CONNECTICUT YANKEE ATOMIC POWER COMPANY

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July 12, 1985

Docket No. 50-213
A02959
A04135
A04557

Director of Nuclear Reactor Regulation
Attn: Mr. John A. Zwolinski, Chief
Operating Reactors Branch #5
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

References: (1) J. A. Zwolinski letter to W. G. Counsil, dated December 17, 1984.

(2) W. G. Counsil letter to D. M. Crutchfield/J. R. Miller, dated September 1, 1983.

(3) D. M. Crutchfield letter to W. G. Counsil, dated June 12, 1984.

(4) J. F. Opeka letter to J. A. Zwolinski, dated May 24, 1985.

Gentlemen:

Haddam Neck Plant
Supplement 1 to NUREG-0737
Emergency Operating Procedures Generation Package
Response to Draft Safety Evaluation

By Reference (1), the NRC Staff transmitted its draft Safety Evaluation for the Haddam Neck Plant Emergency Operating Procedures Generation Package (PGP), which was submitted in Reference (2). The NRC Staff's draft Safety Evaluation concludes that the emergency operating procedures program for the Haddam Neck Plant is acceptable except for the items identified in Section 2.0. During the process of preparing our response to these items, a decision was made to investigate whether the Haddam Neck Plant simulator would be completed on a schedule which would allow for the validation of the Emergency Operating Procedures (EOPs) and operator training on the plant-specific simulator. Based upon this investigation, we concluded that the Haddam Neck Plant simulator would not be completed on a schedule consistent with the requirement of the Order issued by the NRC Staff in Reference (3). This Order requires the implementation of the upgraded EOPs prior to the start of Cycle 14 (i.e., approximately the beginning of March, 1986). Since we believe that the utilization of the plant-specific simulator in the manner described above is the preferred approach, we indicated in Reference (4) that we would request a

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modification to the subject Order and submit our response to Reference (1) by July 12, 1985. The purpose of this submittal is to fulfill that commitment.

Based upon the schedule to complete the installation of the Haddam Neck Plant simulator, upgraded EOPs could be implemented by September 1, 1986 allowing for the validation of the EOPs and operator training on the plant-specific simulator. This implementation date represents approximately a six-month slippage from the existing implementation deadline contained in the Reference (3) Order. The existing implementation schedule was based primarily upon the use of static walkthroughs for the validation of EOPs and operator training in lieu of the plant-specific simulator. The advantages of training operators on the plant-specific simulator prior to the implementation of the EOPs are as follow:

- classroom training and static walkthroughs would be reinforced by dynamic training on the simulator.

- simulator training would provide the opportunity for the operators to exercise actual judgments and decisions using the revised EOPs.

- simulator evaluations of shift teams would allow for a better measure of training effectiveness than written exam/static walkthroughs only.

- dynamic exercises would build operator confidence in the use of the revised EOPs.

Based upon the above, we believe that the postponement of the implementation of the revised EOPs represents an improvement over the program that would otherwise be implemented if the existing implementation deadline is adhered to. This is especially true since there is no intrinsic safety significance associated with the existing implementation date. Accordingly, we hereby request a deferral of the EOP implementation date imposed by the Reference (3) Order from "prior to start of Cycle 14" to "by September 1, 1986."

Since our efforts related to operator training are dependent upon the training program implemented (i.e., with or without the use of the plant-specific simulator), September 1, 1985 represents the date by which our efforts become specifically related to the type of training necessary. We respectfully request, therefore, that the NRC Staff review this request and decide whether it will be approved by August 30, 1985.

Responses to the items contained in Reference (1) are included as Attachment No. 1. Revision 1 to the PGP can be found in Attachment No. 2. These attachments were prepared based upon the utilization of the plant-specific simulator and an associated EOP implementation date of September 1, 1986. If our request is denied by the NRC Staff, these attachments will need to be revised.

Section 3.0 in the draft Safety Evaluation states that "(f)uture changes to the PGP having safety significance should be brought to the attention of the NRC and will be reviewed in accordance with 10 CFR 50.59." Revisions to the emergency operating procedures, but not the PGP, will be reviewed in accordance with 10 CFR 50.59. Changes to the PGP will be performed in

accordance with normal plant administrative controls. We know of no criteria in Supplement 1 to NUREG-0737 or NUREG-0899 indicating that changes to the PGP should be documented pursuant to 10 CFR 50.59.

We trust that this submittal adequately responds to Reference (1) and we look forward to your prompt attention to our request to extend the EOP implementation date.

Very truly yours,

CONNECTICUT YANKEE ATOMIC POWER COMPANY

J. F. Opeka
Senior Vice President

Docket No. 50-213

Attachment No. 1

Haddam Neck Plant

Responses to Items Contained in Draft Safety Evaluation

July, 1985

A. Plant Specific Technical Guidelines (P-STG)

1. Deviations from and additions to the generic guidelines that are of safety significance must be identified in the P-STG. In addition, the analyses or technical justification that support the acceptability of these deviations and additions must be provided.

Response

As a comparison of the Haddam Neck Plant and the Westinghouse ERG reference plant yields no safety deviations, no specific analyses are required. The EOPs themselves are reviewed by NUSCO Safety Analysis Branch as discussed in Section A.3 of the Verification Program.

2. Any additions to or deviations from the generic guidelines included in the P-STG should be verified/validated. This verification/validation step can be accomplished separately or as a part of the EOP verification/validation program. The PGP should discuss how the additions and deviations are to be verified/validated (NUREG-0899, Subsection 4.2). The P-STG discussion indicates the use of the verification and validation Check-Off List. However, it is not clear if these Check-Off Lists will be used as part of the P-STG development or as part of the verification/validation of the additions and deviations. This discussion should be expanded to provide a clear description of the verification/validation for the additions to and deviations from the generic guidelines.

Response

Any additions to or deviations from the generic guidelines will be verified/validated by a team of operators and the NUSCO Safety Analysis Branch. The method of validation will consist of table top, walk-through and plant-specific simulator. The check-off lists will be used in the verification phase only. (See Section A.3 of the Verification Program.)

B. Plant-Specific Writer's Guide (P-SWG)

1. Page layout is addressed in Section 3.2 (p. 10) and in the EOP examples, Figures 1-5 on pages 11, 12, 14, 15, and 17, respectively. However, the following aspects of page layout shown in the EOP examples should be discussed in the text. (NUREG-0899, Subsection 5.5.2).

   a. Section 3.2 states that the page structure employs a pre-printed border to assure all margins are correctly maintained, but the examples only show pre-printed border margins at the top and bottom of the page. The P-SWG should provide guidance to ensure that sufficient side margins are also used to allow for binding and reproduction of the EOPs.

   b. The line spacing of the text should be specified to ensure proper spacing to enhance readability.

Response

Section 3.2 has been revised to specify margin and line spacing requirements.

2. A number of conditions and requirements for steps, cautions and notes are addressed in the P-SWG (Section 4.2). However, an additional requirement should be included in the P-SWG to reduce the possibility for an operator missing a portion of the step, caution or note. That is, a step, caution or note should be complete on a page and not continued onto a new page.

Response

Section 4.2.4 has been revised to require that cautions or notes will be left on the same page. To the extent practical, each step will also be completed on the same page.

3. Note statements are intended to provide supplemental information and, therefore, should not include action steps. Subsection 4.2.4 should be revised to preclude the use of notes for procedure transitions. (NUREG-0899, Subsection 5.7.10).

Response

Section 4.2.4. has been revised as requested.

4. Place-keeping aids can assist the operators in keeping track of their position within a procedure. They are of particular importance when performing concurrent steps or procedures and in the situations where the user's attention is diverted. The P-SWG should be revised to specify the use of some type of place-keeping aid. (NUREG-0899, Subsection 5.5.4).

Response

Section 4.4 has been added. It states that place-keeping aids will be inserted in each procedure transition point so that the procedure can be re-entered at any time. Steps in the procedure will be check marked when the step is complete.

5. To provide consistency among and within EOPs, the headings to be used for the various sections of the EOPs, their sequences, format, and method of emphasis should be addressed in the P-SWG. (NUREG-0899, Subsection 5.5.5, 6, and 7).

