ATTACHMENT 2

PROCEDURES GENERATION PACKAGE

for

BEAVER VALLEY POWER STATION, UNIT 1

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PROCEDURES GENERATION PACKAGE

SECTION 1

Introduction

I. The Procedures Generation Package (PGP) has been developed in response to Supplement 1 of NUREG-0737, part 7.2.b. Its purpose is to describe the process for translating generic Westinghouse Emergency Response Guidelines (ERGs) into plant specific Emergency Operating Procedures (EOPs). This description includes the work necessary to complete the initial draft of the function-oriented EOPs and for maintaining these EOPs after implementation.

II. The PGP consists of the following sections:

- Section 1 - Introduction
- Section 2 - Initial EOP Development
  - Plant Specific Technical Guidelines
  - Program for Verification/Validation
- Section 3 - EOP Administrative Controls Following Initial Implementation
  - Purpose
  - Applicability
  - Definitions
  - Responsibilities
  - References
  - Instructions
  - Appendices
  - Tables and Figures
- Section 4 - Training Program Description
- Section 5 - References
- Section 6 - Tables and Figures

III. The flowpath for preparing the initial draft of the EOPs is shown on Figure 1, Section 6.0.

SECTION 2

Initial Emergency Operating Procedure Development

I. Plant Specific Technical Guidelines

A. The generic Westinghouse Owner's Group ERGs, Rev.1, dated September 1, 1983, which are based on the re-analysis of transients and accidents as described in NUREG-0737 item I.C.1, will be used as the technical guidelines from which plant specific EOPs will be drafted. Following these guidelines will result in the EOPs directing the operators actions in mitigating the consequences of transients and accidents without a need to diagnose an event to maintain the plant in a safe condition.

B. The following major items were considered in the methodology used in translating the Westinghouse ERGs into plant specific EOPs.

1. Identification of design differences between the Westinghouse reference plant and Beaver Valley Unit 1. These differences are itemized on TABLE 1, Section 6.

2. Mechanics of conversion

3. Location of plant specific technical information

4. How the plant-specific technical information will be used

5. The use of old Emergency Operating Instructions

6. Documentation requirements

7. Use of background documents supplied with the technical guidelines

8. Best use of extensive operating experience

C. Mechanics of Conversion

1. The designated EOP writer will obtain and review the following EOP source documents appropriate to the specific procedure being generated.

a. Westinghouse Owners Group, Emergency Response Guidelines Revision 1, dated September 1, 1983.

b. Corresponding Westinghouse Owners Group Background Documents (Procedure specific, and Generic Issues).

c. Beaver Valley Power Station, Unit 1 Updated Final Safety Analysis Report.

d. Beaver Valley Power Station, Unit 1 Technical Specifications.

e. Beaver Valley Power Station, Unit 1 Operating Manual (most current revision).

f. Beaver Valley Power Station Unit 1, Writers Guide for Emergency Operating Procedures.

g. As Built Plant Drawings (as required).

2. The EOP draft will be generated in accordance with the EOP Writers Guide contained in Section 3, Appendix E.

   a. By following the generic ERGs and the EOP writer's guide, the draft EOP will have been prepared utilizing acceptable human factors principles.

3. The direct involvement of a human factors specialist during the CRDR will further ensure the correct application of human factors principles as applied to the draft EOPs during performance of the CRDR.

4. The designated EOP writer will generate an EOP draft, attempting to follow to the maximum extent possible, the ERGs. A step by step correspondence between the draft EOP and the ERG, although ideal, may not be possible. It is therefore important that the writer attempt to maintain consistency of intent between the EOP and the ERG, while incorporating those deviations deemed necessary to account for:

   a. Known equipment differences between the ERG reference plant and BVPS Unit 1.

   b. Known plant condition differences between the ERG reference plant and BVPS Unit 1.

   c. Licensing commitments for BVPS Unit 1.

   d. Resolutions of deficiencies identified by the BVPS EOP Verification or Validation Programs.

   e. Recommendations obtained from operator experience.

5. The EOP writer will document all deviations as identified in Step 3 above on the "EOP-ERG Deviation" form (Figure 53B-1) in Section 3. This documentation is required to:

   a. Provide required information during EOP verification.

   b. Provide required basis information during future EOP revision.

c. Provide documentation to allow for adequate evaluation of the safety significance of the deviation during OSC review prior to final approval.

d. Provide justification for the deviation during validation of the EOP.

e. Demonstrate to the NRC, upon request, that all deviations to the ERGs have been recorded and the safety significance of each has been determined.

Note: Examples of deviations that do not constitute a change in mitigation strategy include:

- changes in wording to clarify the intent of a step
- change in step order to accommodate plant design
- deletion of a step to accommodate plant design
- addition of notes, cautions or steps based on existing operating procedures, operator experience, or plant license commitments

6. If a significant deviation is determined to exist during the OSC review, it can remain as part of the EOP provided an analysis has been prepared for review by the OSC to demonstrate that it is acceptable and that the plant can be brought to a safe condition.

a. A deviation which has safety significance (significant deviation) shall be reported to the NRC along with the analysis or technical justification.

7. The EOP writer will generate a background document providing a step by step description of the EOP in accordance with the BVPS Unit 1 EOP Background Document Writers Guide.

D. Control Room Instrumentation and Controls

1. The generic ERGs have as their basis, the re-analysis of transients and accidents from which the operator information and control needs necessary for mitigation of the events were identified. Consistency will be maintained between the operator information and control needs identified in the generic ERGs and the draft EOPs.

2. The CRDR task analysis, which includes a verification of instrumentation activity, will utilize the draft EOPs in order to:

a. identify the characteristics of the instrumentation and controls needed to satisfy the operators information and control requirements.

b. determine the availability and suitability of existing instruments and controls to satisfy these requirements.

3. The CRDR task analysis will be documented; will provide feedback to the EOP development effort and resolve any resulting human engineering deficiencies in accordance with the CRDR Program Plan.

4. Deviations to the ERG background document equipment qualification statements need not be addressed as this issue is being documented separately under 10CFR50.49 and the review of instrumentation identified in Regulatory Guide 1.97. To do so could influence the EOP development objective for maintaining consistency between the generic ERGs and draft EOPs.

a. The results of the Regulatory Guide 1.97 review will provide feedback to the operators instrumentation and control requirements.

b. Deviations may be identified at this stage of instrumentation and controls review and as such will be reviewed by the Onsite Safety Committee to determine their safety significance.

II. Program for Verification/Validation

A. The programs for verification and validation provide assurance that each draft EOP is:

1. Technically correct in that it accurately reflects the generic technical guidelines.

2. Written correctly in that it accurately reflects the EOP Writer's Guide.

3. Usable in that the procedure can be understood and followed by trained operators, without confusion, delays or errors.

4. Operationally correct in that there is a correspondence between the procedure and the control room/plant hardware, and that the language and level of information presented in the EOP is compatible with the minimum number, qualification, training and experience of the operating staff.

5. Capable of directing the operating staff in managing emergency conditions.

B. The verification program is described in Appendix D of Section 3.

1. The detailed instructions of this program provides the administrative process to be followed in determining if each EOP is technically correct and written correctly and includes:

   a. a process for identifying discrepancies

   b. a process for resolving discrepancies

   c. a feedback mechanism for evaluating changes to the EOP which may result during the verification process

2. This verification program was prepared following the guidance contained in the Emergency Operating Procedures Verification Guidelines written by the Emergency Operating Procedures Implementation Assistance (EOPIA) Review Group and published by INPO.

C. The validation programs include table-top, control-room walk through and simulator validation.

1. The validation programs provide the administrative process to be followed in determining if the procedure is usable and operationally correct and includes:

   a. a process for identifying discrepancies

   b. a process for resolving discrepancies

   c. a feedback mechanism for evaluating changes to the EOP which may result during the validation process.

2. All three programs will be used for validating EOPs. Detailed instructions for each of the validation programs are included in Section 3.

   a. table-top validation; Appendix A, Section 3

   b. control room walk-through validation; Appendix B, Section 3

   c. EOP validation on the simulator; Appendix C, Section 3

3. All EOPs will be validated.

4. The criteria for selecting scenarios, when used, will be developed as part of the CRDR to assure procedures can be used by the operators in the control room with minimum shift staffing. The following bases will be used to select the final set of event sequences when developing a scenario:

   a. They represent the example events that are recommended for analysis in Section 3.8 of NUREG-0700 as determined applicable.

b. They represent a good cross-section of the operation of safety-related systems and equipment.

c. They represent event sequences from Section 14 (Accident Analysis) of the FSAR.

d. They represent a good cross-section of the events to which specific Human Factors Engineering evaluation criteria can be applied.

5. This validation program was prepared following the guidelines contained in the Emergency Operating Procedures Validation Guidelines written by the Emergency Operating Procedures Implementation Assistance (EOPIA) Review Group and published by INPO.

SECTION 3

EOP Administrative Controls Following Initial Implementation

DUQUESNE LIGHT COMPANY

Beaver Valley Power Station

Emergency Operating Procedures

Executive Volume

Unit 1

Executive Volume

Chapter 53B.1

EMERGENCY OPERATING PROCEDURES - EXECUTIVE VOLUME

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Executive Volume

I. PURPOSE

This procedure identifies and describes the process and requirements for generation, revision and approval of Emergency Operating Procedures (EOPs), and EOP supporting documents (eg., administrative procedures, background documents).

II. APPLICABILITY

This procedure applies to all station personnel, vendors and consultants who prepare or revise EOPs.

III. DEFINITIONS

BVPS Unit 1 Control Room Simulator - A full scale model of the BVPS Unit 1 Control Room that dynamically models plant operating characteristics and responses to a given set of conditions.

Emergency Operating Procedures (EOPs) - Symptom and function based procedures directing operator actions necessary to mitigate consequences of transients and accidents.

Emergency Response Guidelines (ERGs) - Westinghouse Owners Group generic technical guidelines that provide the bases for the development of EOPs.

EOP Source Documents - Documents or records upon which the EOPs are based.

EOP Validation - The evaluation performed to determine that the actions specified in the EOPs will mitigate plant transients and accidents, and can be followed by trained operators to manage the emergency conditions in the plant.

Scenario - A structured plan of parameters and plant symptom changes that provide operating cues for conducting the assessment of the EOPs in directing the operator in the mitigation of plant transients and accidents.

Significant Deviation - A difference between the ERG and the EOP that changes the overall mitigating strategy or intent delineated by the ERG that is significant to safety.

Simulator Validation - A method of EOP validation whereby control room operators perform actual control functions on the Control Room Simulator in response to a scenario for an observer/review team.

Table-Top Validation - A method of EOP validation whereby personnel explain and/or discuss procedure action steps for an observer/reviewer in reponse to a scenario or as part of an actual industry operating experience review.

Walk-Through Validation - A method of EOP validation whereby control room operators conduct a step-by-step enactment of their actions in response to a scenario for an observer/review team without carrying out the actual control functions.

IV. RESPONSIBILITIES

A. The Nuclear Station Superintendent is responsible for final approval of all EOPs, revisions to EOPs and revision to EOP administrative procedures.

B. The Nuclear Station Operating Supervisor is responsible for review and maintenance of the EOPs and ECP supporting documents.

C. The Superintendent of Technical Services is responsible for the development of EOP drafts or revisions and associated background documents.

V. REFERENCES

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

B. "Emergency Operating Procedures Implementation Guideline," (INPO 82-016) June 1982.

C. "Emergency Operating Procedures Writing Guideline," (INPO 82-017) July 1982.

D. "Emergency Operating Procedures Verification Guideline," (INPO 83-004) March 1983.

E. "Emergency Operating Procedures Validation Guidelines," (INPO 83-006) July 1983.

F. Westinghouse Owners Group Emergency Response Guidelines, Revision 1, September 1983.

VI. INSTRUCTIONS

A. The need for development of EOPs, EOP revisions, or revision to supporting documents (e.g., administrative procedures, background information, etc.) shall be identified by the Nuclear Station Operating Supervisor (NSOS) or his designee.

1. This type activity will normally be initiated as a result of:

a. action by the Westinghouse Owners Group Emergency Response Guideline Procedures Subcommittee,

b. plant modifications, or plant procedure revisions,

c. feedback from plant operators or the training department.

2. Once identified the NSOS shall assign appropriate personnel to generate a draft procedure or revision OR refer the identified

need to the appropriate station department (eg., Technical Support Services) for draft generation.

B. The designated EOP writer shall generate a draft EOP or EOP revision in accordance with the following guidance:

1. Obtain and review the following EOP source documents appropriate to the specific procedure being generated to ensure previous conclusions reached and assumptions made during the initial drafting of the EOPs is not invalidated.

   - Westinghouse Owners Group, Emergency Response Guidelines, (Most current approved revision)

     NOTE: For initial implementation of the symptom and function based EOPs, the WOG ERGs, Revision 1 dated September 1983 was used.

   - Westinghouse Owners Group Background Documents (procedure specific, and generic issues)

   - Beaver Valley Power Station, Unit 1 Updated Final Safety Analysis Report

   - Beaver Valley Power Station, Unit 1 Technical Specifications

   - Beaver Valley Power Station, Unit 1 Operating Manual

   - As Built plant drawings (as required)

   - Deviation Sheets resulting from previous EOP drafts.

2. Any revision to the EOPs not initiated by the WOG must be reviewed against the source documents. This is to assure that the mitigating strategy is maintained and that a deviation significant to safety is not incorporated which would invalidate the analysis which forms the basis for the acceptability of symptom based EOPs.

3. Any revision to the EOPs initiated by an ERG revision should follow to the maximum extent possible the WOG ERGs or guidance provided by the WOG in order to avoid if possible, significant deviations which constitute a change in mitigation strategy. A step-by-step correspondence between the EOP draft and the ERGs, although ideal, will most probably not be possible. It is therefore important that the writer attempt to maintain correspondence of intent, while incorporating those deviations deemed necessary to account for:

   a. Known equipment differences between the ERG reference plant and BVPS Unit 1.

b. Known plant condition differences between the ERG reference plant and BVPS,Unit 1.

c. Resolutions of deviations identified in previous Verification or Validation efforts.

d. Licensing committments for BVPS, Unit 1.

e. Recommendations obtained from Operations Department.

