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SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
EMERGENCY OPERATING PROCEDURES

REFERENCES: 1) Letter dated August 29, 1986 (NLS-86-318) from A. B. Cutter (CP&L) to Mr. Harold R. Denton (NRC)

2) Letter dated October 1, 1986 (NLS-86-379) from S. R. Zimmerman (CP&L) to Mr. Harold R. Denton (NRC)

3) NUREG-1038, Supplement 4, "Safety Evaluation Report Related to the Operation of Shearon Harris Nuclear Power Plant, Unit No. 1," October 1986

Gentlemen:

Carolina Power & Light Company submits a revised Procedures Generation Package (PGP) for the Shearon Harris Nuclear Power Plant. This satisfies our previous commitments, in the referenced documents, to provide this information to you by April 15, 1987. The PGP contains: 1) plant-specific technical guidelines, 2) writer's guide for emergency operating procedures (EOP), 3) EOP verification and validation program description, and 4) EOP training program description. Each element describes the approach taken as part of the overall EOP implementation plan for the Shearon Harris Nuclear Power Plant.

If you have any questions, please contact Mr. Gregg A. Sinders at (919) 836-8168.

Yours very truly,

S. R. Zimmerman for

S. R. Zimmerman
Manager
Nuclear Licensing Section

GAS/lah (5172GAS)

Attachment

cc: Mr. B. C. Buckley (NRC)
Dr. J. Nelson Grace (NRC-RII)
Mr. G. F. Maxwell (NRC-SHNPP)

IE35
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411 Fayetteville Street • P. O. Box 1551 • Raleigh N. C. 27602

USI

PROCEDURES GENERATION PACKAGE

SHEARON HARRIS NUCLEAR POWER PLANT

UNIT NO. 1

REVISION 1

APPROVED: J. A. Calvert DATE: 3-22-87
Signature

TITLE: MANAGER-OPERATIONS

IE35 1/1

Table of Contents

I. INTRODUCTION

A. Purpose

The Purpose of this Procedures Generation Package (PGP) is to describe the Emergency Operating Procedures (EOPs) development and revision process at the Shearon Harris Nuclear Power Plant. Shearon Harris Nuclear Power Plant is a three loop Westinghouse PWR.

B. Scope

This document was developed in response to Generic Letter 82-33 "Supplement 1 to NUREG-0737-Requirements for Emergency Response Capability," item 7.2.b., page 15.

Revision 1 to this document incorporates comments received during the Operational Readiness Inspection and comments documented in NRC Inspection Report No. 50-400/86-76.

C. Organization

The Shearon Harris Nuclear Power Plant PGP is composed of the following four elements:

1. Plant Specific Technical Guidelines
2. EOP Writers Guide
3. EOP Verification and Validation Program Description
4. EOP Training Program Description

Each element describes the approach being taken as part of the overall EOP implementation plan for the Shearon Harris Nuclear Power Plant.

II. PLANT SPECIFIC TECHNICAL GUIDELINES

A. General

Because of the similarity between SHNPP and the High Pressure (HP) reference plant used in the Westinghouse Owners Group (WOG) Emergency Response Guideline (ERG) development, SHNPP has used the WOG ERGs (HP Revision 1) to develop plant specific EOPs. The High Pressure, Revision 1 ERGs were chosen for SHNPP EOP development for the following reasons:

1. The content and organization of the Revision 1 ERGs are an improvement over the Revision 0 ERGs.

A. General (continued)

2. The content and organization of the Revision 1 ERG Background Document is an improvement over the Revision 0 ERG Background Document.

3. The Revision 1 ERGs have incorporated comments made by the NRC in the SER on the Revision 0 ERGs.

This section describes the method used to convert the WOG guidelines to plant specific EOPs.

Revisions to the SHNPP EOPs will utilize the most recent ERG revision.

B. Source Documents

In the conversion process to plant specific EOPs, the following source documents were made available to EOP writers. The latest revision of these same documents will be made available when the Plant Specific EOPs are revised:

- Writers Guide for EOPs
- WOG generic guidelines and background documents (HP Revision 1)
- SHNPP FSAR
- Plant System Descriptions
- Plant Operating Procedures
- SHNPP Technical Specifications
- SHNPP Piping and Instrument Drawings
- Miscellaneous Technical Manuals, Plant Curves, etc., as necessary
- Setpoint Study

C. Conversion Method

The goals of the SHNPP conversion process are as follows:

- The EOPs are to be technically correct
- The EOPs are to be easily understood

C. Conversion Method (continued)

To accomplish these goals, the following guidance was given to the EOP writers when the EOP project was started:

1. All values entered into the SHNPP EOPs will be documented as to source of the number (if a setpoint) or the method of calculation.