Response

Section 4.5 has been added. It states that headings will be in accordance with the Westinghouse ERGs. Information that should be

focused on will be typed in capital letters. Step numbers will be used to locate specific sections of the procedure.

6. Section 5.0 discusses two types of format that may be used for the Critical Safety Function Status Trees. Since the P-SWG should give direction to the procedure writers, a single status tree format, and the intended location, should be chosen and specified in the P-SWG.

Response

Section 5.0 has been revised to specify a single status tree format.

7. The P-SWG, Subsection 4.2.3, does a good job of describing and defining logic terms and their uses. However, it is suggested that this section be revised to include examples of logic terms or sequences that should be avoided because the statements can be confusing and ambiguous, such as combinations of AND and OR. (NUREG-0899, Subsection 5.6.10).

Response

Section 4.2.3 has been revised as requested.

8. The P-SWG, Subsection 4.2.5, describes the referencing of other procedures and steps. However, there are times when the referred step(s) should be incorporated in the EOP rather than cross-referenced. Decision criteria should be provided to the EOP writers to help them determine when to incorporate steps rather than cross-referencing to them. (NUREG-0899, 5.2.2 and 5.2.7).

Response

Section 4.2.5 has been revised to state that transition steps will be in accordance with the Westinghouse ERGs. They have been proven to be grammatically correct and step transitions are clear and concise.

9. EOP references to out-of-the-way or infrequently used equipment, controls or displays should include information pertaining to their location. Decision criteria should be provided so that EOP writers can decide when to include location information. The format and contents of the location information should be specified. (NUREG-0899, Subsection 5.7.11).

Response

Section 4.6 has been added. The location shall be described in a format that is consistent with standard plant nomenclature for the area it is located within.

10. Action steps need to be written for a variety of situations. The P-SWG should address the formatting for the following types of action steps: (1) verification steps which are used to determine whether the objective of a task or a sequence of actions has been achieved, (2) steps which are repeatedly performed, (3) steps for which a number of alternative actions are equally acceptable, and (4) steps that are performed concurrently with other steps. (NUREG-0899, Section 5.7).

Response

Section 4.7 in the P-SWG has been revised to address verification steps, recurrent steps, equally acceptable steps and concurrent steps.

11. To minimize confusion, delay, and errors in execution of EOP steps, the following concerns should be addressed in the P-SWG: (1) EOPs should be structured so that they can be executed by the minimum shift staffing and minimum control room staffing as required by the Technical Specifications, (2) EOPs should be structured so that operator roles specified in the EOPs and in the training program are consistent with pre-established leadership roles and division of responsibilities, (3) action steps should be structured to minimize physical conflicts between personnel and to minimize the amount of movement needed for carrying out the steps, and (4) action steps should be structured to avoid unintentional duplication of tasks. (NUREG-0899, Section 5.8).

Response

Section 4.8 has been added to address the above items.

12. It is important that an operator be able to quickly access the relevant EOPs or portions of EOPs. The P-SWG should address the accessibility of the EOPs and their various parts and sections. (NUREG-0899, Subsection 6.1.4).

Response

Section 4.9 has been added to address the above item.

13. All copies of the EOPs should be legible, therefore the quality of the reproduced copies of the EOPs should be addressed in the P-SWG. (NUREG-0899, Subsection 6.2.2).

Response

Section 4.9.1 has been added to address legibility.

14. If major changes occur in the plant design, the technical guidelines, the Technical Specifications, the P-SWG, or other plant procedures,

then the EOPs may need to be revised. These revisions should be made in accordance with the PGP. Instructions to effect this should be included in the P-SWG or elsewhere in the PGP. (NUREG-0899, Subsection 6.2.4).

Response

Section 4.10 has been added to address updating of EOPs.

15. The step numbering shown in Figure 5, and discussed in Section 3.3, requires operators to review the document to obtain the entire step identifier, and does not provide the operators with a good perspective of where they are in relation to the entire document. The PGP should be revised to specify a numbering system that allows the complete step identifier to precede each step, such as substep "a" of step 2 would be written 2.a. (NUREG-0899, Subsection 5.5.5).

Response

Section 4.11 has been added to address divisions, headings and numbering. The numbering system will be consistent with that of the Westinghouse ERGs.

C. Validation/Verification

1. The process for ensuring written correctness and technical accuracy should be formalized with the responsibilities and roles of the participants described in the PGP.

Response

Section A.2.2 of the Verification Program was revised to indicate that written correctness and technical accuracy will be verified by licensed operators.

2. The use of the verification process for revisions should be discussed in the PGP. This should include the criteria to determine when verification is required.

Response

Section A.4 of the Verification Program was added to indicate that any changes will be verified correct and validated to insure they provide proper guidance.

3. The PGP lists three possible methods that can be used for validation of the EOPs, but does not indicate which ones or what combinations are planned to be used at Haddam Neck. The validation program should be more formalized and thoroughly described in the PGP, including the roles and responsibilities of the participants.

Response

A summary of the validation program has been added.

4. The licensee will use a plant-specific simulator for validation when it becomes available. The PGP should identify when this simulator will be available (before or after implementation of the EOPs). If the EOPs are going to be implemented before the site specific simulator is available, the PGP should describe how the EOPs will be validated prior to implementation.

Response

It was originally intended that the plant-specific simulator would be utilized to validate the revised EOPs after the EOPs were implemented. We now plan to validate the EOPs on our plant-specific simulator prior to the implementation of the revised EOPs. The PGP has been revised accordingly.

5. The discussion on use of scenarios to validate the EOPs on a simulator should be expanded to indicate that all EOPs will be exercised, including multiple failures (sequential and simultaneous), and to include the criteria to be used for selecting scenarios.

Response

See reply to Item 3. The Validation Program indicates that a wide variety of scenarios, which include multiple failures, will be tested on the plant-specific simulator.

6. Future revisions to EOPs may require validation. The PGP should include: (1) criteria or methods that will be used for determining whether validation of each revision is needed and (2) a description of how you will determine the appropriate validation when needed.

Response

See reply to Item 2. All changes will be verified/validated.

7. The EOP will require a certain number of operators to carry out the various activities and steps specified. The PGP should indicate that the EOPs will be exercised, during plant walk-throughs and simulator exercises, with the minimum control room staff size as required by the Technical Specifications. (NUREG-0899, Subsection 3.3.5.1).

Response

This has been addressed in the validation summary.

8. The control room instrumentation and controls referred to in the EOPs need to be evaluated in terms of their adequacy and their correspondence with the actual instrumentation found in the control room, as follows:

   a. The PGP should describe the plan for determining the operators' information and control needs. (NUREG-0899, Subsection 3.3.5.1).

   b. The PGP should describe the method(s) that will be used to determine whether the actual control room instruments and controls meet the information and control needs. (NUREG-0899, Subsection 3.3.5.1).

   Response

   The PGP has been revised to state that the validation program will be used to determine whether the actual control room instruments and controls meet the information and control needs of the operators. Any inadequacies will be identified and resolved.

   The Control Room Design Review will provide additional assurance that the tasks required to be accomplished by the operators can be carried out and the actual control room instruments and controls provide the necessary information and controls for the operators. Any deficiencies identified will be addressed.

D. Training Program

1. The PGP should state training objectives and describe how these objectives will be accomplished by the training program.

   Response

   The training section has been expanded to include the training objectives and a description of how these objectives will be accomplished.

2. The training program should include a statement of commitment that all operators will be trained on the revised EOPs prior to their implementation. (NUREG-0899, Section 2.3).

   Response

   The training section has been expanded to include this statement.

3. Although the PGP states that a generic simulator will be used for operator training, the training program description should be expanded to address the following items:

   a. Discuss the method to be used to train the operators in areas where the simulator is not like the control room or does not react like the plant, and in parts of the EOPs that cannot be run on the simulator.

   Response

   It was never intended that a generic simulator be used for operator training. Since a plant-specific simulator will be utilized for operator training, no further discussion is necessary.

   b. Indicate that operators will be trained to use the EOPs as a team and that each operator is trained in the role that he would be expected to take in case of an actual emergency.

   Response

   The training section has been expanded to address this.

   c. Indicate the use of a wide variety of scenarios to fully exercise the EOPs on the simulator and thus expose the operators to a wide variety of EOP uses.

   Response

   The training section has been expanded to address this.

   d. Indicate that all EOPs will be exercised by all operators.