4. Generate the draft or revision in accordance with Appendix E of this procedure, "EOP Writers Guide."

5. Draft a background document or revise the appropriate existing background document in accordance with Appendix F of this procedure "EOP Background Document Writers Guide."

6. Record the appropriate information and document any deviations between the ERGs and the EOP on the "EOP-ERG Deviation" form, (Figure 53B-1). This deviation documentation is necessary to:

a. Provide required information during EOP verifications

b. Provide required basis information during future EOP revision

c. Provide documentation to allow for adequate evaluation of the safety significance of the deviation during OSC review prior to final approval.

d. Provide justification for the deviation during validation of the EOP

NOTE: Examples of deviations that do not constitute a change in mitigation strategy include:

- Changes in wording to clarify the intent of a step
- Changes in step order to accommodate plant design
- Deletion of a step to accommodate plant design
- Addition of steps, notes or cautions based on existing operating procedures, operator experience, or plant licensee commitments

C. All draft EOPs or revisions to existing EOPs shall undergo procedure validation prior to implementation.

1. Validation will demonstrate that the operators can manage the emergency conditions through the use of the procedures and that they are operationally correct in accordance with the following:

a. Usability - i.e., the procedure can be understood and followed by trained operators, without confusion , delays or errors.

b. Operationally Correct - i.e., there is a correspondence between the procedure and the control room/plant hardware, and that the language and level of information presented in the EOP is compatible with the minimum number, qualification, training and experience of the operating staff.

c. Effective - i.e., that there is a high level of assurance that the procedures will work.

2. The Nuclear Station Operating Supervisor (NSOS) or his designee shall determine the extent and duration of the EOP validation effort. This determination shall be based on the complexity and scope of the draft or revision, but must address the usability, operational correctness and effectiveness as described above.

3. The evaluation criteria in Table 53B-1 should be utilized when selecting specific methods of validation. The validation effect will consist of either a table-top, a walk-through or simulator method of validation or some combination of these.

a. The validation method and evaluation criteria shall be documented on the "Validation Evaluation Criteria" form, Figure 53B-2, for each draft EOP or EOP revision.

4. Detailed instructions for performance and documentation of each method of validation are contained in:

a. Appendix A - Table-top validation

b. Appendix B - Control room walk/talk-through validation

c. Appendix C - Validation using the plant simulator

5. The Nuclear Station Operating Supervisor or his designee shall review and approve all discrepancy resolutions prior to their incorporation into the EOP.

D. All draft EOPs or revisions to existing EOPs shall undergo procedure verification prior to implementation.

1. Verification of the draft EOPs will assure that consistency has been maintained between EOP source documents and the EOPs by determining that they are:

a. Technically correct, i.e., it accurately reflects the generic technical guidelines.

b. Written correctly, i.e., it accurately reflects the EOP Writers Guide.

2. Detailed instructions for performance and documentation of procedure verification are contained in Appendix D of this procedure.

E. Configuration Control

Emergency operating procedures will be revised only on an entire procedure basis. There will be no page by page changes for any procedure in the EOP set. Additionally because of the complex referencing and branching that occurs within the EOPs, revision to the complete set may be required if any step number changes are made.

APPENDIX A

Detailed Instructions For Performance

Of

Table-Top Validation

Unit 1

APPENDIX A

DETAILED INSTRUCTIONS FOR PERFORMANCE OF TABLE-TOP VALIDATION

I. PURPOSE

The purpose of this detailed instruction is to provide guidance in performing table-top validation of EOPs and to ensure uniformity in documentation of EOP table-top validation.

II. VALIDATION PROCESS

The validation process will be conducted in three parts; preparation, assessment and resolution.

A. Preparation

The preparation phase of validation includes actions required of various members of the assigned Review Team to ensure satisfactory completion of the review.

1. Review Team Chairman

   a. The Review Team Chairman will normally be the author of the draft EOP or the revision being considered.

   b. The Review Team Chairman shall:

      1) Select the approach for this validation method which may consist of:

         - a step-by-step, word-by-word review, or,
         - evaluation against a specified scenario

      2) If a scenario is selected, describe the scenario. It need not be described in detail but should ensure that all "Action/Expected Responses" and "Responses Not Obtained" steps are examined. This description shall include as a minumum:

         - Initial plant conditions at the time of the event, including status of all major ECCS equipment
         - Plant operating history prior to the event
         - A list of actions that will have been accomplished during performance of EOPs prior to entry of the EOP under review

APPENDIX A (continued)

- Assumptions concerning plant response to operator action
- Necessary information to guide the review flow path at transition points (i.e., plant responses that guide the review team through the procedure vice transition to a different procedure.)

3) Select the appropriate evaluation criteria to be applied during this phase of validation from Table 53B-1, and obtain the necessary approval on form "Validation Evaluation Criteria," Figure 53B-2.

4) Ensure all members of the Review Team are provided the draft EOP or revision, appropriate EOP background documents, scenario description (if appropriate) and a list of the evaluation criteria to be applied. These materials should be made available prior to the meeting to allow the team members an opportunity for familiarization.

5) Ensure the applicable deviation forms "EOP-ERG Deviation," Figure 53B-1 are available for review during the assessment phase.

2. Review Team Members will be selected by the Review Team Chairman with the concurrence of the Nuclear Station Operating Supervisor, or his designee.

a. The review team members will normally consist of:

1) The review team chairman

2) A Senior Reactor Operator

3) A Reactor Operator

4) A Shift Technical Advisor

5) A member of the Training Department Staff

6) Any additional members required as determined by the review team chairman.

b. The review team members should, upon receiving the draft EOP or revision, review the material and familiarize themselves with the draft and the criteria for evaluation. They should record any comments, criticism or recommendations appropriate for reference during the Assessment Phase.

APPENDIX A (continued)

B. Assessment

1. The assessment phase of the validation will consist of a review of the draft EOP or EOP revision by the Review Team, and will be conducted in a seminar environment. Members of the team will perform the following functions:

a. Review Team Chairman will direct the review effort by:

1) Reviewing with the team the approach selected for this validation (eg. use of a scenario, or word-by-word review).

2) Reviewing with the team the evaluation criteria to be applied (Figure 53B-2).

3) Initiating the team review.

4) During the course of the team review, pointing out each deviation from the WOG guidelines, and explaining the justification for the deviation (Figure 53B-1).

5) Directing the team through the successful completion of the EOP by providing necessary plant response information at key transition points.

b. Review Team Members shall:

1) Participate in the review of the EOP draft and make comments, criticisms, or recommendations appropriate to the procedure by applying the evaluation criteria.

2) Evaluate each deviation from the ERGs to assist the OSC in determining if the change constitutes a change in over all strategy, significant to safety, and if the strategy presented by the WOG is acceptable for BVPS, Unit 1.

c. Review Team Recorder shall ensure that the required validation documentation is initiated during the team review. This documentation consists of:

1) "Table-Top Validation of Summary Form," Figure 53B-3

2) "Validation Discrepancy Sheet," (Figure 53B-6) recording all comments, or recommendations made during the review.

APPENDIX A (continued)

3) Recording any additional deviations from the ERGs that the team identified on an "EOP-ERG Deviation Form," Figure 53B-1.

C. Resolution

1. The resolution phase of the validation will consist of evaluating and resolving all discrepancies identified during the assessment phase.

2. The Review Team Chairman will:

a. Review all discrepancies recorded during the assessment phase

b. Research and prepare resolutions for all discrepancies

c. Incorporate the resolutions for each discrepancy following the appropriate reviews and approvals

III. DOCUMENTATION

The following documentation of Table-Top Validation shall be maintained for each draft EOP or revision.

A. Completed "Table-Top Validation Summary Form," Figure 53B-3

B. Completed "Validation Discrepancy Sheets" from the assessment phase, Figure 53B-6

C. Completed "Validation Evaluation Criteria Sheets," used during the review, Figure 53B-2.

D. A completed "Deviation Sheet" for each deviation, Figure 53B-1.

APPENDIX B

Detailed Instructions For Performance

Of

Control Room Walk-Through Validation

Unit 1

APPENDIX B

DETAILED INSTRUCTIONS FOR PERFORMANCE OF CONTROL ROOM WALK-THROUGH VALIDATION

I. PURPOSE

The purpose of this detailed instruction is to provide guidance in performing control room walk-through validation of EOPs and to ensure uniformity in documentation of the validation.

II. VALIDATION PROCESS

This validation process will be conducted in three parts; preparation, assessment and resolution.

A. Preparation

The preparation phase of validation includes actions required of various members of the assigned Observer/Reviewer Team to ensure satisfactory completion of the review.

1. The Nuclear Station Operating Supervisor shall:

   a. Select a typical operating crew to exercise the draft EOP or EOP revision.

   b. Designate an individual knowledgeable in EOP usage and formating as the Team Leader. This team leader shall:

      1) Obtain and become familiar with the appropriate source documents.

      2) Select the approach for this validation method which may consist of:

         - a step-by-step, word-by-word examination, or
         - evaluation against some scenario to exercise specific portions of the EOP draft.

      3) If a scenario is selected, describe the scenario. It need not be described in detail, but should ensure that all "Action/Expected Responses" and "Responses Not Obtained" steps are examined. This description shall include as a minimum:

         - Initial plant conditions at the time of the event, including status of all major ECCS equipment
         - plant operating history prior to the event

APPENDIX B (continued)

- a list of actions that will have been accomplished during performance of EOPs prior to entry of the EOP under review
- assumptions concerning plant response to operator action
- necessary information to guide the review flow path at transition points (i.e., plant responses that guide the review team through the procedure vice transition to a different procedure).

4) Select the appropriate evaluation criteria to be applied during this phase of validation from Table 53B-1, and obtain the necessary approval of that criteria on form "Validation Evaluation Criteria," Figure 53B-2.

5) Ensure all members of the review team are provided the draft EOP or revision, appropriate background document, scenario description (if appropriate) and a list of the evaluation criteria to be applied during the walk-through/talk-through validation. These materials should be made available prior to the meeting to allow the team members an opportunity for familiarization.

6) Select one of the following options for this validation method and organize the observer/review team.

- one-on-one; one observer/reviewer and one operator
- one-on-crew; one observer/reviewer and one operating crew
- team-on-crew; observer/reviewers and the operating crew
- team-on-one; observer/reviewers and one operator

7) Select team members with the concurrence of the Nuclear Station Operating Supervisor or his designee.

2. Observer/Reviewer Team

a. The observer/review team may consist of the following, depending upon the option selected for conducting this validation effort.

1) The designated Observer/Reviewer team leader.

APPENDIX B (continued)

2) A member with experience applying human factors principles

3) A member of the procedure writing staff (when required)

4) A Senior Reactor Operator

5) Additional data takers as determined necessary by the team leader.

b. The review team members should upon receiving the draft EOP or revision, review the material and familiarize themselves with the draft and the criteria for evaluation. They should record any comments criticism or recommendations appropriate for reference during the the Assessment Phase.

B. Assessment

1. The assessment phase of the validation will consist of a step-by-step walk-through of the draft EOP or EOP revision being validated. The members of the Observer/Review Teams shall perform the following functions:

a. Team Leader will direct the effort by:

1) Briefing the operator(s) participating in the walk-through on the draft EOP or EOP revision, and the intent of the walk-through. The brief shall consist of:

- an explanation of the objective of the assessment including what the operators are expected to do
- an explanation of the criteria provided on Figure 53B-2, "Validation Evaluation Criteria," that will be used in evaluating the procedure or revision
- reviewing the team approach selected for this validation effort (e.g., use of scenarior or word-by-word review)
- an explanation of the overall strategy of the procedure or revision
- a description of any scenario(s) to be used during the walk-through
- familiarizing the operators with the draft EOP or EOP revision

APPENDIX B (continued)

2) Initiating the walk-through and providing changing plant parameters and guidance to the operators and observer/reviewer team.

3) Ensuring that the required validation documentation is completed during this effort. This documentation consists of:

- "Control Room Walk-Through Validation Summary Form," Figure 53B-4
- "Validation Discrepancy Sheets," Figure 53B-6, recording all comments or recommendations made during the review
- Recording any additional deviations from the ERG that the team identified on "EOP-ERG Deviation Form," Figure 53B-1

4) Stopping the walk-through for discussion of identified discrepanices (when appropriate)

b. Team Members will participate in the validation effort by observing the operators during the walk-through:

1) evaluate the draft procedure using the criteria specified

2) record all identified discrepancies and comments, including operators comments, on the "Validation Discrepancy Sheet," Figure 53B-6

3) provide proposed resolutions for discrepancies during the debriefing

c. The entire team (Observer/Reviewers, Leader and operators) shall upon completion of the walk-through conduct a debriefing to include:

1) discussion of discrepancies or problems identified during the walk-through

2) discussion of possible resolutions to all identified discrepancies

3) a summary of the overall assessment of the draft EOP or EOP revision

APPENDIX B (continued)

C. Resolution

1. The resolution phase of the validation will consist of evaluating and resolving all discrepancies identified during the assessment phase.

2. The Team Leader shall perform the following functions:

a. Review all discrepancies and comments from the assessment phase

b. Research and propose resolutions for all discrepancies

c. Forward the proposed resolutions for all discrepancies, the discrepancy sheets, and the "Validation Summary Form," Figure 53B-4, to the Procedures Group for incorporation of resolutions into final draft procedures

d. Determine with the concurrence of the Nuclear Station Operating Supervisor, or his designee if follow-up Validation or Verification of the EOP draft or revision is needed.

3. The responsible Procedures Engineer will incorporate the proposed resolutions into the procedure following the appropriate reviewers and approvals .

