) will be used to facilitate these actions. The operating team will supply the following information to the observer team:

a. Describe the action being taken.

b. Identify instruments and controls used.

c. Identify expected system responses and how they are verified.

d. Identify contingency actions which might be taken that aren't in the procedure.

e. Identify any other procedure deficiency identified during the validation process.

Simulator Validation - Simulator validation of the EOP's will occur during the first requalification cycle after the plant specific simulator is operational. Under current scheduling, this validation step would occur after EOP implementation. This is considered acceptable for the following reasons:

a. A walkthrough validation will be completed prior to implementation.

b. The Generic Guidelines were validated on the CE simulator which models the Calvert Cliffs control room. Validation on a site specific simulator is expected to provide much more cost effective information (both quantity and quality) than a replay of procedures on the CE simulator.

c. Delay of procedure implementation until the site specific simulator is available would cause an unjustified delay in providing better information and guidance to the operating shifts.

Feedback From Actual Performance - To provide for continual monitoring of procedure correctness and useability, the validation checklists developed for use in the validation above will be reviewed after an EOP is used in an actual plant transient and after use in simulator exercises run during operator requalification sessions.

IV. DOCUMENTATION

All comments made during the verification and validation processes will be documented on the EOP Deviation Sheet (Attachment (5), EOP Writer's Guide) and forwarded to the appropriate procedure writer for resolution. The procedure writer will determine the proper corrective action and document this response on the respective deviation sheet. All deviation sheets will become part of the EOP History File as described in the Writer's Guide.

EOP TRAINING PLAN

EOP TRAINING PLAN

I. INTRODUCTION

This document identifies the methods to be used by the Baltimore Gas and Electric Company in compliance with NRC regulation, for the training of Operations Personnel on the philosophy and use of Emergency Operating Procedures (EOP's) at Calvert Cliffs Units I and II.

II. EOP PHILOSOPHY

The objective of this portion of the training program is two fold and will incorporate as its objectives, 1) an overview of the revised procedures, and 2) safety function concepts as applied to the EOP's.

A. The overview will consist of the following items:

1. Format and content level
2. Relationship of EOP's to existing plant procedures
3. Principles of Standard Post Trip Actions
4. Principles of Optional Recovery Guidelines
5. Relationship to the Functional Recovery Guidelines

B. Safety function concepts portion will consist of the following items:

1. Safety Function Definitions
2. Accomplishing Safety Functions
3. Use of Safety Functions

III. PROCEDURE USE

Operator training associated with the revised procedures will be completed in two phases. The initial training phase will be completed in a classroom atmosphere and the second phase will be completed using the plant specific simulator.

A. During the classroom phase, each EOP will be discussed and challenged to verify its correctness. Lectures presented will include the following areas for each event based procedure:

1. Event Introduction
2. Event Characteristics
3. Mitigation Process
4. Maintenance of Safety Functions

B. The Functional Recovery Guideline will include, in addition, the following:

1. Use of the Functional Recovery Guideline
2. Basic Structure of the Guideline
3. Detailed bases in terms of Safety Function Concepts

C. Following the classroom training, simulator sessions will allow each operating crew to implement the procedures during simulated real-time scenarios developed to exercise all aspects of the procedures. Close observation of the crews will allow problem areas to be corrected and procedure inadequacies to be identified.

D. In addition to the training described, written examinations will be administered as part of initial and requalification training programs to ensure understanding of the procedures.

IV. ONGOING TRAINING PROGRAM

Future revisions to the EOPs may be expected as a result of revisions or supplements to the EPGs, revisions to plant specific design information, or improvements to existing safety analyses. Operator retraining will be performed prior to the implementation of such revisions in accordance with the general methods discussed above.