   Response

   All operators will be trained on the revised EOPs. However, a wide variety of EOPs, in lieu of all EOPS, will be exercised by the operators. (See Item 3.c above.)

4. The PGP should state that the operator's knowledge and performance of EOPs will be evaluated after training and that appropriate follow-up training will be conducted in deficient areas.

   Response

   The training section has been expanded to address this.

Docket No. 50-213

Attachment No. 2

Haddam Neck Plant

Emergency Operating Procedures
Generation Package
Revision 1

July, 1985

Emergency Operating Procedures
Generation Package

PURPOSE

The purpose of this Emergency Operating Procedures Generation Package is to describe the program of the development and implementation of new symptom-oriented emergency procedures from the Westinghouse Owners Group Emergency Guidelines for the Connecticut Yankee Atomic Power Company plant at Haddam Neck.

The Connecticut Yankee plant is a Westinghouse pressurized reactor with four loops having loop stop valves. The licensed power is 1825 megawatt thermal with once through cooling. The Connecticut river is the ultimate heat sink.

The Engineered Safety Features at the Haddam Neck plant consist of: two charging pumps; two high pressure safety injection pumps; two low pressure safety injection pumps; two residual heat removal pumps and heat exchangers; two emergency diesel generators; four service water pumps; four recirculating cooling fans for the containment; two station batteries; and all of the necessary electric busses, pipes, controls and instrumentation to provide for two independent trains of equipment for mitigating accident conditions.

SCOPE

This package has been developed to meet the requirements of USNRC Generic Letter 82-33 and other related documents. It is intended to outline the methods and reference material used to produce Emergency Operating Procedures (EOPs) and to verify, validate and implement them in an orderly and understandable manner. There will also be documentation of the conversion from the Generic Emergency Recovery Guidelines produced by the Westinghouse Owners Group Subcommittee, as well as documentation of the verification and validation of the end product.

This package consists of the following parts:

1. Introduction

2. Plant Specific Technical Guidelines

3. Writers Guide for Emergency Operating Procedures

4. Verification Program

5. Validation Program

6. Training Program

PLANT SPECIFIC TECHNICAL GUIDELINES

The following program for converting the Westinghouse Emergency Response Guidelines into Emergency Operating Procedures will be used at the Connecticut Yankee Atomic Power Company.

The existing Emergency Operating procedures will remain in effect until the new Emergency Operating Procedures program is completed.

The reference material used to make the conversion from the existing EOPs to a new set of more symptom-oriented EOPs will encompass but not be limited to:

1. The existing EOPs
2. Adaptation of the Westinghouse ERPs
3. Plant Technical Specifications
4. Facility Description and Safety Analysis
5. As built plant drawings
6. Experience gained from past operation of Connecticut Yankee and any other similar plant
7. Any other pertinent information

Those people involved in the process of writing the EOPs will note each step in the ERGs and will write a justification for any deviation from the ERGs used to make the EOPs more plant specific. As an example, the ERGs may have steps directing an operator on proper valving of a boric acid injection system while Connecticut Yankee has no comparable system. All such changes shall be documented on a form similar to that shown below.

Step Documentation: EOP Rev._____

Page_____of_____

EOP Step:

ERG Step:

Justification for difference:

EOP Writer_____

Date_____

The Writers Guide which is part of this Generation Package will be used to formulate the Emergency Operating procedures in a uniform pattern so that all of the series of procedures will have common features.

The Verification and Validation Checkoff sheets will be used so that a documentation of the process used for the entire development of the EOPs may be kept on record for future reference.

CONNECTICUT YANKEE ATOMIC POWER COMPANY

WRITERS GUIDE
FOR
EMERGENCY RESPONSE PROCEDURES

TABLE OF CONTENTS

1. PURPOSE AND SCOPE

The purpose of this document is to provide administrative and technical guidance on the preparation of Emergency Response Procedures. This guide applies to both Optimal Recovery Procedure and Function Restoration Procedures.

2. ERP Designation and Numbering

ERPs are plant specific emergency procedures which specify operator actions to be taken during plant emergency situations to return the plant to a safe stable condition. Each procedure shall be uniquely identified to facilitate preparation, review, use and subsequent revision.

2.1 Procedure Title

Every separate procedure shall have its own descriptive name which summarizes the scope of that procedure, or states the event which it is intended to mitigate.

2.2 Procedure Numbering

Every separate procedure shall have its own alpha-numeric designation to supplement the descriptive title. Alpha designators are to be assigned according to the definitions provided in Table 1.

Numeric designators are assigned sequentially in order of procedure development. Each "ES" numeric shall consist of the number designator of the reference "E" procedure, plus a decimal integer, again assigned sequentially.

TABLE 1

DEFINITIONS OF LETTER DESIGNATORS FOR ERPs

E - a procedure for diagnosis or mitigation of design basis events.

ES - a procedure which supplements the actions of an "E" procedure.

ECA - a procedure containing tasks for mitigation of events significantly beyond the design basis that are not easily covered in the E's or ES's or which may complicate or reduce the effectiveness of the E procedure if included therein.

FR - a procedure to address or respond to a challenge to a Single Critical Safety Function (CSF).

S - designator for SUBCRITICALITY CSF

C - designator for CORE COOLING CSF

P - designator for INTEGRITY CSF

H - designator for HEAT SINK CSF

Z - designator for CONTAINMENT CSF

I - designator for INVENTORY CSF

"ECA" procedures shall each have a number designator, and related sub-procedures shall be assigned additional decimal integers.

Alpha and numeric designators shall be separated by a hyphen.

Examples: E-0 (Zero designates the diagnostic procedure)
ES-1.1
ES-1.2
ES-1.3

ECA-1
ECA-1.1

Function Restoration Procedures shall all be designated by the letters FR plus an additional letter which corresponds to the respective Critical Safety Function. All of the separate procedures related to a particular Safety Function are assigned decimal numbers in increasing order. Typically, the first (number .1) procedure for each safety function corresponds to the RED condition.

The procedure letter and decimal number are separated from the FR designator by a hyphen.

Examples: FR-S.1
FR-S.2

FR-0.1 (Zero designates the diagnostic, status tree procedure.)

2.3 Revision Numbering

The single digit following the abbreviation "Rev." will be used to designate the revision level of each procedure after initial version.

Each revision number will be accompanied by a date, printed immediately below it.

Examples: Rev. 2
1 MAY 1985

2.4 Page Numbering and Identification

Each page of a procedure will be identified by the procedure title, alpha-numeric designator, revision number and date in a title block at the top of the page. Each page number will be specified as "____ of____", centered on the bottom of the page. The last page of each procedure (Page Z of Z) will additionally be identified by the word "END" following the last instruction step.

3. Format

The following format is to be applied consistently to all Emergency Response Procedures.

3.1 Procedure Organization

All Optimal Recovery Procedures (E, ES, ECA) will have three (3) sections. The Cover Sheet will summarize procedure intent and state either entry symptoms or means of entry. The Operator Actions will comprise the bulk of each procedure and present the actual stepwise guidance. A Foldout Page will summarize information which is continually required for operator guidance. A single Foldout Page will be used for each E-series and ECA-series.

The function Restoration Procedures will have only the Cover Sheet and Operator Actions.

3.2 Page Formats

All pages of the Emergency Response Procedures will use the same page structure except the Foldout Page which is discussed below. This page structure employs a pre-printed border to assure all margins are correctly maintained, (margin right side ~ 1/4", margin left side ~ 1 1/8") and pre-printed designator boxes and page cues to assure completeness and consistency. (See Figure 1.) Line spacing will be approximately 3/16".

The pages for presentation of operator action steps will use a two-column format within the pre-printed border. The left-hand column is designated for operator actions, and the right-hand column is designated for contingency actions when the expected response is not obtained. These pages will use pre-printed title blocks above the separate columns (including the "step" column) for uniformity (see Figure 2.)

The Foldout Page does not use the bordered-page format. It is intended to summarize only that information which an operator should have continuously available, so page content will vary by procedure. Each Foldout Page shall be titled at the top in large bold type "FOLDOUT FOR E-X SERIES PROCEDURES."