III. DOCUMENTATION

The following documentation of the control room walk-through validation shall be maintained for each draft EOP or EOP revision:

A. Completed Control Room Walk-Through Validation Summary Sheet, Figure 53B-4

B. Completed Validation Discrepancy Sheets from the assessment phase, Figure 53B-6

C. Completed Validation Evaluation Criteria Sheets used during the review, Figure 53B-2

D. A completed Deviation Sheet for each deviation, Figure 53B-1

APPENDIX C

Detailed Instructions For Performance

Of

EOP Validation On The Simulator

Unit 1

APPENDIX C

DETAILED INSTRUCTIONS FOR PERFORMANCE OF EOP VALIDATION ON THE SIMULATOR

I. PURPOSE

The purpose of this detailed instruction is to provide guidance in performing EOP validation on the BVPS Unit 1 simulator, and to ensure uniformity in documentation of the validation.

II. VALIDATION

This validation process will be conducted in three parts; preparation, assessment and resolution.

A. Preparation

The preparation phase of validation includes actions required of various members of the observer/reviewer team to ensure satisfactory completion of the review.

1. The Nuclear Station Operating Supervisor shall:

   a. Select a typical operating crew to exercise the draft EOP or EOP revision

   b. Designate an individual knowledgeable in EOP usage and formatting as the Team Leader. This team leader shall:

      1) Obtain and become familiar with the appropriate source documents

      2) Select the appropriate evaluation criteria to be applied during this phase of validation from Table 53B-1, and obtain necessary approval on form "Validation Evaluation Criteria," Figure 53B-2.

      3) In conjunction with a Training Representative determine the scenario(s) and malfunctions to be employed in the simulator validation. The scenario need not be described in detail, but should ensure that the procedure objectives as stated in the PURPOSE, and the background documents are satisfied. The scenario description shall include as a minimum:

         a) Initial plant conditions at the event initiation, including status of all major ECCS equipment

         b) Plant operating history prior to the event

APPENDIX C (continued)

c) A list of actions that will have been accomplished during performance of other procedures prior to entry into the EOP being validated.

d) Necessary information to guide the review flow path at transition points (i.e., plant responses that guide the review through the procedure, vice transition to a different procedure).

4) Ensure all members of the review team are provided the appropriate background document, scenario description (if appropriate) and a list of the evaluation criteria to be applied during the simulation. These materials should be made available prior to the simulation briefing to allow the team members an opportunity for familiarization.

5) Ensure that all materials to be used by the operating team participating in the validation are available (e.g., draft EOPs, necessary graphs and tables, related reference materials)

6) Ensure appropriate forms for documentation of the validation are available, and use during the review.

7) Select one of the following options for performing this validation:

- one-on-one; one observer/review and one operator
- one-on-crew; one observer/reviewer and an operating crew
- team-on-crew; observer/reviewers and the operating crew
- team-on-one; observer/reviewers and one operator

8) Select the observer/reviewer team members with the concurrence of the Nuclear Operating Supervisor or his designee.

9) Coordinate with Training Section the scheduling of the simulator to accomplish the validation effort.

2. Observer/Reviewer Team

APPENDIX C (continued)

a. The observer/reviewer team may consist of the following depending upon the option selected for conducting this validation effort:

1) The designated observer/reviewer team leader.

2) A member with experience applying Human factors principles

3) Member of procedure writing staff (when required)

4) Additional data takers as deemed necessary by the team leader

5) One control room operating crew, to include an SRO, two ROs and one STA

6) Personnel required for operation of the simulator (e.g., a simulator instructor)

b. The review team members should, upon receiving the draft EOP or revision, review the material and to the extent possible familiarize themselves with the draft, and the criteria for evaluation specified. For extensive additions or revisions to the EOP set, this may be accomplished through formal group training.

B. Assessment

1. The assessment phase of the validation will consist of an objective observation of the performance of the draft EOP on the simulator, applying specific evaluation criteria to determine the acceptability of the procedure. Members of the observer/reviewer team shall perform the following functions:

a. Team Leader will direct the effort by:

1) Briefing the control room operating team prior to beginning the simulator run. This brief will consist of:

- an explanation of the objective of the assessment including what the operators are expected to do
- an explanation of the criteria provided on Figure 53B-2, "Validation Evaluation Criteria"
- an explanation of the overall strategy of the procedure

APPENDIX C (continued)

- a description of the scenario(s) to be used during the validation

2) Initiating the simulator validation and stopping the effort for discussion of identified discrepancies (when appropriate).

3) Ensuring all identified discrepancies and comments are properly documented and the following forms are completed:

- "Summary of EOP Validation on the Simulator" Figure 53B-5

- "Validation Discrepancy Sheets," Figure 53B-6 including recording of all comments or recommendations made during this effort

- Recording of any additional deviations from the ERGs that the team identified on "EOP-ERG Deviation Form," Figure 53B-1

4) Conducting a debriefing of the operating crew, and the observer team. This debriefing should include:

- a discussion of discrepancies or problems identified during the simulator run,

- solicitation of possible resolutions to discrepancies,

- a summary of the overall assessment phase for the given EOP.

b. Observer/Reviewer Team Members will participate in the simulator validation by observing the operators to:

1) evaluate the draft EOP by applying the specified criteria

2) record all identified discrepancies and comments, including operators comments for discussion during the debriefing on the "Validation Discrepancy Sheet," Figure 53B-6

3) provide proposed resolutions for discrepancies during the debriefing

c. Operating Crew members will:

APPENDIX C (continued)

1) Assume normal watch standing positions prior to initiation of the scenario.

2) Operate the simulator referencing the EOPs being validated as to allow for evaluation by the observers.

3) During the debriefing, identify any problems encountered during the simulation, and propose resolutions to the problems.

C. Resolution

1. The resolution phase of the validation will consist of evaluating and resolving all discrepancies identified during the assessment phase.

2. The Team Leader shall perform the following functions:

   a. Review all discrepancies and comments from the assessment phase.

   b. Research and propose resolutions for all discrepancies.

   c. Forward the "Validation Discrepancy Sheets" containing the proposed resolutions, and the "Validation Summary Form" to the Procedures Group for incorporation of resolutions into the final draft procedures.

   d. Determine, with the concurrence of the Nuclear Station Operating Supervisor or his designee, if follow-up Validation or Verification of the EOP draft, or EOP revision is required.

3. The responsible Procedures Engineer will incorporate the proposed resolutions into the procedure following the appropriate reviews and approvals.

APPENDIX C (continued)

III. DOCUMENTATION

The following documentation of the validation of EOPs on the simulator shall be maintained for each draft EOP or EOP revision:

A. Completed "Simulator Validation Summary Sheet," Figure 53B-5

B. Completed "Validation Discrepancy Sheets," Figure 53B-6, from the assessment phase

C. Completed "Validation Evaluation Criteria Sheets," Figure 53B-2, used during the review

D. A completed "Deviation Sheet," Figure 53B-1, for each deviation

APPENDIX D

Detailed Instructions For Performance

Of

EOP Verification

Unit 1

Executive Volume

APPENDIX D

DETAILED INSTRUCTIONS FOR PERFORMANCE OF EOP VERIFICATION

I. PURPOSE

The purposes of this detailed instruction is to provide guidance in determining that consistency has been maintained between EOP source documents and the EOPs, and to ensure uniformity in documentation of this verification process.

II. VERIFICATION PROCESS

The process of EOP verification consists of three phases: preparation, assessment and resolution.

A. Preparation

1. The Nuclear Station Operating Supervisor or his designee (the appropriate supervisor if EOP draft preparation has been performed by another station group), shall appoint the necessary personnel as evaluators to conduct the comparative evaluation. Personnel shall be designated based on operations experience, understanding of plant hardware, the WOG ERGs and the EOP writers guide.

2. The designated evaluators shall obtain and review the appropriate EOP source documents. This review should be made to familiarize the evaluators with the draft EOP or EOP revision, and the criteria to be applied during the evaluation (Table 53B-2).

B. Assessment Phase

1. The assessment phase of the verification process shall consist of a step-by-step comparitive evaluation between the source documents and the draft procedure or EOP revision by the evaluator to include the following areas:

   a. Review of the draft procedure or EOP revision to examine written correctness. This review will address the following:

      1) Legibility

      2) Format consistency

      3) Identification Information

      4) Information presentation

      5) Procedure referencing and branching

APPENDIX D (continued)

b. Review the draft procedure or EOP revision to examine technical accuracy. This review will address the following areas:

1) Entry conditions or symptoms information

2) Instruction step, caution or note information

3) Quantitative information

4) Plant hardware information

5) Operator Instrumentation and Control Needs

2. The reviews for written correctness and technical accuracy will be made by applying the appropriate criteria delineated in the Evaluation Criteria Checklist (Table 53B-2).

3. The evaluator will record for each step, note, or caution of the EOP or revision, any discrepancy noted on the "EOP Verification Discrepancy Sheet" (Figure 53B-7). The proposed resolution of the discrepancy should also be recorded.

4. A summary, documenting that the comparitive evaluation was performed and indicating that each step, note or caution was either acceptable, or listing the applicable discrepancy sheet shall be recorded on the EOP Verfication Summary Sheet (Figure 53B-8).

C. Resolution Phase

1. The resolution phase of the validation will consist of evaluating and resolving of all discrepancies identified during the assessment phase.

2. The assigned Procedures Engineer will:

a. Review all discrepancies and comments from the assessment phase

b. Incorporate proposed resolutions, or make appropriate corrections to the EOP draft or revision

c. Document the discrepancy resolution on the Discrepancy Sheet, and the Verificaiton Summary Sheet.

3. The evaluator shall determine, with the concurrence of the Nuclear Station Operating Supervisor, or his designee, if follow up

APPENDIX D (continued)

Verification or Validation of the draft EOP or EOP revision is required.

III. DOCUMENTATION

A. The documentation developed through out the verification process will be maintained by the Procedures Group and shall include:

1. Completed "EOP Verification Summary Sheets," Figure 53B-8

2. Completed "EOP Verification Discrepancy Sheets," Figure 53B-7.

APPENDIX E

Writers Guide

For

Emergency Operating Procedures

Unit 1

Executive Volume

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Executive Volume

I. INTRODUCTION

A. Purpose

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

B. Scope

1. This writers guide applies to the writing of all EOPs and subsequent revisions to EOPs.

APPENDIX E (continued)

II. EOP DESIGNATION AND NUMBERING

Each EOP shall be uniquely identified. This identification will permit efficient administration of the process of procedure preparation, review, revision, distribution, and operator use.

A. Title Sheet

One Title Sheet shall be placed in the front of the EOP set to identify and introduce the EOP's (See Figure 53B-9).

B. Procedure Title

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

The title should be consistent with the generic guidelines title.

C. Procedure Numbering

1. EOP's are to be subdivided into 3 categories:

a. Procedure for diagnosis or mitigation of design basis events (E-series).

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

c. Emergency Contingency procedures (ECA-series) to address events that go beyond the design basis events and that are not easily covered in the E-series or which may complicate or reduce the effectiveness of the E-series procedures if included therein.

2. Alphanumeric Procedure Designators:

a. Design basis event procedures should be designated E, using the same number as designated by the generic guideline.

Example: E-0

b. Subprocedures to these design basis event procedures should be designated as follows:

Example: E-0; ES-0.1, ES-0.2, etc.
E-1; ES-1.1, ES-1.2, etc.

APPENDIX E (continued)

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

Example: FR-H.3, etc.

d. Emergency contingency procedures and subprocedures should be designated ECA, using the same decimal number used by the generic guideline.

Example: ECA-1.1, etc.

D. Revision and Issue Numbering and Designation

1. One or two digits following the word "Revision" will be used to designate the revision level of the EOP.

Example: Revision 1 or Revision 12
└── Revision Level

2. One or two digits following the word "ISSUE" will be used to designate the revision level of the ERG utilized as a reference to the EOP

Example: ISSUE 1
└── Revision level of reference ERG

3. The procedure revision number, is to be placed at the bottom right margin of each page.

4. To identify revisions to the text of an EOP, a change bar located in the left margin alongside the text change will be used to indicate a change in the left column, and a bar in the right margin will indicate the text change in the right column.

5. An Administrative - Approval Sheet (See Figure 53B-9) will be maintained to track revisions. This Approval Sheet shall be placed behind the Title Sheet and shall record revisions for the entire EOP set.

E. Page Numbering

1. Each page of the procedure will be identified by:

a. The page number shall be specified as "Page___ of___", to be centered at the bottom of each page.

APPENDIX E (continued)

III. FORMAT

A. Page Format

1. Each page of the EOPs shall include the BVPS unit designator followed by the Chapter of the Operation Manual and the Section J in the upper right corner of the page as shown on Figures 53B-11, and 53B-12.

Example: 1.53.A
- 1 — BVPS Unit Designator
- 53 — Operating Manual Chapter

2. Each page of the EOPs shall include a facility designator and identification as an EOP which shall be centered on the top of each page as shown on Figures 53B-11 and 53B-12

Example: BVPS - EOP
- BVPS — Facility Designator
- EOP — Procedure type designator

3. A dual-column format shall be used. The left-hand column is designated for operator action or expected plant response, and the right-hand column is designated for contingency actions to be taken when the expected response is not obtained. A sample page format is presented in Figure 53B-12.

4. Step numbering and indentation shall be in format presented in Figure 53B-12.

5. A border shall frame the procedure page to ensure that information is not cut off of a page during reproduction.

6. The margins of each procedure page shall allow sufficient space that the border is clearly visable and space exists on the left side margin to allow hide punches for a standard ringed binder.

7. The procedure steps shall be separated by a minumum of two line spaces. Procedure sub-steps shall be separated by a minimum of one line space.

B. Procedure Organization

1. Cover Sheet (Figure 53B-13)

a. Each procedure shall have a Cover Sheet which shall contain the following sections:

APPENDIX E (continued)

1) Procedure Number; which conforms to the requirement of II.C.1 and 2 "Procedure Numbering"

2) Title; which shall be stated for operator association with the symptoms

3) Purpose; which states the purpose or intended objective of the procedure in a specific, consise form

4) Symptoms or Entry Conditions; which includes only those alarms, indications, operating conditions, automatic system actions or other unique conditions that the operator is to use in deciding to use the EOP.