2. The two column format of the WOG guidelines will be retained for the SHNPP EOPs. In addition, the use of Path Procedures (explained in Section IID) will be used as a part of the EOP Network.

3. When a WOG guideline requests plant specific information or actions to be added to the procedure, the information is to be added to the procedure. However, if the operator actions are routine and well within the knowledge of the operator, the specific details may not be included in the procedure.

4. If the WOG guideline fails to identify or address actions that are unique to SHNPP, then steps will be included to encompass the necessary actions.

5. If a WOG step specifies an action that cannot be performed or is not applicable to SHNPP, the step will be deleted or modified.

6. Minor modifications to WOG steps are acceptable without extensive justification provided that the change does not alter the intent of the guideline.

When revisions to the SHNPP EOPs are undertaken, the EOP writers will be given the guidance, as listed above. In addition, each procedure change will be evaluated from a human factors standpoint. Procedure changes to improve human factors will not require extensive justification, provided that the change does not alter the intent of the guidelines.

D. Shearon Harris Nuclear Power Plant EOP Network

The SHNPP EOP network is based on the WOG Emergency Response Guidelines. The SHNPP EOP network contains Critical Safety Function Status Trees, Function Restoration Procedures, End Path Procedures, and PATH Procedures. A cross-reference title listing is shown in Attachment 1.

D. Shearon Harris Nuclear Power Plant EOP Network (continued)

The Path Procedures incorporate the actions of E-0, "Reactor Trip or Safety Injection", E-1, "Loss of Reactor or Secondary Coolant", and E-3, "Steam Generator Tube Rupture" guidelines into two logic tree Path Procedures.

The Path Procedure (flowpath) concept was chosen for the following reasons:

1. Path Procedures (flowpaths) make the actions of applicable procedures visible to the operator without having to turn pages.

2. Path Procedures (flowpaths) provide the operator with visible guidance which will assist the operator in stabilizing the plant and bringing the plant to a safe stable condition quickly and consistently.

3. Path Procedures (flowpaths) relieve the operator of the burden of memorization of immediate actions because they are incorporated into the Path Procedures. The Path Procedures will be maintained in an area readily accessible to the control room operator.

4. The flowpath concept has been adopted by Carolina Power & Light (CP&L) for use at its three (3) nuclear plant sites.

Additional information on the Path Procedure format and content is contained in the SHNPP Writers Guide (Attachment 2).

E. Conversion Method Documentation

To document and track the conversion process, an ERG/EOP Transition Document was created. The ERG/EOP Transition Document consists of the following parts:

1. List of differences between the ERG High Pressure reference plant and Shearon Harris Nuclear Power Plant

2. Step deviation document

3. Derivations for the instrument values used in the SHNPP EOPs (Setpoint Study)

4. WOG/SHNPP "Plant Specific" STEP MATRIX

E. Conversion Method Documentation (continued)

The step deviation Document in part two of the ERG/EOP Transition Document is used to explain any variance between a SHNPP step and a WOG step.

F. ERG/EOP Transition Document

The following provides additional details on the contents of the ERG/EOP Transition Document. These documents will be revised, as necessary due to EOP Revisions.

1. SHNPP/HP Reference Plant

A detailed comparison was made between the generic HP Reference Plant and SHNPP. The results of this comparison revealed the following two major differences:

SHNPP is a 3 loop plant versus a 4 loop plant for the HP Reference Plant.

SHNPP does not have the High-Head SI Subsystem and the HP Reference Plant does have the High-Head SI Subsystem.

These two differences between SHNPP and the HP Reference Plant do not constitute safety significant changes.

2. Step Deviation Document

To document the conversion process from the WOG ERGs to the SHNPP EOPs, a step deviation document was developed. The step deviation document consists of the following two (2) sections:

ERG/EOP step comparison

ERG/EOP step instrumentation and control requirements comparison

For each SHNPP EOP step, a step deviation form was prepared. This step deviation form explained any variance between the SHNPP EOP step and the WOG ERG step. In the same manner any variance between the SHNPP EOP step instrumentation and control requirements and the WOG ERG step instrumentation and control requirements was also explained

F. ERG/EOP Transition Document (continued)

The step deviation forms document that the variances that do exist between SHNPP EOP steps and the WOG ERG steps do not constitute safety significant changes.

3. Derivation of Instrument Values

For each instrument value used in the SHNPP EOPs, a derivation (including instrument uncertainties) has been developed and documented (Setpoint Study).