3.3 Instructional Step Numbering

Procedure steps will be numbered as follows:

1. High-level step

    a. Substep

    Substeps are lettered sequentially according to expected order of performance. If the order of substep performance is not important, then the substeps are designated by bullets (o).

Numbers	Symptom/Titles	Revision No./Date

Figure 1 Preprinted Page Format

of

Numbers	Symptom/Titles	Revision No./Date

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Figure 2 Preprinted Page (2-column) Format

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

4. Writing the Procedure

The following format is to be applied consistently when writing Emergency Response Procedures.

4.1 Cover Sheet

Each cover sheet will contain two explanatory sections in addition to procedure and page designators. The first will be titled "PURPOSE" and will briefly describe what the procedure is intended to do for the operator. The second section is a summary of those symptoms which require entry into the procedure. This section will be titled "SYMPTOMS OR ENTRY CONDITIONS". Certain procedures such as E-0 and ECA-2 can be entered purely based on symptoms; for these procedures, a symptom summary is sufficient (see Figure 3). For other procedures, which can only be entered by transition from previous procedures, a summary of the entry conditions (and procedure/step) should be provided (see Figure 4).

4.2 Operator Actions

Steps directing operator action should be written in short and precise language. The statement should present exactly the Task which the operator is to perform. The equipment to be operated should be specifically identified, and only these plant parameters should be specified which are presented by instrumentation available in the control room. (If possible, use of qualified instruments is preferred). It is not necessary to state expected results of routine tasks.

EMERGENCY INSTRUCTION E-0

REACTOR TRIP OR SAFETY INJECTION

A. PURPOSE

The purpose of this procedure is to verify proper response of the automatic protection systems following manual or automatic actuation of a REACTOR TRIP or SAFETY INJECTION, to assess plant conditions, and to identify the appropriate recovery procedures.

B. SYMPTOMS: (1)

I. Following are symptoms of a reactor trip:

a. Any reactor trip annunciator lit

b. Rapid decrease in neutron level indicated by nuclear instrumentation

c. All shutdown and control rods are fully inserted. Rod bottom lights are lit

d. Rapid decrease in unit load to zero power

II. Following are symptoms of reactor trip and safety injection:

a. Any SI annunciator lit

b. SI pumps in service

c. (Enter other plant specific symptoms)

Figure 3 Cover Sheet Example for E-0

A. PURPOSE

The purpose of this procedure is to provide recovery from transients for which E-3, Steam Generator Tube Rupture, and ES-3.3, SGTR With Secondary Depressurization are not applicable.

B. SYMPTOMS OR ENTRY CONDITIONS

The symptoms required for the use of the procedure may occur at many times during the E-3 and ES-3.3 recovery actions. The symptoms are included in steps 11, 13, 15 and 16 of E-3, Steam Generator Tube Rupture, and steps 11, 14, 16 and 17 of ES-3.3, SGTR With Secondary Depressurization.

Figure 4 Cover Sheet Example for ECA-3

All steps are assumed to be performed in sequence unless stated otherwise in a preceding NOTE or preceeded by a bullett (see Section 4.2.4). To keep the individual steps limited to a single action, or a small number of related actions, any complex evolution should be broken down into composite parts.

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

Refer to Figure 5 as an example of the format for representing operator actions in the following sections.

4.2.1 Instruction Steps, Left-Hand Column

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

- Expected responses to operator actions are shown in ALL CAPITAL LETTERS.
- If a step requires multiple substeps, then each substep will have its own expected response.
- If only a single task is required by the step, then the high level step contains its own EXPECTED RESPONSE.
- Left-hand column tasks should be specified in sequence as if they could be performed in that manner. The user would normally move down the left hand column when the expected response to a particular step is obtained.

Figure 5 Instruction Steps Example

Numbers	Symptom/Titles	Revision No./Date
E-1	LOSS OF REACTOR COOLANT	5 July 1982

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	NOTE Foldout page should be open	
1	Check if RCPs Should Be Stopped:	
	a. High-head SI pumps running - CHECK FOR FLOW OR PUMP BREAKER INDICATOR LIGHTS LIT	a. DO NOT STOP RCPs. Go to step 2.
	b. RCS pressure - EQUAL TO OR LESS THAN 1700	b. DO NOT STOP RCPs. Go to step 2.
2	Check RWST Level: - GREATER THAN 130,000 gal.	Go to step 20.
3	Check Containment Sump Level: -increasing	Rediagnose event, go to E-0, REACTOR TRIP OR SAFETY INJECTION, STEP 32.
	CAUTION Alternate water sources for AFW pumps will be necessary if CST level is low.	
4	Check Steam Generator Levels:	
	a. Narrow range level - GREATER THAN 70%	a. Maintain full AFW flow until narrow range level is greater (3) %
	b. Throttle AFW flow to maintain narrow range level at 50%	b. IF narrow range level in one steam generator continues to increase, THEN go to E-3, STEAM GENERATOR TUBE RUPTURE, step 1.

of

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

- All procedures should end with a transition to either another procedure or to some normal plant procedure.

4.2.2 Instruction Steps, Right-Hand Column

The right-hand column is used to present contingency actions which are to be taken in the event that a stated condition, event, or task in the left-hand column does not represent or achieve the expected result. Contingency actions will be specified for all steps or substeps for which the task requirement might not be satisfied. The following rules apply to the right-hand column:

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

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

- 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.

- As a general rule, all contingent transitions to other procedures take place out of the right-hand column. (Pre-planned transitions may be made from the left-hand column.)

- 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.

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

4.2.3 Use of Logic Terms

The logic terms AND, OR, NOT, IF, IF NOT, WHEN, and THEN, are to be used to describe precisely a set of conditions or a sequence of actions. Logic terms will be highlighted for emphasis by capitalizing and underlining. (See Figure 5.)

The two-column format equates to the following logic: "IF NOT the expected response in the left-hand column, THEN perform the contingency action in the right-hand column." The logic terms should not be repeated in the right-hand column.

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

WHEN is used for an expected condition.

AND calls attention to combinations of conditions and shall be placed between each condition. If more than three conditions are to be combined, a list format is preferred.
OR implies alternative combinations or conditions. OR means either one, or the other, or both (inclusive).

IF NOT should be used when an operator must respond to the second of two possible conditions. IF should always be used to specify the first condition. (The right-hand column of the two-column format contains an implicit IF NOT.)

Combinations of Logic Terms - the use of AND and OR along with IF and THEN, within one same steps should be avoided. When AND and OR are used together, the logic statements can be confusing and ambiguous. For example, IF condition A AND condition B OR condition C occurs, THEN go to Step 5.3.6.

4.2.4 Notes and Cautions

Because the present action-step wording is reduced to the minimum essential, certain additional information is sometimes desired, or necessary, and cannot be merely included in a background document. This non-action information is presented as either a NOTE or a CAUTION. (See Figure 5.).

To distinguish this information from action steps, it will extend across the entire page and will immediately precede the step to which it applies. Each category (NOTE or CAUTION) will be preceded by its descriptor in large, bold letters. Multiple statements included under a single descriptor heading shall be separately identified by noting them with bullets.

CAUTION denotes some potential hazard to personnel or equipment associated with the following instructional step.

NOTE is used to present advisory or administrative information necessary to support the following action instruction.

As a general rule, neither a CAUTION or NOTE will be used to replace an instruction/operator action step. Notes should not be used for procedure transitions. CAUTIONS or NOTES should be complete on a page and not continued onto a new page.

4.2.5 Transitions to Other Procedures or Steps

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

Example: Go to ES-0.2, REACTOR TRIP RESPONSE, Step 1.

Transition steps will be in accordance with WOG Guidelines. Transitions to a different step in the same procedure are specified in a similar manner.

Example: Go to Step 20.

4.2.6 Component Identification

Equipment, controls and displays will be identified in "operator language" terms. Standard abbreviations which may be used throughout the procedures are listed alphabetically in Table 2. Since similar components are used in both primary and secondary systems, it is always necessary to clarify the location, even if the wording appears redundant.

Example: PRZR PORV vs. SG PORV identifies the pressurizer power operated relief valve as distinct from a steam generator power operated relief valve.

4.2.7 Level of Detail

To allow an operator to efficiently execute the action steps in a procedure, all unnecessary detail must be removed. Any information which an operator is expected 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.