2. Operator Actions Section

a. The remaining section of the procedure is the Operator Actions Section, which shall contain the following sections:

1) Steps; the actions or expected responses shall be numbered using alpha-numeric convention in a sequential order with circled seps indicating IMMEDIATE Action Steps.

2) Action/Expected Response; operator actions and expected plant response should be short, consise, identifiable instructions that provide appropriate directions for the user.

3) Response Not Obtained; these steps shall parallel the Action/Expected Response steps and provide operator guidance when the expected plant response specified is not obtained.

APPENDIX E (continued)

IV. WRITING INSTRUCTIONAL STEPS

A. Instruction Step Length and Content

1. Instructions should be short and concise. General rules to be used in meeting these objectives are as follows:

a. Instruction steps should deal with only one idea.

b. Short, simple sentences should be used in preference to long, compound, or complex sentences.

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

d. Objects of operator actions should be specifically stated. This includes identification of exactly what is to be done and to what.

e. Limits should be expressed quantitatively whenever possible.

f. Mandatory sequence of steps is assumed unless otherwise stated.

g. Identification of components and parts should be complete.

h. Instruction content should be written to communicate to the user.

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

j. When actions are required based upon receipt of an annunciated alarm, list the setpoint of the alarm for ease of verification.

k. When requiring resetting or restoration of an alarm or trip, list the expected results immediately following the resetting or restoration if it would be beneficial to the operator.

l. When considered beneficial to the user for proper understanding and performance, describe the system response time associated with performance of the instruction.

m. When system response dictates a time frame within which the instruction must be accomplished, prescribe such time frame. If possible, however, avoid using time to initiate operator actions, Operator actions should be related to plant parameters.

APPENDIX E (continued)

n. Units of measure specified in procedural steps shall be consistant with actual units used on plant equipment.

o. When anticipated system response may adversely affect instrument indications, describe the conditions that will likely introduce instrument error and means of determining if instrument error has occured by using a NOTE.

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

B. Instruction Column

1. The left column of the dual-column format will contain the operator instructional steps. The following rules are established for this column, in addition to the general rules above.

a. Expected indications should be presented in this column.

b. Operator actions in this column should be appropriate for the expected indications.

C. Response Not Obtained Column

1. Contingency actions will be presented in the right column of the dual-column format. Contingency actions are operator actions that should be taken in the event a stated conditon, event or task does not represent or achieve the expected result. The need for contingency action occurs in conjunction with tasks involving verification, observation, confirmation and monitoring.

2. Contingency actions will be specified for each circumstance in which the expected results or actions might not be achieved. The contingency actions should identify, as appropriate, directions to override automatic controls and to initiate manually what is normally automatically initiated.

D. Use of Logic Terms

1. The logic terms AND, OR, NOT, IF, IF NOT, WHEN, and THEN are necessary to describe precisely a set of conditions or sequence of actions. When logic statements are used, logic terms will be highlighted so that all the conditions are clear to the operator. Emphasis will be achieved by using capitilization and underlining. All letters of the logic terms shall be capitalized and the logic term shall be underlined.

APPENDIX E (continued)

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

3. The dual-column format used equates to the logic, IF NOT the action in the left column, THEN follow the action specified in the right column; for example: IF RCS pressure below 1536 psig, THEN verify SI pump flow.

4. Use other logic terms as follows:

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

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

   c. When action steps are contingent upon certain conditions or combinations, the step shall 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.

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

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

E. Use of Cautionary Information and Notes

1. Because the present action-step wording is reduced to the minimum essential, certain additional information is sometimes desired, or necessary, and cannot be merely included in training. This non-action information is presented as either a NOTE or a CAUTION.

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

APPENDIX E (continued)

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

2. The entire contents of a CAUTION or NOTE should be able to be read completely without interruption by intervening steps and shall be completed on the same page started.

3. CAUTIONS and NOTES should be accurate and concise.

4. The following format shall be used to denote a CAUTION:

a. To distinquish a CAUTION from action steps, a box composed of astrisks will outline the CAUTION information and will extend across the entire page as shown in Figure 53B-12.

b. The word CAUTION shall be underlined and printed in large type.

c. The CAUTION information will immediately precede the step to which it applies.

d. Multiple statements included under a single descriptive heading shall be separately identified.

5. The following format shall be used to denote a NOTE:

a. To distinquish a NOTE from action steps and CAUTION information, the NOTE shall be enclosed in boxes (framing) and will extend across the entire page as shown in Figure 53B-12.

b. The word NOTE shall be underlined and printed in large type.

c. The NOTE will immediately precede the step to which it applies.

d. Multiple statements included under single descriptor heading shall be separately identified.

6. As a general rule, neither a CAUTION or NOTE will be used to replace an instruction/operator action step. However, procedure transitions can be included as non-action information in a NOTE when absolutely necessary.

F. Calculations

APPENDIX E (continued)

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

G. Referencing and Branching to Other Procedures or Steps

1. Referencing implies that an additional procedure or additional steps will be used as a supplement to the procedure presently being used.

   a. Referencing other steps within the procedure being used, either future steps or completed steps, should be minimized.

   b. When only a few steps would be involved in the referencing the steps should be stated in the procedure as they are needed.

2. To minimize potential operator confusion, branching will be used when the operator is to leave one procedure or step and use another procedure or step.

   a. Use the key-words "GO TO" to direct the operator to leave the present step and not return until directed.

   b. Specify information as to procedure and step directed to.

3. Use the key words "Refer to" when the operator is directed to use a procedure or attachment as a guideline and concurrently with the procedure.

4. Use quotation marks to emphasize the title of the referenced or branched procedure; examples: GO TO E-1 "Loss of Reactor Coolant", GO TO Step 20.

H. Component Identification

1. With respect to identification of components, the following rules are to be followed:

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

   b. When the engraved names and numbers on panel placards and alarm windows are specifically the item of concern in the procedure, the engraving should be quoted verbatim and emphasized by using all capitals.

APPENDIX E (continued)

c. The names of plant system titles are emphasized by initial capitalization. When the word "system" is deleted from the title because of brevity and is understood because of the context, the title is also emphasized by initial capitalization.

d. If the component is seldom used, or if it is felt that the component would be difficult to find, the benchmark identification should be specified in brackets and location information should follow:

Example: [1SI-P-1A] at BB-A

I. Level of Detail

1. Too much detail in EOPs should be avoided in the interest of being able to effectively execute the instructions in a timely manner. The level of detail required is the detail that a newly trained and licensed operator would desire during emergency conditions.

2. To assist in detemining the level of EOP detail, the following general rules apply.

a. For control circuitry that executes an entire function upon actuation of the control switch, the action verb appropriate to the component suffices without further amplification of how to manipulate the control device; for example "Close Pressurizer Spray Valves [1RCS-PCV455A (455D)]. Recommended action verbs are as follows:

- For power-driven rotating equipment, use START, STOP.
- For valves, use OPEN, CLOSE, THROTTLE.
- For power distribution breakers, use SYNCHRONIZE, CLOSE and OPEN.
- For control switches with a positional placement that establishes a standby readiness condition, the verb "SET" should be used, along with the engraved name of the desire position. Positional placements are typically named "AUTO" or "NORMAL"; for example, SET PORV control switches in AUTO.
- For multiposition control switches that have more than one position for a similar function, placement to the desired position should be specified; for example, "Place Sample Return Valve Control Switch in NORMAL".

APPENDIX E (continued)

- Standard practices for observing for abnormal results need not be prescribed within procedural steps. For example, observation of noise, vibration erratic flow, or discharge pressure need not be specified by steps that start pumps (also refer to Table 1 - Glossary).

J. Printed Operator Aids

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

2. Units of Measure

a. Units of measure on Figures, tables, and attachements should be given for numerical values that represent observed, measurement data, or calculated results. A virgule (slant line) should be used instead of "per". For example: ft/sec., lbs/hr, etc.

3. Titles and Headings

a. Capitalization should be used for reference to tables, figures, titles of tables, figures within text material, and column headings within a table.

Examples: Refer to Figure 201 for. . . .
as shown in Table 20. . . .
Equipment Power Supplies, etc.

4. Figure, Table, and Attachment Numbering

a. Sequential arabic numbers should be assigned to figures, tables, and attachments in separate series. The sequence should correspond with the order of their reference in the text. The symbol "#" and abbreviation "No." are unnecessary and should not be used. The number alone suffices.

Examples: Figure 1, Figure 2, etc. Table 1,
Table 2, etc. Attachment 1,
Attachment 2, etc.

b. Page identification for attachments should consist of a block of information that identifies:

1) Procedure number

2) Attachment number

APPENDIX E (continued)

3) Page number

4) Revision number

Page numbering of attachment shall conform with the requirements of Section II Step E.1 a & b, "Page Numbering". The first page of an Attachment will be "Page 1 of __".

V. MECHANICS OF STYLE

A. Spelling

1. Spelling should be consistent with modern usage. When a choice of spelling is offered by a dictionary, the first spelling should be used.

B. Puctuation

1. Punctuation should be used only as necessary to aid reading and prevent misunderstandings. Word order should be selected to require a minimum of punctuation. When extensive punctuation is necessary for clarity, the sentence should be rewritten and possibly made into several sentences. Punctuation should be in accordance with the following rules:

a. Brackets - shall be used to indicate equipment benchmark numbers.

b. Colon - shall be used to indicate that a list of items is to follow, for example: Restore cooling flow as follows: . . . .

c. Comma - Use of many commas is a sign the instruction is too complex and needs to be rewritten. Therefore, evaluate the number of commas to ensure the instruction is not to complex. Use comma after conditional phrases for clarity and ease of reading. Example: WHEN level decreases to 60 inches, THEN start pump . . . .

d. Parentheses - shall be used to indicate alternative items in a procedure or instruction usually denotes B train components.

e. Periods - shall be used at the end of complete sentences and for indicating the decimal place in numbers.

f. Capitalization - shall be used to emphasize the directing of equipment operation, for example: CLOSE PRZR PORV(s). "GO

APPENDIX E (continued)

TO" shall be captialized when directing branching to other procedures. All accronyms and logic words shall be capitalized. Other places where normal English convention would require its use should be capitalized.

g. Hyphenation - shall be used between elements of a compound word when standard usage calls for it. When doubt exists, the compound word should be restructured to avoid hyphenation.

C. Use of Underlining

1. Underlining will be used for emphasis of the following items:

a. The major task defined in each step.

b. Logic terms (i.e., IF, THEN, IF NOT, etc)

c. Headings of CAUTIONS and NOTES (i.e., CAUTION, NOTE).

d. Headings of Attachments, and columns in attachments.

D. Vocabulary

1. Words used in procedures should convey precise understanding for a trained person. The following rules apply:

a. Use simple words. Simple words are usually short words of few syllables.

b. Use common usage if it makes the procedure easier to understand.

c. Use words that are concrete rather than vague, specific rather than general, familiar rather than formal, precise rather than blanket.

d. Define key words that may be understood in more than one sense.

e. Verbs with specific meanings should be used.

f. Equipment status should be denoted as follows:

1) Operable/operability - These words mean that a system, subsystem, train, component, or device is capable of performing its specified function(s) in the intended manner. Implicit in this definition is the assumption that all necessary attendant instrumentation, controls,

APPENDIX E (continued)

normal and emergency electrical power sources, cooling or seal water, lubrication or other auxilary equipment required for the system, subsystem, train, component, or device to perform its function(s) are also capable of performing related support function(s).

2) Operating - This word means that a system, subsystem, train, comporent, or device is in service and is performing its specified function(s) and that Equipment Clearances, or other conditions do not prevent it from maintaining that service.

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 in service.

E. Numerical Values

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

a. Arabic numerals should be used.

b. For numbers less than unity, the decimal point should be preceded by a zero; for example 0.1

c. 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.

d. Acceptance values should be specified in such a way that addition and subtraction by the user is avoided if possible. This can generally be done by stating acceptance values as limits. Examples: 510 F maximum, 300 psig minimum; 580 to 600F. For calibration points, statement of the midpoint and its lower and upper limits would accomplish the same purpose: For example: 10 milliamperes (9.5 to 10.5). Avoid using ±.

e. Engineering units should always be specified for numerical values of process variables. They should be the same as those used on the control room displays, for example: psig instead of psi.

F. Abbreviations, Letter Symbols, and Acronyms

1. The use of abbreviations should be minimized because they may be confusing to those who are not throughly familiar with them. Abbreviations may be used where necessary to save time and space,

APPENDIX E (continued)

and when their meaning is unquestionably clear to the intended reader. Consistency should be maintained through the procedure.

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

3. Letter symbols may be used to represent operations, qualities, elements, relations and quantities.

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

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

6. Refer to Table 53B-4 for a list of approved acronyms and abbreviations.

VI. CONTINUOUSLY MONITORED CONDITIONS

Since plant symptom changes may occur, items not identified by the EOP are addressed by the use of: "Symptomatic Response/Unexpected Conditions" and/or "Critical Safety Function Status Trees."

A. Symptomatic Response/Unexpected Conditions

1. Provides a mechanism to identify operator actions that should be performed any time a listed symptom appears during the performance of an EOP.

2. The information listed will be contained on one page in the format present in Figure 53-14.

3. A Symptomatic Response/Unexpected Conditions sheet will be provided for each E-series and ECA-series procedure which will appear on the back side of each page in the procedure body.

B. Critical Safety Function Status Trees (CSF).

1. Provides a mechanism to address potential challenges to the state of plant safety that could occur at any time during and EOP which would require a transition to a FRP.