4. WOG/SHNPP "Plant Specific" STEP MATRIX

For each WOG step that recommends the addition of "Plant Specific" information, a Matrix showing the SHNPP step has been developed.

III. EMERGENCY OPERATING PROCEDURES WRITERS GUIDE

A. General

The Writers Guide (OMM-006) is a plant specific document that provides instructions on writing EOPs using sound writing principles. In addition to establishing sound writing principles, the Guide helps to promote consistency among the EOPs and their revisions, independent of the number of EOP writers.

The Writers Guide will be revised, as necessary, based on feedback from operator training and plant experience.

B. Document Description

The SHNPP Writer's Guide is provided as Attachment 2.

IV. SHNPP EOP VERIFICATION AND VALIDATION PROGRAM

A. General

The SHNPP EOP Verification & Validation Program is a plant-specific document that is used to perform V&V on any changes to the SHNPP EOP network.

B. Document Description

The purpose of the SHNPP EOP Verification & Validation Program is to ensure the SHNPP EOPs meet the following objectives:

- That the EOPs are technically correct (i.e. they accurately reflect the WOG Emergency Response Guidelines).

A. General (continued)

- That EOPs are written correctly (i.e. they accurately reflect the SHNPP EOP Writers Guide).
- That EOPs are usable (i.e. they can be understood and followed without confusion, delays, and errors).
- That there is a correspondence between the procedures and the control room/plant hardware (i.e. control equipment/indications that are referenced are available both inside and outside of the control room, use the same designation, use the same units of measurement, and operate as specified in the procedures).
- That the language and level of information presented in the EOPs are compatible with the minimum number, qualifications, training, and experience of the operating staff.
- That there is a high level of assurance that the procedures will work (i.e. the procedures correctly guide the operator in mitigating transients and accidents).

The SHNPP EOP Verification & Validation Program is included as Attachment 3.

V. EOP TRAINING PROGRAM

A. General

The objectives of the Shearon Harris Nuclear Power Plant EOP training is as follows:

1. To enable the Operators and STAs to understand the structure of the EOPs
2. To familiarize the Operators and STAs with the technical bases of the EOPs
3. To enable the Operators and STAs to use the EOPs under operational conditions

This section will describe the training conducted prior to implementation of the SHNPP EOPs, the training to be accomplished for replacement operators and training due to revisions for licensed personnel. These programs are governed by approved plant Training Instructions.

B. Pre-Implementation Training Program

To accomplish the above objectives and to maximize the effectiveness of the EOP procedures, the EOP procedure training was integrated with the SHNPP Cold License Training Program. The Cold License Operator Training Program, TI-202A, consists of the following seven (7) major phases:

1. Phase I — Theory Training
2. Phase II — System Training
3. Phase III — Systems O. J. T.
4. Phase IV — Simulator Preparatory Training
5. Phase V — Simulator Training
6. Phase VI — General Physics Review and Audit
7. Phase VII — Preparatory License Review Training

The EOP procedure training took place in Phase IV and V. Phase IV is classroom training and Phase V is simulator training. The Phase IV (Simulator Preparatory Training) training is divided into two (2) parts - Phase IVA and IVB. Phase IVA is pre-simulator and procedure training. Phase IVB is Mitigating Core Damage and Transient and Accident Analysis training.

In Phase IVA, the Operators and STAs received training on all available plant procedures including the EOPs. In Phase IVB, the Operators and STAs obtained additional training on the basis for emergency action taken to recover the plant during transient and accident situations.

The Phase V training consisted of nine (9) weeks of training on the simulator, as a member of a shift. The simulator sessions used scenarios to provide the Operators and STAs with symptoms of events which allowed them to become familiar with the use of the EOP network. Each candidate was trained and evaluated in his assigned role. This training was completed prior to initial fuel load and implementation of the EOP network.

C. Licensed Operator Replacement Training

Reactor Operator Replacement Training is accomplished in accordance with TI-201, "Reactor Operators Replacement Training Program". TI-202 describes training for Senior Reactor Operators.

C. Licensed Operator Replacement Training (continued)

TI-201 currently provides approximately ten weeks of classroom lectures to review major systems and cover plant procedures, including the EOPs. This is followed by approximately 9 weeks of Simulator and Transient & Accident Analysis Training as a member of a shift. During the Simulator Training phase, the EOPs are exercised by the RO candidate as RO. This includes major accidents including multiple and sequential failure scenarios. Any portion of the EOP network that cannot be exercised on the SHNPP Simulator, is discussed as part of the simulator exercise or in the "Simulator Differences" lesson.