- Use "start/stop" for power-driven rotating equipment.
- Use "open/close/throttle" for valves.
- Use "trip/close" for electrical breakers. (LOCK OUT for breaker switches with a pull-to-lock feature.)
- Use "place in standby" to refer to equipment when actuation is to be controlled by automatic logic circuitry.

4.3 Foldout Page

Only a single foldout page will be supplied for each "E-series" and "ECA-series" of procedures. The sheet will be numbered as the final page of the last procedure in the series. (That procedure will still be captioned with "END" after the last instruction step.) The foldout page will be titled "FOLDOUT FOR EX SERIES PROCEDURES", (see Figure 6) and will use a single column format (vs. two-column).

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

Previously supplied guidance on writing instructional steps is applicable (Section 4.2), with the exception of right-hand column (contingency) instructions.

4.4 Place-Keeping Aids

Placekeeping aids will be inserted in each procedure transition point so that the procedure can be re-entered at any time. Steps in the procedure will be check marked when the step is complete.

4.5 Section Headings

Headings will be in accordance with the Westinghouse ERG Guidelines.

Information that should be focused upon will be typed in capital letters.

Step numbers will be used to locate specific sections of the procedure.

4.6 Infrequently Used Equipment

The location of equipment that is infrequently used should be specified in the EOPs so that an operator can find the proper location in a minimum of time. The location should be described in a format that is consistent with standard plant nomenclature for the area it is located within.

4.7 Content of EOPs

4.7.1 Verification Steps

Verification steps are used to determine whether the objective of a task or a sequence of actions has been achieved. There are three common methods for verification:

- Checking that an action has resulted in a command signal to a piece of equipment. The operator should not rely on this type of check, but should use a more positive indication.

- Checking that an action has resulted in a positive indication that the equipment has responded to a command.

- Checking that an operator has correctly performed an action or has carried out a series of steps.

These types of verification steps should be used where appropriate in the procedures to ensure that equipment responses and operator actions have occurred and are correct.

4.7.2 Equally Acceptable Steps

Equally acceptable steps are those for which any one of several alternative steps or sequence of steps may be equally correct. For these steps, the operator should always be directed to carry out one of the alternative steps (or sequences), but should also be given the other alternatives when it is possible that the designated steps (or sequence) cannot be done (e.g., a designated piece of equipment is unavailable).

4.7.3 Recurrent Steps

Recurrent steps are those that require the operator to repeatedly perform a given action, typically, monitoring or controlling some plant parameter. (e.g., "Check condensate storage tank level every 30 minutes"). For these steps, the operator should be told when or how often the steps are to be performed, be reminded to perform the steps, and be told the conditions for which the steps should no longer be carried out.

4.7.4 Concurrent Steps

Concurrent steps are those which have to be performed at the same time. The EOPs should explicitly indicate which steps are concurrent so that operators can easily refer to both (or all) sets of steps. The maximum number of concurrent steps should not be beyond the capability of the control room staff to perform them.

4.8 Control Room Staffing and Division of Responsibilities

This section considers staffing in the control room, and the division of responsibility and leadership among the control room staff as it applies to the use of EOPs. The variable nature of control room events and staff capabilities, and the turnover in control room shift crews, make the goals of this section difficult to achieve. However, the following guidelines are important to the efficient and accurate development, and execution of EOPs, and should be followed to the extent possible.

4.8.1 Consistency Between Staffing and Procedures

The EOPs should be structured so that the number of people required to carry out specific actions, concurrent actions, and other responsibilities, does not exceed the minimum shift staffing required by a plant's Technical Specifications.

4.8.2 Division of Responsibility

During an emergency, it is vital that the actions of the control room staff be carried out efficiently and accurately. This will be determined in part by the quality of the EOPs and the training of the operators. However, for the benefits of good procedures and training to be realized, it is important that control room personnel operate as a team with pre-established leadership roles and divisions of responsibility.

4.8.3 Staffing of the Control Room

The number and qualifications of personnel available in the control room will determine the number of sequential actions, concurrent actions and other responsibilities that can be carried out, and the efficiency with which they can be carried out. The following goals should be considered in writing the EOPs:

- Minimize physical conflicts between personnel (carrying out actions at the same locations at the same time, or crossing paths),

- Avoid unintentional duplication of tasks by control room personnel,

- Ensure that the control room supervisor should be able to keep up with staff actions and plant status.

4.9 Accessibility/Legibility

Accessibility refers to the ease with which the operator can identify and access the relevant Emergency Operating Procedures. The EOPs should be uniquely identifiable and should be labeled to facilitate rapid identification and access to any procedure or any part of a procedure.

4.9.1 The EOP's should be printed in a clear, concise manner and the quality of the reproduced copies will be sufficient to insure they are legible to the operators.

4.10 Updating EOPs

When changes occur in the plant design, Technical Specifications, Technical Guidelines, Writer's Guide, other plant procedures or control room that will affect the EOPs, the EOPs should be revised on a timely basis to reflect these changes. In addition, when operating and training experience, simulator exercises, control room walk-throughs, or other information indicate that incorrect or incomplete information exits in the EOPs, the EOPs should be revised on a timely basis. These changes should be reviewed to ensure consistency with the Technical Guidelines and the Writer's Guide. Operators should be encouraged to suggest improvement to EOPs.

4.11 Devisions, Headings and Numbering

The manner in which the text is organized and divided should be evident through the use of headings and an alphanumeric numbering system. The system used should provide operators with a logical means of determining where they are located in relationship to the overall document. Further, the approach selected should allow operators to identify steps in the procedures. The numbering system will be consistent with that of the Westinghouse ERG guidelines.

5. Status Tree Format

Critical Safety Function Status Trees will be presented in the format and orientation shown in Figure 7.

Color-coding and line-pattern coding shall both be used from the last branch points to the termini. (See Figure 8.)

All text on Status Trees shall be at least as legible (type size and spacing) as the instruction steps in the procedures.

Each status tree shall have a designator block identical to that used in the standard guideline format, and containing the same information.

TABLE 2

ABBREVIATIONS USED IN PROCEDURES

ac	-	alternating current (electrical power)
AFW	-	auxiliary feedwater
ATW	-	anticipated transient without scram
BAT	-	boric acid (storage) tank
BIT	-	boron injection tank
CCP	-	centrifugal charging pump
CCW	-	component cooling water
CRDM	-	control rod drive mechanism
CST	-	condensate storage tank
CVCS	-	chemical and volume control system
dc	-	direct current (electrical power and signals)
LOCA	-	loss of coolant accident
MD	-	motor driven (in reference to pumps)
MSIV	-	main steamline isolation valve
NR	-	narrow range (level indication)
PORV	-	power operated relief valve
PDP	-	positive displacement pump
PRT	-	pressurizer relief tank
PRZR	-	pressurizer
RCP	-	reactor coolant pump
RCS	-	reactor coolant system
RHR	-	residual heat removal
RPV	-	reactor pressure vessel
RTD	-	resistance temperature detector
RWST	-	refueling water storage tank
RVLIS	-	reactor vessel liquid inventory system
SI	-	safety injection
SG	-	steam generator
SGTR	-	steam generator tube rupture
SUR	-	startup rate
TC	-	thermocouple
TD	-	turbine driven (in reference to pumps)
VCT	-	volume control tank
WR	-	wide range (level indication)

Figure 6 Example Foldout Page

FOLDOUT FOR E-2 SERIES PROCEDURES

1. RCP TRIP CRITERIA

   - o Trip any RCP if component cooling water to that pump is lost.
   - o Trip all RCPs if BOTH conditions listed below are met:
     a. SI is ON.
     b. RCS pressure - EQUAL TO OR LESS THAN (1700) PSIG.

2. SI REINITIATION CRITERIA FOLLOWING LOSS OF SECONDARY COOLANT

   a. Reinitiate SI if ANY ONE of the parameters listed below occurs:
      (1) RCS Subcooling - LESS THAN (20) %F
      (2) Pressurizer level - less than (20) %

3. AFW SUPPLY SWITCHOVER CRITERION

   IF DWST level less than 54,000 gallons, THEN SWITCH TO ALTERNATE AFW water supply.