APPENDIX E (continued)

2. The CSF should be formated as presented in Figure 53-15.

3. The information shall be completed on one page and be assigned its own unique number. (i.e., F-0.1, etc.)

4. Line pattern coding shall be provided from each last branch to its terminus which will be refered to as colored paths in the EOPs and FRPs as follows:

Severity	Designation
RED path	solid heavy lines
ORANGE path	dashed heavy lines
YELLOW path	dotted heavy lines
GREEN path	hollow lines

VII. Figures and Tables (attached)

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TABLE 53B-1

Application of Validation Evaluation Criteria

Validation Principles / Procedure Characteristics	Usability		Operational Correctness		
	Level of Detail	Understandability	Plant Compatibility		Operator Compatibility
Validation Method	EOPs contain sufficient information, consistent with training, for the operators to manage emergency conditions in the plant	EOPs are written so that they are readily comprehended by the operators	EOPs are compatible with control room hardware	EOPs are compatible with plant responses	EOPs are compatible with remotely located hardware and responses	EOPs are compatible with shift manning levels and policies
Table-Top Method	X	X	O	O	O	P
Walk-Through Method	X	X	P	O	P	X
Simulator Method	X	X	X	X	P	X

Legend:

X - Evaluation can be made with method.

P - Evaluation can be partially made with method.

O - Evaluation cannot be made with method.

TABLE 53B-1

VALIDATION EVALUATION CRITERIA

This list is intended to provide a basis for determining what evaluation criteria must be utilized to evaluate the acceptability of an EOP draft or revision with respect to usability, operational correctness and effectiveness. The list is not intended to be all inclusive, nor will every criterion apply to evaluation of every step in all drafts or revisions. The list will give guidance in determining a set of criteria appropriate for a specific evaluation effort, and provide guidance in determining what the overall program for satisfactory validation (i.e., for a given revision are all three methods of validation required?)

METHOD			I. USEABILITY	
T-T	W-T	S	A.	LEVEL OF DETAIL
x	x	x	1.	Is there sufficient information to perform the specified actions at each step?
x	x	x	2.	Are the alternatives adequately described at each decision point?
x	x	x	3.	Are the labeling, abbreviations, and location information as provided in the EOP sufficient to enable the operator to find the needed equipment?
x	x	x	4.	Is the EOP missing information needed to manage the emergency condition?
x	x	x	5.	Are the contingency actions sufficient to address the symptoms?
x	x	x	6.	Are the titles and numbers sufficiently descriptive to enable the operator to find referenced and branched procedures?

LEGEND:

x - may be evaluated with this method of validation
o - cannot be evaluated with this method of validation
T-T - table-top validation
W-T - walk-through validation
S - simulator validation

TABLE 53B-1 (continued)

T-T	W-T	S		
			B.	UNDERSTANDABILITY
x	x	x	1.	Is the EOP easy to read?
x	x	x	2.	Are the figures and tables easy to read with accuracy?
x	x	x	3.	Can the values on figures and charts be easily determined?
x	x	x	4.	Are caution and note statements readily understandable?
x	x	x	5.	Are the EOP steps readily understandable?
			II.	OPERATIONAL CORRECTNESS
			A.	PLANT COMPATIBILITY
x	x	x	1.	Can the actions specified in the procedure be performed in the designated sequence?
x	x	x	2.	Are there alternate success paths that are not included in the EOP's?
o	x	x	3.	Can the information from the plant instrumentation be obtained, as specified by the EOP?
o	o	x	4.	Are the plant symptoms specified by the EOP adequate to enable the operator to select the applicable EOP?
o	o	x	5.	Are the EOP entry conditions appropriate for the plant symptoms displayed to the operator?
x	x	x	6.	Is information or equivalent not specified in the EOP required to accomplish the task?
o	o	x	7.	Do the simulator responses agress witht he EOP basis?
o	x	x	8.	Are the instrument readings and tolerances stated in the EOP consistent with the instrument values displayed on the instruments?
o	x	x	9.	Is the EOP physically compatible with the work situation (too bulky to hold, binding would not allow them to lay flat in work space, no place to lay the EOP's down to use)?
o	x	o	10.	Are the instrument readings and tolerances specified by the EOP for remotely located instruments accurate?

LEGEND:
- x - may be evaluated with this method of validation
- o - cannot be evaluated with this method of validation
- T-T - table-top validation
- W-T - walk-through validation
- S - simulator validation

TABLE 53B-1 (continued)

T-T	W-T	S	B. OPERATOR COMPATIBILITY	
o	x	x	1.	If time intervals are specified, can the procedure action steps be performed on the plant within or at the designated time intervals?
o	x	x	2.	Can the procedure action steps be performed by the operating shift?
o	x	x	3.	If specific actions are assigned to individual shift personnel, does the EOP adequately aid in the coordination of actions among shift personnel where necessary?
x	x	x	4.	Can the operating shift follow the designated action step sequences?
o	x	x	5.	Can the particular steps or sets of steps be readily located when required?
o	x	x	6.	Can procedure exist point be returned to without omitting steps when required?
x	x	x	7.	Can procedure branches be entered at the correct point?
X	x	x	8.	Are EOP exit points specified adequately?

LEGEND:

x - may be evaluated with this method of validation
o - cannot be evaluated with this method of validation
T-T - table-top validation
W-T - walk-through validation
S - simulator validation

TABLE 53B-2

VERIFICATION EVALUATION CRITERIA CHECKLIST

I. Written Correctness

A. Legibility

1. Are the printed borders visible on all procedure pages?

2. Are the text, tables, graphs, figures, and charts legible to the evaluator?

B. EOP Format Consistency

1. Do the following sections exist in each EOP:

a. Cover Page that includes a "PURPOSE" and "ENTRY CONDITIONS OR SYMPTOMS" Section

b. The cover page is consistent with page layout specified in Writers Guide.

c. ACTION OR INSTRUCTION STEP pages.

d. ACTION OR INSTRUCTION STEP pages are consistent with sample page layout in Writers Guide.

C. Identification Information

1. Is the procedure title descriptive of the purpose of the procedure?

2. Does the cover sheet correctly provide the following:

a. Procedure title

b. Procedure number

c. Unit number

d. Revision number

e. Number of pages

3. Does each page correctly provide the following:

a. Procedure designator

b. Revision number

c. Page ___ of ___ numbers

4. Does the procedure have all its pages in the correct order?

TABLE 53B-2 (continued)

D. Information Presentation

1. Are instruction steps numbered correctly?

2. Are operator-optional sequence steps identified?

3. Are instruction steps constructed to comply with the following:

   a. Steps deal with only one idea.

   b. Sentences are short and simple.

   c. Operator actions are specifically stated.

   d. Objects of operator actions are specifically stated.

   e. Objects of operator actions are adequately stated.

   f. If there are three or more objects, they are listed (and space is provided for operator check-off).

   g. Punctuation and capitalization are proper.

   h. Abbreviations are correct and understandable to the operator.

4. Do instruction steps make proper use of logic structure?

5. When an action instruction is based on receipt of an annunciator alarm, is the setpoint of the alarm identified?

6. Are precautions and cautions used appropriately?

7. Are precautions and cautions placed properly?

8. Are precautions and cautions constructed to comply with the following:

   a. They do not contain operator actions.

   b. They do not use extensive punctuation for clarity.

   c. They make proper use of emphasis.

9. Are notes properly used?

10. Are notes properly placed?

11. Are notes worded so that they do not contain operator actions?

12. Are numerical values properly written?

13. Are values specified in such a way that mathematical operations are not required of the user?

TABLE 53B-2 (continued)

14. Is a chart or graph provided in the procedure for necessary operator calculations?

15. Are units of measurements in the EOP the same as those used on equipment?

E. Procedure Referencing and Branching

1. Do the referenced and branched procedures identified in the EOP's exist for operator use?

2. Is the use of referencing minimized?

3. Are referencing and branching instructions correctly worded?

a. "GO TO" (branching)

b. "REFER TO" (referencing)

4. Do the instructions avoid routing users past important information such as cautions preceding steps?

5. Are the exit conditions compatible with the entry conditions of the referenced or branched procedure?

II. Technical Accuracy

A. Entry Conditions or Symptoms Information

1. Are the entry conditions of the EOP listed correctly?

2. If additional entry conditions have been added, do they comply with the following:

a. Appropriate entry conditions for which the EOP should be used

b. Not excessive

B. Instructional Step, Caution, and Note Information

1. Are EOP/ERG differences:

a. Documented

b. Explained

2. Is the ERG technical foundation (strategy) changed by the following changes in EOP steps, cautions, or notes:

a. Elimination

b. Addition

TABLE 53B-2 (continued)

c. Sequence

d. Alteration

3. Are correct, plant-specific adaptations incorporated per ERG:

a. Systems

b. Instrumentation

c. Limits

d. Controls

e. Indications

4. Have licensing commitments applicable to EOP's been addressed?

5. Are differences between the licensing commitments and the EOP's or ERG's documented?

C. Quantitative Information

1. Do the quantitative values, including tolerance bands, used in the EOP comply with applicable EOP source document?

2. Where ERG values are not used in the EOP, are the EOP values computed accurately?

3. When calculations are required by the EOP, are equations presented with sufficient information for operator use?

D. Plant Hardware Information

1. Is the following plant hardware specified in the EOP available for operator use:

a. Equipment

b. Controls

c. Indicators

d. Instrumentation

2. Do instruments and controls have needed characteristics to meet operator information and control requirements.

a. Visual Displays

1) Displays should indicate values in a form usable by the operator without mental conversion.

TABLE 53B-2 (continued)

2) Displays should be sensitive to operator use of information (trending requirements, calculation, etc.)

3) Scale units should be consistent with the degree of precision and accuracy needed by the operator.

4) Scale ranges should span the expected range of operational parameters.

5) Zone markings should be used to show the operator the implications of various readings.

b. Controls

1) Control positions should be sufficient for required control actions.

2) The precision and range of a control should not exceed the need.

3) Operators should be provided with feedback on control actions and system response.

TABLE 53B-3

GLOSSARY

Check	To note a condition and compare with some procedure requirement.
Control	To manually or automatically operate equipment as necessary to satisfy procedure requirements. Example: Control AFW flow to maintain S/G level...
Establish	To make arrangements for a stated condition. Example: Establish normal pressurizer pressure and level control.
Faulted	Used to describe a secondary system component with a feedwater or steam break.
Initiate	To begin a process (begin is preferred).
Intact	Describes a steam generator which has neither a tube rupture nor is faulted.
Local (Locally)	An action performed by the operator outside the control room.
Maintain	To control a given plant parameter to some procedure requirement continuously. Example: Maintain steam generator level in the narrow range.
Manual (Manually)	An action performed by the operator in the control room. (The word is used in contrast to an automatic action, which takes place without operator intervention).
Monitor	Similar to "check", except implies a repeated function.
Normal	A value of a process parameter experienced during routine plant operations.
Ruptured	Used in describing a steam generator with a tube(s) break.
Stable	In reference to process parameters, it means controllable within some desired range.

TABLE 53B-3 (continued)

Throttle	To operate a valve in an intermediate position to obtain a certain flow rate. (control is perferred).
Verify	To observe that an expected characteristic or condition exists. Typically the expectation comes from some previous automatic or operator action.

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EOP-ERG DEVIATION

Procedure No.	EOP Procedure Title	EOP Step No.

PURPOSE OF STEP:

DEVIATION TO BE RESOLVED:

SOURCE	#	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
WOG-ERG Step(s)			
BVPS-EOP Step(s)			

(continued on next page)

Figure 53B-1

(Continued from previous page)

JUSTIFICATION OF DEVIATING STEP:

SIGNIFICANT DEVIATION

Is this a significant deviation?

__ No
__ Yes; and it has been found acceptable for inclusion in the procedure.

_____
(OSC Meeting Number)

PLANT SPECIFIC INFORMATION/REFERENCES:

Executive Volume

VALIDATION EVALUATION CRITERIA

VALIDATION METHOD: _____ EOP TITLE: _____

EOP NUMBER: _____ _____

REVISION NUMBER: _____

DATE OF REVIEW: _____

Description of Criteria: _____

Prepared By: _____ Date: _____
Review Team Chairman/Team Leader

Approved By: _____ Date: _____
Nuclear Station Operating Supervisor
(or designee)

Figure 53B-2

Executive Volume

TABLE TOP VALIDATION SUMMARY FORM

EOP NUMBER:_____ EOP TITLE: _____

REVISION NUMBER:_____ _____

DATE OF REVIEW:_____

REVIEW COMMITTEE MEMBERS: JOB DESCRIPTION

Author/Moderator _____ _____

Recorder _____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

SCENARIO DESCRIPTION: _____

_____

_____

_____

_____

_____

DISCREPANCIES: NO __ Yes;(See Attached)_____

RESOLUTION REVIEW: _____
Nuclear Station Operating Supervisor (or designee)

Figure 53B-3

Executive Volume

CONTROL ROOM WALK-THROUGH VALIDATION SUMMARY FORM

EOP NUMBER:_____ EOP TITLE:_____

REVISION NUMBER:_____ _____

DATE OF WALK-THROUGH_____

WALK-THROUGH PARTICIPANTS:

Observer(s)/Reviewer(s) _____

_____

_____

_____

Operating Crew Members _____

_____

_____

_____

Scenario Description _____

_____

_____ _____

_____

_____

Discrepancies: No __ Yes;(See Attached)_____

Resolution Review: _____
Nuclear Station Operating Supervisor (or designee)

Figure 53B-4

Executive Volume

SUMMARY OF EMERGENCY OPERATING PROCEDURE VALIDATION ON THE SIMULATOR

EOP NUMBER: _____ EOP TITLE _____

REVISION NUMBER: _____

DATE OF SIMULATION: _____

SIMULATION PARTICIPANTS:

		Job Description
Observer(s)/Reviewer(s)	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
Operating Crew(s)	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

Scenario Description: _____

_____

_____

_____

_____

Discrepancies: No __ Yes; (See Attached) _____

Resolution Review: _____
Nuclear Station Operating Supervisor (or designee)

Figure 53B-5

Executive Volume

VALIDATION DISCREPANCY SHEET

VALIDATION METHOD: _____

EOP NUMBER: _____ EOP TITLE _____

REVISION NUMBER: _____ _____

STEP NUMBER: _____

DISCREPANCY: _____

_____

_____

_____

_____

Observer(s)/Reviewer(s)/Recorder _____

RESOLUTION: _____

_____

_____

_____

_____

Resolution of Discrepancy By: _____

Has the resolution resulted in a change in the EOP requiring re-validation?

No __
Yes __ Date Completed _____

Has the resolution resulted in a change in the EOP requiring re-verification?

No __
Yes __ Date Completed _____

Reviewed and Approved: Yes __ No __

Resolution Incorporated By: _____

Figure 53B-6

Executive Volume

EOP VERIFICATION DISCREPANCY SHEET NUMBER _____

EOP NUMBER: _____ EOP TITLE: _____

REVISION NUMBER: _____ _____

EOP STEP NUMBER: _____

DISCREPANCY: _____

_____

_____

_____

_____

_____

_____

RESOLUTION: _____

_____

_____

_____

_____

_____

_____

RESOLUTION INCORPORATED BY: _____ DATE _____

Figure 53B-7

Executive Volume

EOP VERIFICATION SUMMARY SHEET

EOP NUMBER: _____ EOP TITLE: _____

REVISION NUMBER: _____ _____

SCOPE OF VERIFICATION: (reason) Initial for EOP Implementation

EOP SOURCE DOCUMENTS USED:

1. Westinghouse Owners Group Emergency Response Guidelines, Rev. 1
2. Updated FSAR, Unit 1
3.
4.
5.

VERIFICATION RESULTS	ACCEPTABLE	DISCREPANCY SHEET # (s)
1. Written Correctness		
a. Legibility	_____	_____
b. Format Consistancy	_____	_____
c. Identification Information	_____	_____
d. Information Presentation	_____	_____
e. Proc. Ref. and Branch.	_____	_____
2. Technical Accuracy		
a. Entry Cond. or Symptoms	_____	_____
b. Inst. Step, Cautns, Notes	_____	_____
c. Quantitative Information	_____	_____
d. Plant Hardware Infor.	_____	_____
e. Operator Information and Control Needs	_____	_____

VERIFICATION PERFORMED BY: _____ DATE: _____

RESOLUTIONS INCORPORATED BY: _____ DATE: _____

Figure 53B-8

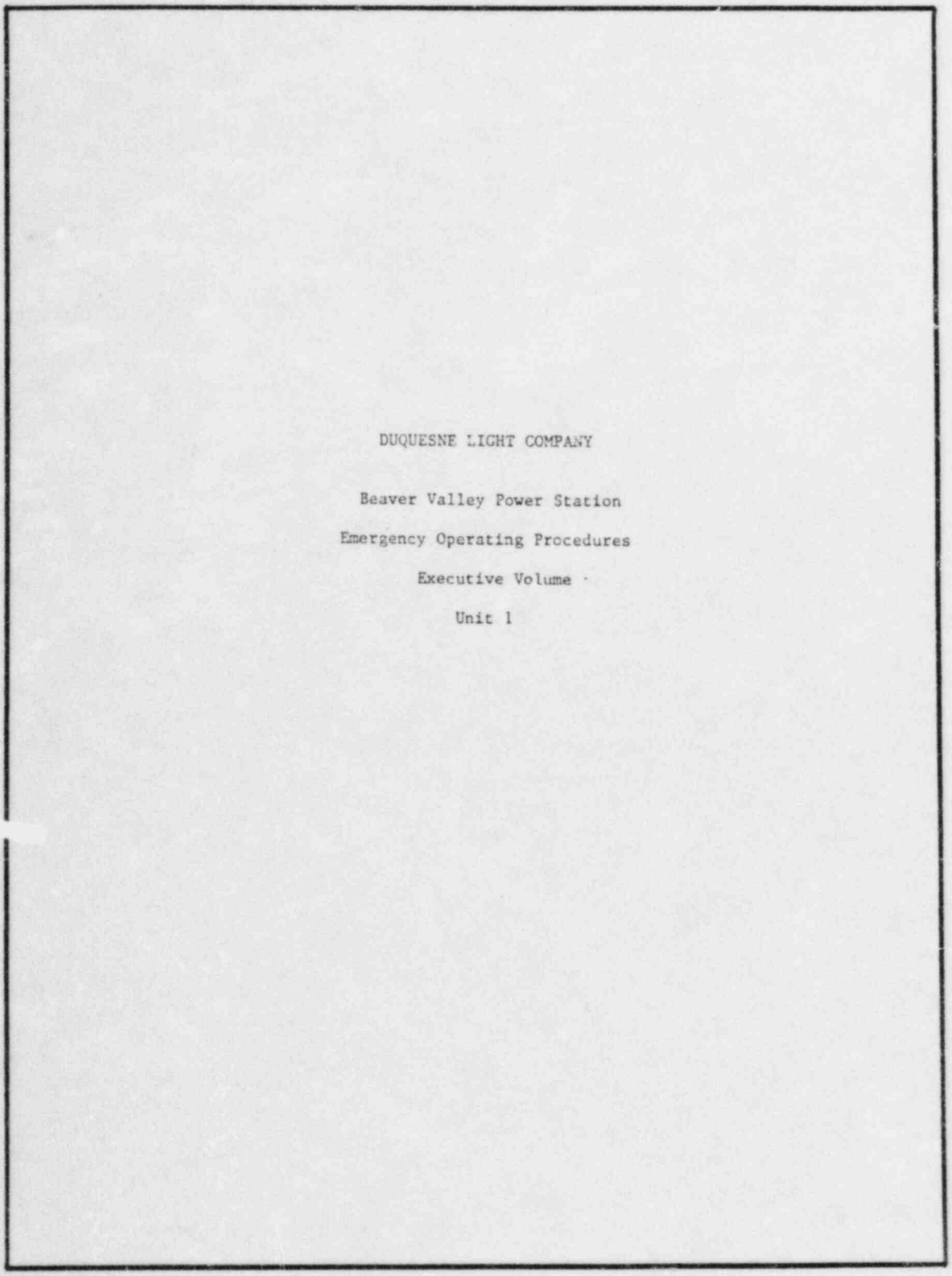


Figure - 53B-9
Title Sheet Example

Executive Volume

DUQUESNE LIGHT COMPANY
Beaver Valley Power Station

APPROVAL SHEET - NONADMINISTRATIVE

UNIT 1 - OPERATING MANUAL

CHAPTER 53.B EMERGENCY OPERATING PROCEDURES - EXECUTIVE VOLUME

SECTION 1 - GENERATION, REVISION, REVIEW AND APPROVAL OF EMERGENCY OPERATING PROCEDURES

ISSUE 1

Rev. No.	Pages Issued	OSC Review Date	Nuclear Station Operating Supervisor		Station Superintendent Approval		Effective Date
			Signature	Date	Signature	Date	

Figure - 53B-10
Revision Tracking Sheet Example

Executive Volume

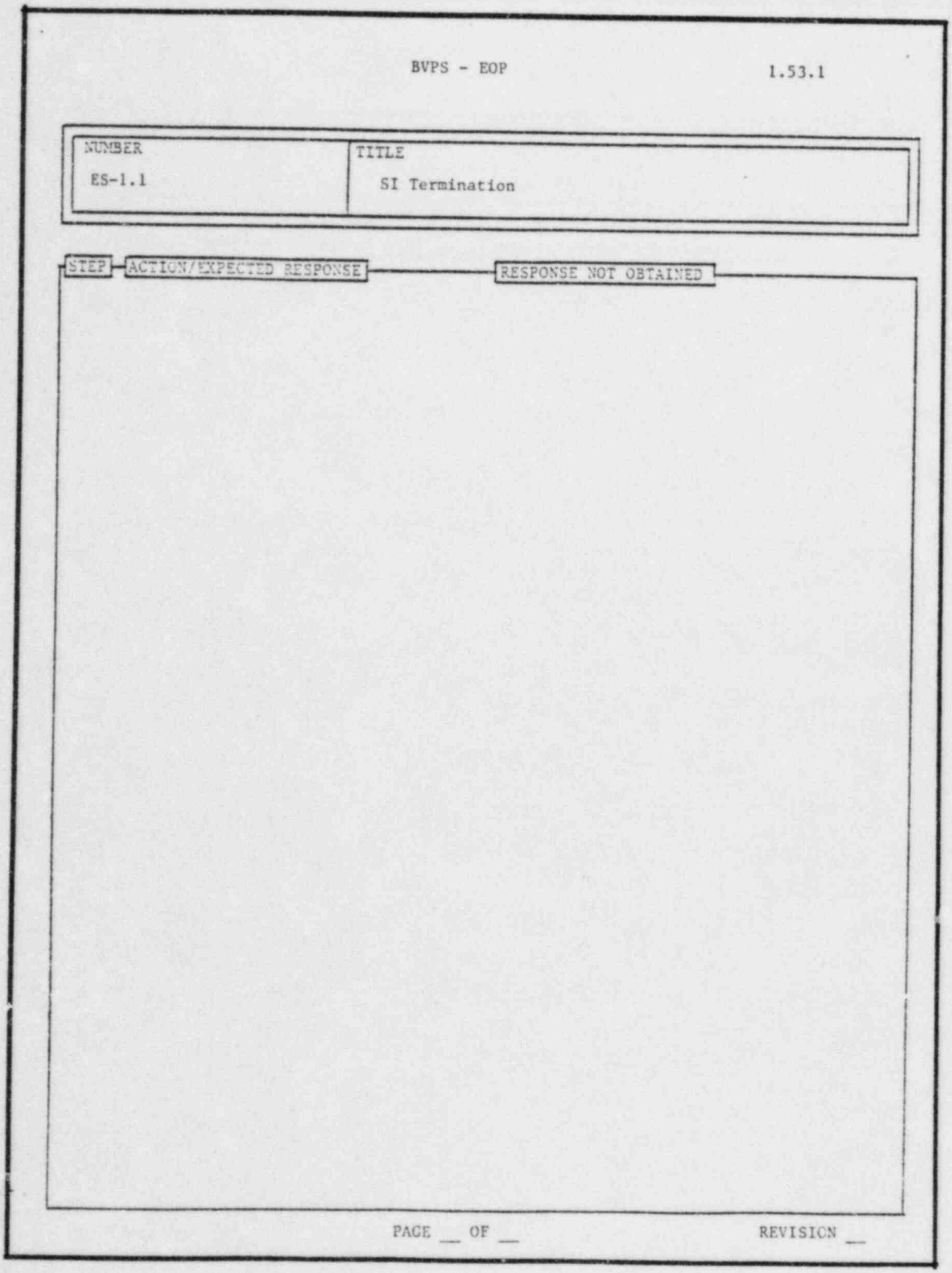
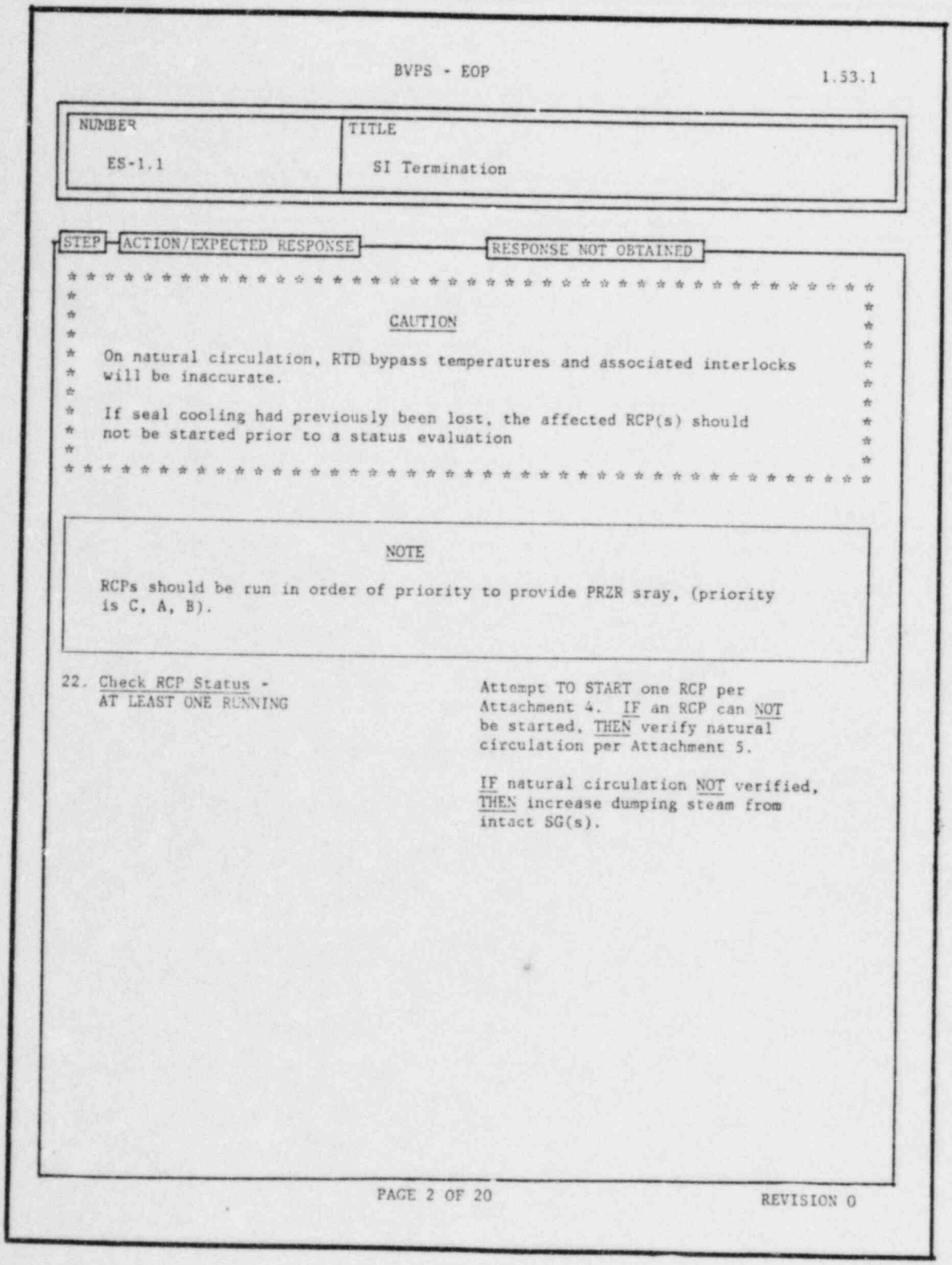


Figure - 53B-11
Procedure Page Format Example



BVPS - EOP 1.53.1

NUMBER	TITLE
ES-1.1	SI Termination

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

On natural circulation, RTD bypass temperatures and associated interlocks will be inaccurate.