FIGURE 7

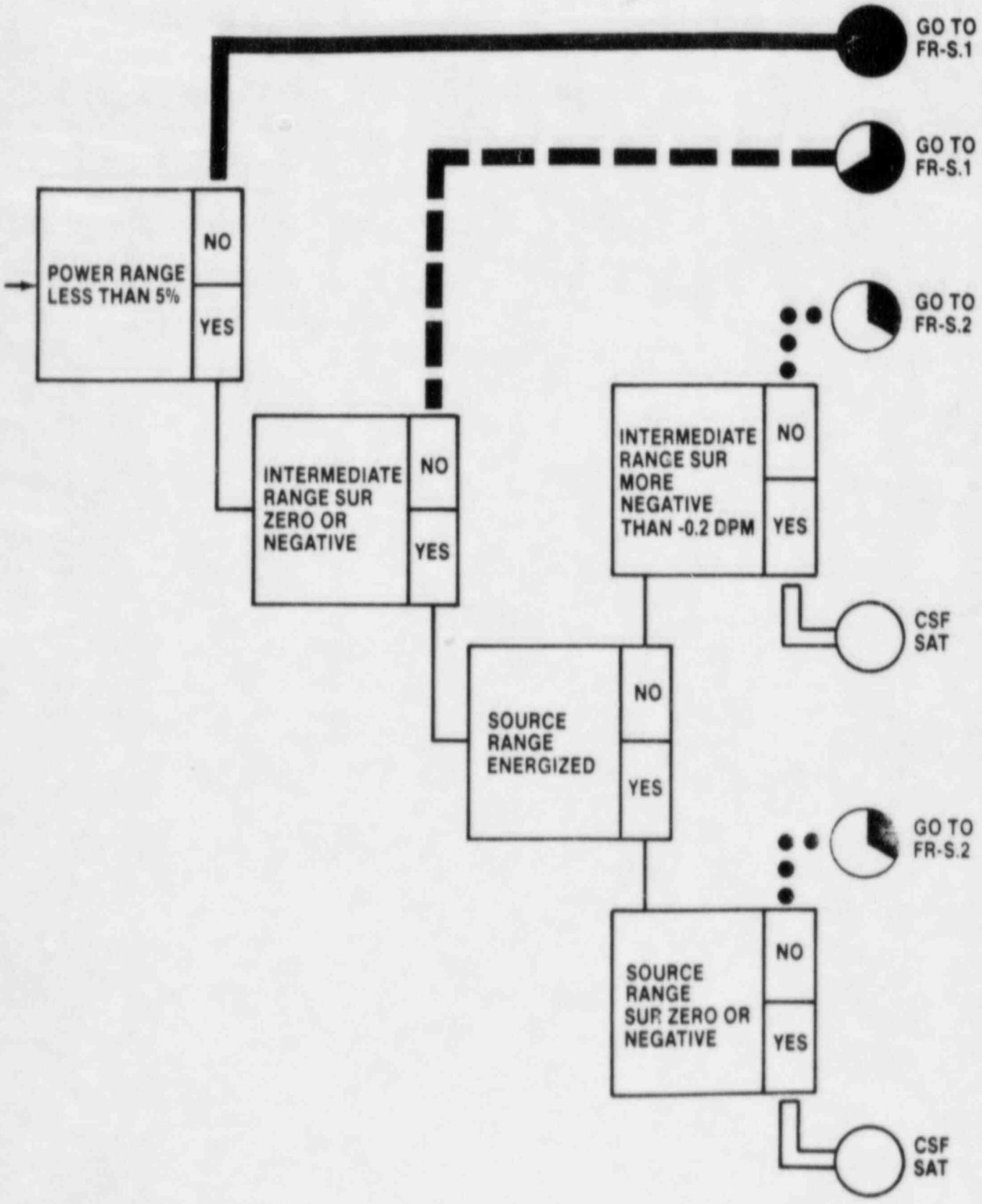
GO TO FR-S.1
GO TO FR-S.1
POWER RANGE LESS THAN 5%
NO
YES
GO TO FR-S.2
INTERMEDIATE RANGE SUR ZERO OR NEGATIVE
NO
YES
INTERMEDIATE RANGE SUR MORE NEGATIVE THAN -0.2 DPM
NO
YES
CSF SAT
SOURCE RANGE ENERGIZED
NO
YES
GO TO FR-S.2
SOURCE RANGE SUR ZERO OR NEGATIVE
NO
YES
CSF SAT

Figure 8

THE SCHEME OF LINE PATTERN CODING USED TO IDENTIFY PRIORITIES

BRANCH LINE	STATUS IDENTIFIER	
═══	○	THE CRITICAL SAFETY FUNCTION IS SATISFIED - NO OPERATOR ACTION IS CALLED FOR
CORRESPONDS TO GREEN		
● ● ● ● ●	◔	THE CRITICAL SAFETY FUNCTION IS NOT FULLY SATISFIED - OPERATOR ACTION MAY EVENTUALLY BE NEEDED
CORRESPONDS TO YELLOW		
▬ ▬	◔	THE CRITICAL SAFETY FUNCTION IS UNDER SEVERE CHALLENGE - PROMPT OPERATOR ACTION IS NECESSARY
CORRESPONDS TO ORANGE		
▬▬▬	◉	THE CRITICAL SAFETY FUNCTION IS IN JEOPARDY - IMMEDIATE OPERATOR ACTION IS REQUIRED
CORRESPONDS TO RED		

6. Mechanics of Style

6.1 Spelling

All spelling should be consistent with modern usage as specified in the Standard Dictionaries.

6.2 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:

- Use a colon to indicate that a list of items is to follow.

  Example - Stop the following equipment:

- Use a comma after conditional phrases for ease of reading.

  Example - IF level exceeds 50%, then.....

- Use parenthesis to indicate alternative items in a procedure.

- Do not use brackets.

- Use a period to indicate the end of complete sentences and for indicating the decimal place in numbers.

6.3 Capitalization

Capitalization shall be used in the procedures for emphasis in the following cases:

- Logic terms will be capitalized and underlined.

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

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

- o Operator action steps may be completely capitalized FOR EMPHASIS.

- o Abbreviations (TABLE 2) are commonly capitalized.

- o Section headings on foldout pages are capitalized and underlined.

6.4 Vocabulary

Words used in the procedures should convey precise meanings to the trained operator. Simple words having few syllables are preferred. These are typical of words in common usage.

Verbs with specific meanings should be used. The verb should exactly define the task expected to be performed by the operator. A list of frequently used verbs is included as Table 3.

Some words have unique meanings as listed below:

manual (manually) - an action performed by the operator in the control room. (The word is used in contrast to an automatic action, which takes place)

local (locally) - an action performed by the operator outside the control room.

Example: Directly turning a handwheel to close a valve.

Certain other words are to be avoided simply because they are not adequately defined when used without modification. These include: stable, approximately, rapidly, slowly and normal. The same words become acceptable when some clarification is provided.

Example: Rapidly (up to 200°F/HR) cool down the RCS.

Inequalities are to be expressed in words rather than symbols: i.e., "greater than, less than". These words are always appropriate for comparing pressures, temperatures, levels and flowrates. The words "above" and "below" should not be used in this context.

6.5 Numerical Values

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

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

Acceptance values should be stated in such a way that any addition and subtraction operations are avoided, if possible. This is done by stating acceptance values as limits. Examples: 2500 psig maximum, 350°F minimum, between 450°F and 500°F. Tolerances can be expressed by stating the nominal value followed by the acceptable range in parenthesis.

Example: 550°F (540°F to 560°F)

Avoid: 550°F ± 10°F

Engineering units should always be specified when presenting numerical values for process parameters. They should be the same as those used on the control room displays.

6.6 Abbreviations and Acronyms

Abbreviations and acronyms should be limited to those commonly used by operators. Table 2 lists the most common ones necessary for these procedures.

Abbreviations and acronyms from Table 2 will be uniformly capitalized whenever they are used.

TABLE 3

ACTION VERBS

Verb	Usage
Align	To arrange a series of components into a desired configuration. Example: Align the system for normal charging.
Block	To inhibit an automatic actuation. Example: Block SI actuation.
Check	To note a condition and compare with some procedure requirement. Example: Check pressurizer level - GREATER THAN 20%.
Close	To change the physical position of a mechanical device. Closing a valve prevents fluid flow. Closing a breaker allows electrical current flow.
Complete	To accomplish specified procedures requirements.
Control	To manually operate equipment as necessary to satisfy procedure requirements. Example: Control pressurizer level.
Establish	To make arrangements for a stated condition. Example: Establish normal pressurizer pressure and level control.