If seal cooling had previously been lost, the affected RCP(s) should not be started prior to a status evaluation

NOTE

RCPs should be run in order of priority to provide PRZR sray, (priority is C, A, B).

22. Check RCP Status -
AT LEAST ONE RUNNING

Attempt TO START one RCP per Attachment 4. IF an RCP can NOT be started, THEN verify natural circulation per Attachment 5.

IF natural circulation NOT verified, THEN increase dumping steam from intact SG(s).

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Figure - 53B-12
Step Numbering and Indention Example

BVPS - EOP 1.53.1

NUMBER	TITLE
E-1	Reactor Trip Response

A. PURPOSE

This procedure provides actions to recover from a loss of reactor or secondary coolant.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from:

1. E-0, "Reactor Trip Or Safety Injection, " Step __, and FR-H.1, "Response To Loss Of Secondary Heat Sink," Step __, when a PRZR PORV is stuck open and its block valve cannot be closed.

2. E-0, "Reactor Trip Or Safety Injection," Step __, with any of the following symptoms: high containment radiation, high containment pressure, or high containment recirculation sump level.

3. E-0, "Reactor Trip Or Safety Injection," Step __, and ECA-2.1, "Uncontrolled Depressurization Of All Steam Generators," Step __ when RCS pressure is less than the shutoff head pressure of the low-head SI pumps.

4. ES-1.1, "SI Termination," Step __, if RCS pressure decreases after stopping all but one charging/SI pump.

5. ES-1.1, "SI Termination," Step __ and Step __, and FR-1.2, "Response Tc Low Pressurizer Level," Step __, if SI has to be reinitiated.

6. E-2, "Faulted Steam Generator Isolation," Step __ after identification and isolation of a faulted SG.

7. ECA-0.2, "Loss Of All AC Power Recovery With SI Required," Step __ after normal injection mode conditions are established.

8. ECA-1.2, "LOCA Outside Containment," Step __, when a LOCA outside containment is isolated.

9. FR-C.1, "Response To Inadequate Core Cooling," Step __ and Step __, and FR-C.2, "Response To Degraded Core Cooling," Step __, after core cooling has been reestablished.

10. FR-H.1, "Response To Loss Of Secondary Heat Sink," Step __, if RCS pressure is less than all non-faulted SG(s) pressure.

11. FR-H.1, "Response To Loss Of Secondary Sink," Step __, after secondary heat sink has been reestablished and all PRZR PORVs are closed.

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Figure - 53B-13
Cover Sheet Example

CONTINUOUSLY MONITORED PARAMETERS

1. SI REINITIATION CRITERIA

Manually operate SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit TCs - LESS THAN 35°F [230°F FOR ADVERSE CONTAINMENT]
- PRZR level - CANNOT BE MAITAINED GREATER THAN 5% [( )% FOR ADVERSE CONTAINMENT]

2. RED PATH SUMMARY

a. SUBCRITICALITY - Nuclear power greater than 5%

b. CORE COOLING - Core Exit TCs greater than 1200°F
-OR-
Core exit TCs greater than 700°F

AND RVLIS full range less than

(5) with no RCPs running

c. HEAT SINK - Narrow range level in all SGs less than 51% AND total feedwater flow less than 350 gpm

d. INTEGRITY - Cold leg temperature decrease greater than 100°F in last 60 minutes AND RCS cold leg temperature less than ( )°F

e. CONTAINMENT - Containment pressure greater than ( ) PSIG.

3. SECONDARY INTEGRITY CRITERIA

Go to E-2, "Faulted Steam Generator Isolation," Step 1, if any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

4. E-3 TRANSITION CRITERIA

Go to E-3, "Steam Generator Tube Rupture," Step 1, if any SG level increases in an uncontrolled manner or any SG has abnormal radiation.

5. COLD LEG RECIRCULATION SWITCHOVER CRITERION

Go to ES-1.3, "Transfer To Cold Leg Recirculation," Step 1, if RWST level decreases to less than (10).

6. AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if level decreases to less than.

7. CHARGING PUMP MINIFLOW CRITERION

- CLOSE charging pump mini-flow isolation valves any time after SI actuation, prior to RCP trip setpoint
- RE-OPEN charging pump mini-flow isolation valves any time after RCS repressurizes above 1350 PSIG, but MUST be OPEN at 2000 PSIG

Figure - 53B-14
Foldout Page Example

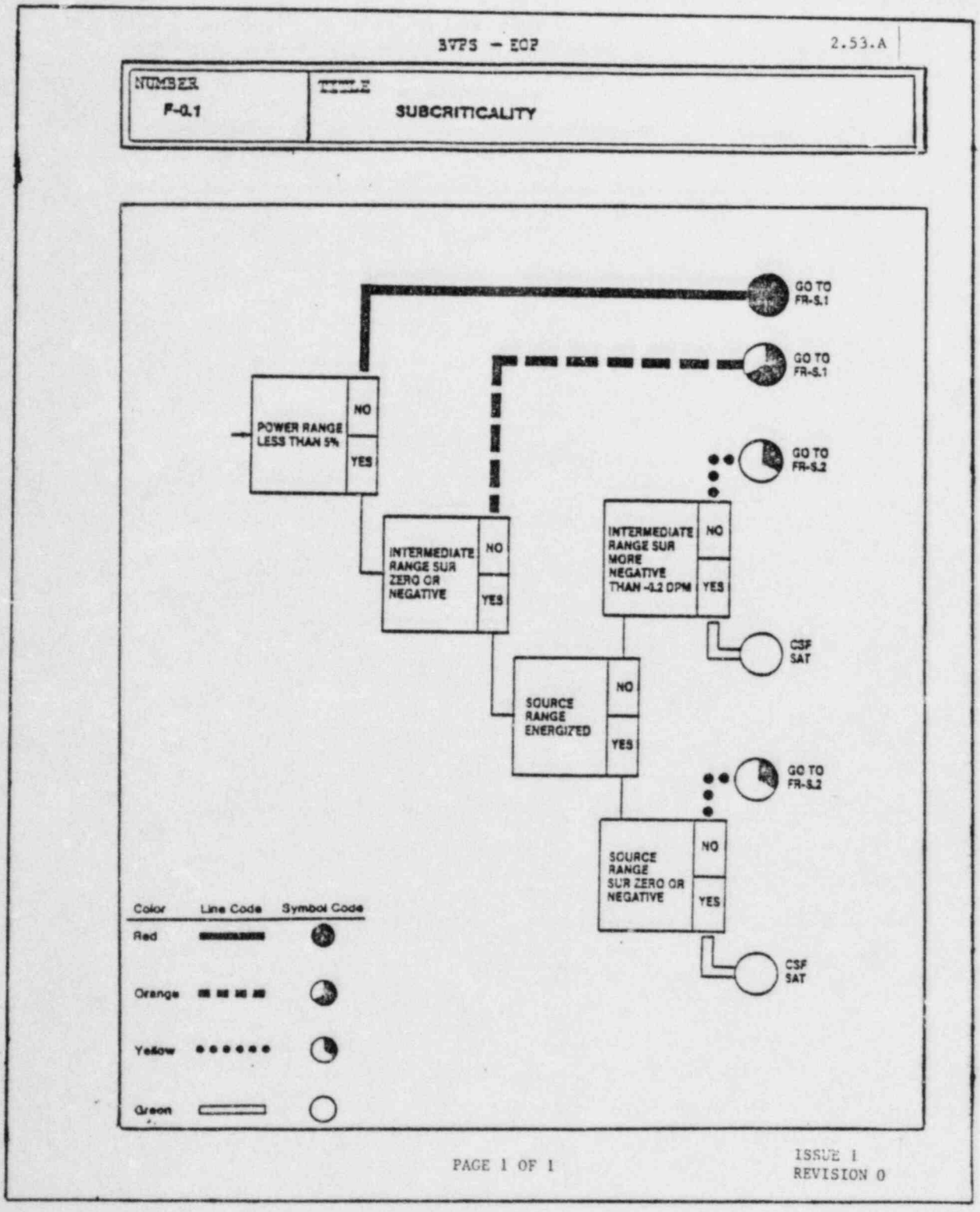

Figure - 53B-15
Critical Safety Function Status Tree Example

SECTION 4

Training Program Description

I. Program Objectives:

A. To provide training to appropriate personnel on the upgraded EOPs or subsequent major revisions prior to implementation.

B. To provide the technical bases of the upgraded EOPs including how plant systems, subsystems, components, etc., relate to the EOPs, plus their function and use during transients and accidents.

C. To provide a working knowledge of the technical content of the EOP which establishes the know-how to perform each step in all EOPs so that the EOP objectives are achieved.

D. To demonstrate the ability of individuals and crews to execute the upgraded EOPs under operational conditions as modeled on the Beaver Valley Unit 1 Simulator and achieve safe, stable or shutdown conditions.

E. To provide reasonable assurance that the methods to be used in training are adequate.

II. Scope of Training:

A. This training program will instruct plant operators on the upgraded EOPs and will consist of classroom and simulator training. This will be completed prior to initial implementation of these EOPs.

B. Training will be conducted with all operators performing their normal control room functions. Additional training will be conducted where members of a crew alternate responsibilities.

C. Classroom Instruction:

1. The philosophy behind the approach to the upgraded EOPs will be reviewed.

2. Each procedure prepared for implementation will be reviewed in a step-by-step format. Each step and its associated background document will be discussed and, where necessary, emergency contingency actions and function restoration guidelines followed.

SECTION 4
(Continued)

a. Discussion includes:

1) actions necessary for accident mitigation,

2) control of safety functions,

3) accident evaluation and diagnosis, and

4) procedure direction to achieve a safe, stable or shutdown condition. (Areas or steps not exercised by simulator operation will be addressed.)

b. The EOP under discussion and its background document are the student's main reference and study material.

3. After the classroom training has been completed, operations crews are scheduled for simulator exercises. (Areas or steps not exercised by simulator operations covered in the classroom phase will be reviewed during simulator exercises.)

D. Simulator Training:

1. Simulator sessions will be designed to enable students to demonstrate that they can carry out an EOP successfully during simulated transients and accident conditions.

a. Scenarios incorporating possible multiple simultaneous or sequential failures will be developed to exercise the specified EOP.

b. Students will use the new or revised EOPs during simulator exercises.

2. Each operator will exercise each upgraded EOP during simulator training.

3. A simulator walk-through, control room walk-through or a desk top review will be performed as part of the EOP training if the following should occur:

a. A realistic simulator scenario cannot be developed, or

b. an accurate duplication of plant response cannot be achieved.

4. Performance evaluations will be completed for each EOP evolution scenario conducted during simulator training.

SECTION 5

References

- NUREG-0899
- Westinghouse Emergency Response Guideline, Rev. 1, September 1, 1983
- EOP Implementation Guideline (INPO 82-016), June 1982
- EOP Writing Guideline (INPO 82-017), July 1982
- EOP Verification Guideline (INPO 83-004), March 1983
- EOP Validation Guideline (INPO 83-006), July 1983
- Beaver Valley, Unit 1, Control Room Design Review Program Plan submitted to the NRC on September 27, 1983
- Letter to the NRC dated March 14, 1984 (Carey tc Varga) documenting a conference call which provided clarification for identifying deviations when writing plant-specific EOPs from generic ERGs
- Letter WOG-84-164, dated December 17, 182; Supplement 1 to NUREG-0737
- NUREG-0700

SECTION 6

Tables and Figures

Table 1 - Reference Plant/BVPS Unit 1 Plant Comparison

Figure 1 - Flowpath for preparing the initial draft of EOPs

TABLE 1

Reference Plant/BVPS Unit 1 Plant Comparison

1. Reactor Trip Actuation System

No significant differences exist between the described reference system and BVPS Unit 1 system.

2. Engineered Safeguards Features Actuation System

a. Safety Injection (SI) Signal

- Safety Injection initiating signals are identical for the described reference system and BVPS Unit 1.
- Plant systems and components which are automatically actuated by an SI signal are similar for the described reference plant and BVPS Unit 1. (See description of SI, Item 8.)
- RESET/BLOCK features of the SI signal actuation logics are identical for the described reference plant and BVPS Unit 1.

b. Containment Spray Signal

- Containment spray signals are automatically initiated by the same parameters for the described reference plant and BVPS Unit 1.
- Identical to the described reference plant, High-3 (10 psig) containment pressure or manual operator initiation will automatically initiate a complete containment spray system start, and an initiation of containment isolation Phase B (CIB).
- Actuation and reset capability of the containment spray system and the containment isolation Phase B are accomplished by a common actuation reset push button (one for each train) and, therefore, are always accomplished simultaneously. This actuation/reset arrangement varies from the described reference plant in that CIB and Containment Spray System as described in the reference plant may be actuated or reset independently. This difference offers no significant problem since the reset capability does not provide a signal to change status of equipment but merely allows the operator to take manual control of the respective equipment.

c. Auxiliary Feedwater (AFW) Start Signal

- The BVPS Unit 1 AFW start signals and the described reference plant start signals are identical.
- In both the reference plant and BVPS Unit 1, automatic actions initiated by an AFW pump start signal are identical

TABLE 1 (Continued)

d. Containment Isolation Phase A (CIA)

- CIA actuation and reset logics are identical for BVPS Unit 1 and the described reference plant.

e. Containment Isolation Phase B Signal (CIB)

- See Containment Spray Signal (above).

f. Main Steamline Isolation Signal (SLI)

- SLI actuation signals and resulting automatic actions are identical for the reference plant and BVPS Unit 1.

- SLI reset is automatic upon clearing of the initiating signal.

g. Containment (CNMT) Ventilation Isolation Signal

- BVPS Unit 1 CNMT ventilation isolation signal sends isolation signals to the purge supply and exhaust damper. These dampers are closed during normal operation. This deviates from the reference containment.

- The signal actuates on High-High CNMT radiation levels.

h. Main Feedwater Isolation Signal (FWI)

- FWI actuation signals and resulting automatic isolation are identical for BVPS Unit 1 and the described reference plant.

- RESET capability at BVPS Unit 1 is limited to reset of feedwater regulating valve bypass valves. This reset may be accomplished once the initiating signal is cleared.

3. Nuclear Instrumentation System (NIS)

The described reference plant NIS is the same as that utilized by BVPS Unit 1.

4. Rod Control Instrumentation System

The described reference plant Rod Control Instrumentation System is identical to that utilized by BVPS Unit 1.

5. Radiation Instrumentation System

The described reference system is identical to the system utilized by BVPS Unit 1.

6. Containment Instrumentation System

The described reference plant system is identical to the systems employed at BVPS Unit 1.

TABLE 1 (Continued)

7. Reactor Coolant System (RCS)

The BVPS Unit 1 RCS performs the same function as the described reference plant. It does have three distinct variations in configuration, these being:

- a three-loop design instead of four
- three pressurizer PORVs instead of two
- loop isolation valves

8. Safety Injection System (SI)

The BVPS Unit 1 SI System performs identical functions as those described for the reference plant. The BVPS SI System is slightly different in configuration than the described reference plant. These differences are:

- BVPS does not have a subsystem corresponding to the reference plant High-Head SI subsystem (HHSI). SI flow at high pressure (greater than approx. 805 psi) is provided exclusively by the charging/HHSI subsystem. This system corresponds to the described reference charging/SI subsystem.

- BVPS Unit 1's Boron Injection Tank contains a minimum of 900 gallons of primary-grade makeup water, borated to between 2000 and 7700 ppm.

- The BVPS Unit 1 Low-Head SI (LHSI) subsystem does not interface with the Residual Heat Removal System. These systems are completely separate. (See description of RHR System below.)

- The BVPS Unit 1 SI-Accumulator subsystem has a minimum pressurization requirement of 605 psi.

9. Residual Heat Removal System (RHR)

The BVPS Unit 1 RHR System is constructed similarly and operates identically to the described reference system. The singular difference between the systems is that the BVPS RHR System is provided with two pumps (independent of the LHSI pumps) utilized for Reactor Coolant circulation while utilizing the RHR System. (See description of difference of the LHSI systems in Item 8.)

10. Chemical and Volume Control System (CVCS)

The described reference plant and the BVPS Unit 1 CVCS systems are essentially identical. The one exception to their similarity is the BVPS system having three centrifugal charging/HHSI pumps instead of the reference system's two centrifugal and one positive displacement pump.

11. Component Cooling Water System (CCR)

The described reference system and the BVPS Unit 1 system are essentially identical.

TABLE 1 (Continued)

12. Service Water System (RPRW)

The BVPS Unit 1 Reactor Plant River Water System functions to satisfy the reference plant's service water system.

13. Containment Spray System

The described reference system correlates to the BVPS Unit 1 Quench Spray System. The Quench Spray System and the additional Recirc Spray System utilized by BVPS Unit 1 are described in Attachment A.

14. Containment Atmospheric Control System

The Containment Atmospheric Control System described by the WOG in the reference plant and that utilized at BVPS Unit 1 perform nearly identical functions. The major apparent difference is the safety grade and major function of the fan coolers in containment.

The described reference plant has safety-grade fan coolers tasked with post-accident containment heat removal. This differs from BVPS in that the containment fan coolers are not safety grade and, although their operation is desirable under post-accident conditions, the design requirements for post-accident heat removal requirements are satisfied by the Containment Spray System (See Item 13.)

15. Main Steam System (MS)

The described reference Main Steam System and the BVPS Unit 1 Main Steam System are designed to perform the same functions. Five major physical differences exist in the configuration of the systems:

- The BVPS system has three instead of four steam generators (SGs).
- The BVPS SGs are isolated by trip and non-return valves instead of simple isolation valves.
- The BVPS MS System has an additional steam release path provided by the Residual Heat Release valve. This valve is an air operated to open, spring return to close, valve capable of relieving approx. 200 k lbm/hr (1.7% thermal power). This release corresponds to reactor decay heat and RCS pump heat 20 to 25 minutes after a full-power reactor trip.
- The design and normal operating pressure of the BVPS MS System are slightly lower than those described in the reference plant, i.e., 1085/1005, respectively, instead of 1185/1100.
- The BVPS steam supply to the turbine-driven AFW pump originates from each of the three SGs and has manual isolation capability from individual SGs. The AFW pumps cannot be remotely isolated, but swing check valves are supplied in the supply lines to minimize the probability of simultaneous SG depressurization during steamline break accidents. The steam supplies are administratively controlled to provide steam from two of three SGs at all times.

TABLE 1 (Continued)

16. Main Feedwater and Condensate System

The BVPS Unit 1 Main Feedwater and Condensate System and the described referenced system perform the same functions. One significant difference in system configuration is that the BVPS has two motor-driven feed pumps (two motors per pump) instead of one motor-driven and two turbine-driven pumps in the described reference plant.

17. Auxiliary Feedwater System (AFW)

The BVPS Unit 1 AFW system and the described reference AFW system perform identical functions. The only significant difference between the BVPS system and the reference system is that any of the three pumps is aligned to all three SGs following an AFW start.

18. Steam Generator Blowdown System

There are no significant differences between the described reference plant system and the BVPS Unit 1 system.

19. Sampling System

There are no significant differences between the described reference plant system and the BVPS Unit 1 system.

20. Spent Fuel Storage and Cooling System

There are no significant differences between the described reference system and the BVPS Unit 1 system.

21. Control Rod Drive Mechanism Cooling System

These systems have no significant differences.

22. Control Rod Drive System

No described differences exist.

23. Turbine Control System

No described differences exist.

24. Electrical Power Systems

The BVPS Unit 1 system and the described reference system are identical with the exception of the containment fan coolers being powered from an emergency power supply.

TABLE 1 (Continued)

25. Pneumatic Power System

The described reference system and the BVPS Unit 1 system perform essentially the same function. The significant difference between the systems is that the equipment inside containment is not isolated on CIA, but is supplied by air compressors located inside containment.

FLOWPATH FOR PREPARING THE INITIAL DRAFT OF EOPS

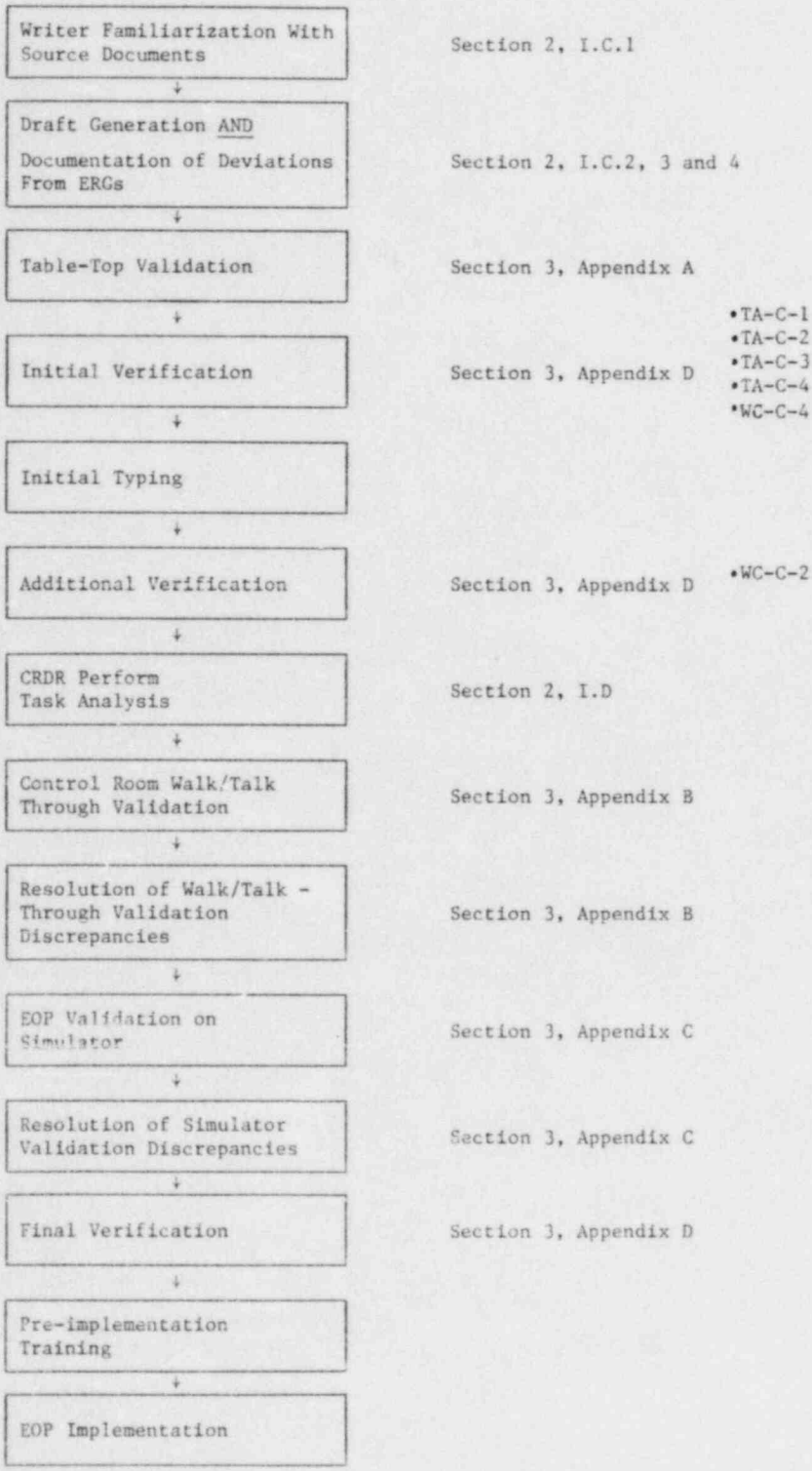

FIGURE 1

ATTACHMENT A

Excerpt from BVPS Operating Manual, Chapter 13

SUMMARY DESCRIPTION

The containment depressurization system is composed of two groups of subsystems: (1) the quench spray and (2) the recirculation spray subsystem. The quench spray subsystem, shown in Figure 13-1, is made up of two separate parallel subsystems consisting of a pump discharging to a 360 degree spray header located just beneath the top of the reactor containment. Each one being 100 percent capacity. Each of these subsystems draws water independently from the refueling water storage tank (RWST). Both quench spray pumps start automatically upon receipt of a containment isolation phase B (CIB) signal.

In addition to the cooling and depressurization functions of the spray fluid, sodium hydroxide (NaOH) solution is added to the quench spray from the chemical addition tank to improve removal of radioactive iodine from the containment atmosphere. The addition of sodium hydroxide solution from the chemical addition tank occurs automatically when the quench spray subsystems are energized by a CIB signal. Redundant trains of two rotary positive displacement pumps and a block valve are provided to meter the (NaOH) into the Quench Spray Pump suctions to assure uniform spray chemistry under all postulated operating modes of quench spray. The quench spray pH is maintained between 8.5 and 10.9 while caustic addition is occurring. Under those conditions where both trains of the chemical addition systems are available to the quench spray system, the Chemical Addition Tank may be exhausted before the Refueling Water Storage Tank and the quench spray will become a boric acid spray for the duration of quench spray operation. The sump pH will have reached a minimum of 8.5 in these cases and thus the recirculation spary pH will be at or above 8.5.

During quench spray when the containment returns to subatmospheric pressure following a Loss of Coolant Accident (LOCA), quench spray flow will be reduced to approximately 1,100 gpm per train to minimize subatmospheric peak pressure. This reduction is accomplished by the addition of an orifice in parallel with motor operated valve [MOV-QS-103A & B] on each quench spray pump discharge.

The normally open motor operated valve [MOV-QS-103A & B] permits full quench spray flow following a LOCA until the containment is again subatmospheric. Then on a Refueling Water Storage Tank level signal the valve [MOV-QS-103A& B] will close and quench spray flow will be throttled to approximately 1,100 gpm by the orifices.

Each of four recirculation spray subsystems, shown in Figure 13-1, consists of a recirculation pump, a recirculation spray cooler, and each feeds a 180 degree spray ring header located beneath the top of the reactor containment approximately 80 feet above the operating floor. The four recirculation spray pumps take their suction from the containment sump. The sump is enclosed by a protective screen assembly which prevents debris from entering the pump suction and precludes clogging of the spray ring nozzles. Two of the recirculation spray pumps and associated motors are located outside the containment and are designated as the outside recirculation spray pumps. The other two pumps and motors are located inside of containment and are designated the inside recirculation spray pumps. The outside recirculation spray pumps can also be used to provide suction for the high head safety injection pumps after a DBA, if both low head safety injection pumps fail.

In order to provide adequate NPSH for the recirculation spray (RS) pumps, cold QS water is diverted to the RS pump suctions. Approximately 150 gpm is diverted to each inside RS pump, and approximately 300 gpm is diverted to each outside RS pump. Orifices are employed to provide the necessary flow split between each set of outside and inside RS pumps.

All four recirculation spray pumps start automatically, after a time delay, on a CIB signal. The time delay in starting the inside and outside recirculation spray pumps allows the containment sump to fill. The sump is filled from the quench spray system plus water due to ruptured lines or vessels in the reactor coolant system. The quench spray and recirculation spray subsystems are QA Category I and are designed for seismic loading.

Should both LHSI pumps fail during a LOCA, the outside recirculation pumps can supply suction to the HHSI pumps to provide a means of recirculating water to the HHSI pumps or to the reactor cold legs.