ACTION VERBS (Continued)

Verb	Usage
Initiate	To begin a process (Begin is preferred).
Maintain	To control a given plant parameter to some procedure requirement continuously. Example: Maintain steam generator 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 unobstructed position. Opening a valve permits fluid flow. Opening an electrical breaker prevents current flow.
Record	To document specified characteristics. Example: Start one RCP.
Start	To originate motion of an electrical or mechanical device, either directly or by remote control.
Stop	To terminate motion of an electrical or mechanical device. Example: Stop both diesels.
Throttle	To operate a valve in an intermediate position to obtain a certain flow rate. Example: Throttle AFW flow to maintain S/G level.

ACTION VERBS (Continued)

Verb	Usage
Trip	To manually activate a semi automatic feature. Commonly, "trip" is used to refer to component de-activation. Example: Trip the reactor; trip the turbine. Trip a breaker. . .
Verify	To observe that an expected characteristic or condition exists. Typically the expectation comes from some previous automatic or operator action.

EMERGENCY OPERATING PROCEDURES
VERIFICATION PROGRAM

2.1 EOP VERIFICATION PROCESS OVERVIEW

EOP verification is the static evaluation performed to confirm the written correctness of the EOPs and to ensure that generic and/or plant-specific technical aspects have been properly incorporated. The written correctness of the EOPs is evaluated by comparison of the EOPs to the plant-specific writers guide for EOPs and other appropriate administrative policies. The incorporation of applicable technical aspects is evaluated by comparison of the EOPs to designated source documents and plant hardware (plant equipment, instruments, indications, and controls).

Evaluation of the written correctness can facilitate EOP Validation by minimizing the potential for complications during validation resulting from human factors discrepancies. The EOP Validation Program can then be directed at proving that the human factor concerns have been satisfactorily considered with regard to crew operations, or will be able to indicate specific factors that were overlooked.

Evaluation for proper incorporation of technical aspects, referred to as EOP technical accuracy, can be accomplished by static comparison with source documents and existing plant hardware. The ultimate in the evaluation of technical accuracy would be the comparison of the written EOPs to perfect, ideal EOPs. Since perfect, ideal EOPs do not exist, a utility can only compare their EOPs to the existing plant hardware and to the source documents used as the bases for the EOPs. These source documents reflect state-of-the-art analysis and advances or detection of errors in the analysis is outside the scope of EOP Verification and Validation.

As discussed, EOP Verification Process and EOP Validation Program interrelate. The distinctions between Verification and Validation are in the type of evaluation (static or dynamic) and the process used (comparative evaluation or performance). An EOP Verification Process should consider the following generic elements of the process:

- o Source Documents
- o Personnel (performing Verification)
- o Evaluation Criteria (based on Verification Principles)
- o Discrepancy Detection
- o Discrepancy Resolution
- o Documentation of Verification

Depending on how the elements are organized and considered, the process can be implemented through the use of a verification checklist that structures the review and documents the review process.

2.2 EOP VERIFICATION OBJECTIVES

By definition, the EOP Verification Process evaluates the written correctness and technical accuracy of the EOPs. Therefore, EOP verification can be considered adequate when the following basic objectives are satisfied.

- o Written correctness - The plant specific writers guide for EOPs and other appropriate administrative policies have been applied correctly

- o Technical accuracy - Proper incorporation of generic and/or plant-specific technical aspects from source documents and plant hardware have been incorporated correctly.

2.3 SCOPE OF EOP VERIFICATION

The scope of the EOP Verification Process encompasses a thorough review process to ensure that the technical information contained in the applicable source documents has not been altered without appropriate considerations. Alterations such as additions or deletions could result in EOPs that change the technical intent of the source documents. By performance of the verification process, such discrepancies can be identified and corrected.

A.1 GENERAL

This EOP Verification Process is designed specifically for evaluating emergency operating procedures (EOPs) which were prepared in accordance with the plant-specific writers guide for emergency operating procedures contained in the Emergency Operating Procedures Writers Guide. This Writers Guide was used to provide the basis for the evaluation criteria for written correctness. The remaining verification principles addressing the technical accuracy are satisfied by using the evaluation criteria described with each principle. The evaluation criteria are presented on a checklist and are applicable to all.

A.2 SOURCE DOCUMENTS

The following source documents will be considered for use by the personnel conducting EOP Verifications.

1. Existing EOPs
2. Plant Technical Specifications
3. Facility Description and Safety Analysis
4. As built plant drawings
5. Westinghouse Owners Group E.R.Ps.
6. Experience gained from past operation of Connecticut Yankee and other similar plants.
7. Any other pertinent information.
8. Best estimate accident analysis for CY.

A.2.2 PERSONNEL

The EOP Verification Program will be carried out by a team of people from the Operating Department, Training Department, NUSCO Reactor Engineering Branch and other selected personnel.

CY Operations Department members will be responsible for written correctness and technical accuracy.

A.2.3 EVALUATION CRITERIA

The evaluation criteria are presented as questions on the following checklist to guide the verification of all the EOPs.

A.2.4 DISCREPANCY DETECTION

Any discrepancies detected will be described on the comment sheets which will be attached to the checklist. These forms will be reviewed by the appropriate manager to ensure the discrepancy has been correctly identified.

A.2.5 DISCREPANCY RESOLUTION

The comment sheets will be forwarded to the EOP writer for correction. The corrected procedures will then be presented for EOP Validation.

A.2.6 DOCUMENTATION

The documentation of the EOP Verification Process will be the comment sheets and the checklist used. This documentation will be inputted to records management system.

A.3 EOP VERIFICATION CHECKLIST

Each of the evaluation criteria questions presented can generally be answered with YES or NO. If the EOP being evaluated possesses the characteristic specified in the question, enter a checkmark (X) in the YES column. If it lacks the characteristic, check No. In a very few instances, the characteristic might not be applicable to the EOP. For example, if the EOP does not contain graphs or charts, the question concerning their legibility is not applicable. In cases like this, enter N/A in the Yes and No columns.

When a question is answered with No, an explanation should be recorded in the Comment Sheet and its number recorded in the column. All differences between the EPG and EOP should be explained and documented.

The EOP evaluation questions are arranged in a sequence that allows the reviewer to proceed efficiently through the Verification Procedure. It is suggested that the reviewer complete the evaluation of the EOP on the first Verification Principle, Reproducibility, before proceeding to the second principle, complete the evaluation on the second principle before proceeding to the third, and so on. Record the EOP title and number in the space provided. Also, record the revision number and date, if applicable. All source documents used in the verification of the EOP should be identified by title, number (if applicable), revision number, and date. Upon completing the evaluation, the reviewer(s) should enter name(s) and date(s) in the space provided.

Selected plant Emergency Operating Procedures will be reviewed by (NUSCO), Northeast Utilities Service Company Safety Analysis Branch as per Nuclear Engineering and Operations Procedure NEO 3.12, Safety Evaluations.

A.4 REVISIONS

Any changes to the ERG's will be verified correct, and validated to insure they provide proper guidance. Any additions or deviations from the generic guidelines will be verified/validated by a team of operators and NUSCO Safety Analysis Engineers. The method of validation will consist of table-top, walk-through and/or plant-specific simulator, as applicable. The checkoff lists will be used for the verification phase only.

COMMENT SHEET

SUBJECT: _____

FROM: _____ Date _____

DISCREPANCY: _____

_____

_____

_____

_____

_____

_____

TO: _____

RESOLUTION: _____

_____

_____

_____

_____

_____

_____

_____

DATE: _____

VERIFICATION CHECKLIST

Procedure Title/No._____

Revisic . No._____

Date of Issue_____

Written Correctness reviewed by_____Date_____

Technical Accuracy reviewed by_____Date_____

Source documents used in verification:

_____

_____

_____

_____

_____

_____

_____

_____

VERIFICATION CHECKLIST

EOP DESIGNATION AND NUMBERING	NO	YES	COMMENT
Title and Number correct			
Page Numbering correct			
Revision Numbering correct			
EOP FORMAT			
Organization correct			
Page Formats correct			
Step Numbering correct			
Instruction Steps left-hand column			
Results Not Obtained - Instructions right-hand column			
Notes and Cautions properly placed			
Transition to Other Procedures or Steps correct			
Level of detail sufficient			
MECHANICS OF STYLE			
Spelling correct			
Punctuation correct			
Capitalization correct			
Vocabulary correct			
Numerical Values correct			
Entry to Other Procedures correct			

SOURCE DOCUMENTS	NO	YES	COMMENT
Are EOP/EPG differences:			
Documented			
Explained			
Change Assumptions			
Are Plant Specific Values Incorporated:			
Instruments			
Limits			
Indications			
Controls			
Systems			
Calculated Values			

EMERGENCY OPERATING PROCEDURES

VALIDATION PROGRAM

The Connecticut Yankee EOP Validation Program will be an ongoing program paralleling the operator training program. Because it is an ongoing program, time as a resource is unlimited and will determine only when the different Validation methods will be used.

There are three possible methods to validate Emergency Operating Procedures. They are Table Top, walk through at Real Control Room, and Plant-Specific Simulator. The Table Top method is as the name implies, a simple method of Operators and Non-operators sitting at a table and going through the Emergency Procedures to determine their completeness, viability, understandability and applicability. This is a process that requires very little equipment other than the procedures and background information.

The second method of validation will be a walk through at the control room and any other portion of the plant required to complete the procedure. This method will require operators both licensed and nonlicensed, supervisors and perhaps, persons other than those directly involved in plant operations, such as, Human Factors people. In this method the scenarios will be developed and set for as many events and multiple events as practicable. The Operating personnel will then walk through the procedures or combination of procedures to determine the merit of the procedure and make corrective suggestions as they deem necessary. Resources required for this method are the Emergency Operating procedure, prints and other technical data used in developing the procedures and access to the control room or a mockup of the control room.

The third method will use the plant specific simulator. This is the most complete method of validating the Emergency Operating procedures as it will be the nearest to the real thing as possible. Here the scenarios will be programmed into the simulator and the operating crews will use the Emergency Operating Procedures to treat the symptoms and mitigate the accident.

The objective of this Validation program is to ensure that the operator using the Emergency Operating Procedures can recognize the malfunction, select the right procedure or procedures and mitigate the accident in a timely manner and return the plant to a safe and stable condition.More specifically, the objectives of the validation program are to verify the following:

a. The procedure brings about the desired plant condition when followed in sequence without omissions or deletions using the entry conditions prescribed in the procedure.

b. The procedures fit together as a group. Each major plant transient should be an entry condition for a procedure and each procedure should end in a stable plant condition or entry into a procedure that continues to move toward stable conditions.

c. Procedures as a whole are not circulatory or repetitive.

d. The procedure can be used by the operator without hesitation and without reference to non-procedural information.

e. Execution of the procedure as written does not require an operator to perform excessive travel around the Control Room to execute the procedure.

f. The procedure as written does not require an operator to perform more than one task simultaneously or perform steps that conflict or cancel other steps.

All of the above methods will be used, as available, to validate the Emergency Operating procedures at Connecticut Yankee.

The Documentation is performed for each step of the Validation process. When a procedure is used in a walk through or a simulated process an Error Summary form shall be used to indicate whether or not the procedure steps are valid as written and also to make recommendations for corrections.

The procedures with the Error Summary form will be returned to the writer so that an evaluation may be made and revisions to the Emergency Operating Procedures can be initiated. The corrected Validated Emergency Operating Procedure will then be presented to the Plant Operating Review Committee, for processing in accordance with Quality Assurance Procedure QA 1.2-6.5, "Procedure Review and Approval".

If no errors are found in a procedure during the validation process this shall be so stated on the Error Summary form so that a record of validation may be established.

Summary

The objective of the validation program is to test the EOP's accuracy and applicability by giving walk through's with several different crews of operators. A wide variety of scenarios will be used to evaluate the EOP's. These scenarios will be chosen from the attached 40 scenarios. The validation team will consists of 3 members:

Shift Supervisor - head Validation Team insure procedures are in agreement with current EOP's, Tech. Specs. and WOG Guidelines.

SRO Instructor - Checks procedures from a Training viewpoint, insures procedures meet acceptance criteria for individual guidelines.

NUSCO Engineering - insure all calculations for pressure, RCS temperature, subcooling, RVLIS, and SI reduction sequence are current. Checks transition to and from all status trees for accuracy.

The validation program will be used to determine whether the actual control room instruments and controls meet the information and control needs of the operators.

Errors found during validation phase will be corrected before the procedures are sent to PORC for approval. All future revisions to EOP's will be verified and validated in accordance with this program.

EOP walk throughs will be conducted by the minimum staff required by Tech. Specs. Validation will be accomplished by walk-through, table-top, and/or the plant-specific simulator.

EOP VALIDATION INDEX

1. Response To Inadequate Core Cooling

2. SG Tube Rupture Without Pressurizer Pressure Control

3. Response To Degraded Core Cooling

4. Response To Saturated Core Cooling

5. Loss Of Normal Steam Release Capabilities

6. Response to PTS

7. Response To Anticipated PTS

8. Response To High Containment Pressure

9. Response To Containment Flooding

10. Response To Containment Hi Radiation Level

11. Response To High Pressurizer Level

12. Response To Lo Pressurizer Level

13. Loss Of Heat Sink

14. Steamline Break In Containment

15. LOCA In Containment

16. Response To Voids In Reactor Vessel

17. Station Blackout With SGTR & Failed RCP Seal

18. Stuck Open PORV And Block Valve

19. SGTR Subcooled Recovery Desired ECA 3.1

20. Normal Reactor Trip From INST Malfunction

21. SGTR Saturated Recovery Desired ECA 3.2

22. Resposne To Loss Of Core Shut Down

23. Spurious SI Actuation

24. Leak Outside Containment In PAB

25. Natural Circulation Cooldown

26. Natural Circulation Cooldown With Steam Void In Vessel

27. Uncontrolled Depress, Lo Head Recirc, Hi Head Recirc

28. Normal Reactor Trip With 2 Rods Stuck Out

29. SGTR With RCP

30. Loss Of Heat Sink

31. PORV And Block Valve Open

32. Loss Of AC With No SI Required

33. Loss Of AC With SI Required

34. SGTR Cooldown Using Steam Dump

35. Safety Injection Termination

36. SG Tube Rupture With Isolated Loop

37. SG Tube Rupture, Cooldown Using Backfill

38. SG Tube Rupture, Cooldown Using Blowdown

39. ATWS

40. SG Tube Rupture With Steam Line Break In Containment

ATTACHMENT 1

ERROR SUMMARY FORM

EMERGENCY OPERATING PROCEDURES

NAME OF PROCEDURE_____

STEP #	REASON FOR ERROR	REMARKS

EOP TRAINING PROGRAM

1. Objective

The training program has the following major objectives:

1) To enable the operator to understand the structure and format of all EOP's.
2) To enable the operator to understand the technical bases of all EOPs.
3) To enable the operator to understand how all EOPs ensure that safety functions are satisfied.
4) To give the operator experience in using a wide variety of the EOPs under simulated control room conditions.
5) To exercise a wide variety of the EOPs with all licensed operators.
6) To train all operators on the revised EOPs prior to their implementation.

2. Training Process

The training process can be divided into the following areas. In each area training is presented to the operations staff one shift at a time. This emphasizes the team approach of each shift and reinforces operator roles.

a. Awareness and Involvement in the Upgrade Process.
Operators will be involved in the development and validation process.

b. Individual Study and Review
Prior to classroom presentation, each EOP will be reviewed by the licensed operator.

c. Classroom Presentation and Discussion
Instruction will be given on:
1) Use of the new format
2) Standard post trip actions
3) Each event specific EOP
4) When and how to use the functional EOP

d. Simulator Instruction

A plant-specific simulator in conjunction with walk-throughs will be utilized for operator training. A wide variety of scenarios will be used to fully exercise the EOPs and thus expose the operators to a wide variety of EOP uses.

e. Examination

Tests will be administered to check that the necessary information has been learned.

The operator's knowledge and performance of EOPs will be evaluated after training and appropriate followup training will be conducted in deficient areas.