TI-202, "Senior Reactor Operator Replacement Training Program" currently provides approximately three weeks of classroom lectures to review procedures including the EOPs and their bases. This is followed by approximately four weeks of Simulator Training as a member of a shift. During the Simulator Training phase, the EOPs are exercised by the SRO candidate as SRO. This includes major accidents including multiple and sequential failures. Any portion of the EOP network that cannot be exercised on the SHNPP Simulator is discussed as part of the simulator exercise or in the "Simulator Differences" lesson.

All license candidates (RO and SRO) are individually evaluated throughout the training sequence. This consists of periodic written, oral, and simulator evaluations. Prior to the NRC exam, each candidate receives an NRC-type exam administered by CP&L. This exam is designed to determine the candidates ability to operate the Plant under normal, abnormal, and emergency conditions, which includes the proper use of the EOPs.

TI-201 and TI-202 may be revised as necessary to ensure that the training programs continue to provide competent replacement operators. This may result in a change in the amount of time devoted to the EOPs. However, these changes will be based on feedback from previous classes and industry "good practices" resulting in improved training on EOPs and other required subjects.

D. Training Due to EOP Revisions

When a change or revision to the EOPs is initiated, the Operations Engineer will notify the Harris Training Unit Manager.

D. Training Due to EOP Revisions (continued)

The Harris Training Unit Manager will determine the type of training needed to smoothly implement the EOP change or revision. For minor changes, a pre-shift briefing may be adequate when the change is implemented.

Major revisions which would require extensive training will be coordinated between the Operations Unit and the Training Unit. Whenever possible, major revisions will be implemented during plant outages so that the licensed operating staff can complete the training prior to implementation of the revision. If the revision must be implemented prior to a scheduled outage, the training will be accomplished, for each shift, during that shift's next training week.

Any change or revision to the EOPs that require formal training, will include an evaluation of each licensed individual, once the training is completed.

VI. ATTACHMENTS

1. EOP TITLE CROSS REFERENCE
2. SHNPP EOP WRITERS GUIDE
3. SHNPP EOP V&V PROGRAM

ATTACHMENT 1: EOP TITLE CROSS REFERENCE

CP&L	WOG GUIDELINES	TITLE
EPP-1	ECA-0.0	Loss of AC Power to 1A-SA and 1B-SB Busses
EPP-2	ECA-0.1	Loss of All AC Power Recovery without SI Required
EPP-3	ECA-0.2	Loss of All AC Power Recovery with SI Required
EPP-4	ES-0.1	Reactor Trip Response
EPP-5	ES-0.2	Natural Circulation Cooldown
EPP-6	ES-0.3	Natural Circulation Cooldown with Steam Void in Vessel (With RVLIS)
EPP-7	ES-0.4	Natural Circulation Cooldown with Steam Void in Vessel (Without RVLIS)
EPP-8	ES-1.1	SI Termination
EPP-9	ES-1.2	Post-LOCA Cooldown and Depressurization
EPP-10	ES-1.3	Transfer to Cold Leg Recirculation
EPP-11	ES-1.4	Transfer to Hot Leg Recirculation
EPP-12	ECA-1.1	Loss of Emergency Coolant Recirculation
EPP-13	ECA-1.2	LOCA Outside Containment
EPP-14	E-2	Faulted Steam Generator Isolation
EPP-15	ECA-2.1	Uncontrolled Depressurization of All Steam Generators
EPP-16	N/A	Deleted
EPP-17	ES-3.1	Post-SGTR Cooldown Using Backfill
EPP-18	ES-3.2	Post-SGTR Cooldown Using Blowdown
EPP-19	ES-3.3	Post-SGTR Cooldown Using Steam Dump
EPP-20	ECA-3.1	SGTR With Loss of Reactor Coolant: Subcooled Recovery
EPP-21	ECA-3.2	SGTR With Loss of Reactor Coolant: Saturated Recovery
EPP-22	ECA-3.3	SGTR Without Pressurizer Pressure Control
FRP-S.1	FR-S.1	Response to Nuclear Power Generation/ATWS
FRP-S.2	FR-S.2	Response to Loss of Core Shutdown
FRP-C.1	FR-C.1	Response to Inadequate Core Cooling
FRP-C.2	FR-C.2	Response to Degraded Core Cooling
FRP-C.3	FR-C.3	Response to Saturated Core Cooling
FRP-H.1	FR-H.1	Response to Loss of Secondary Heat Sink
FRP-H.2	FR-H.2	Response to Steam Generator Overpressure
FRP-H.3	FR-H.3	Response to Steam Generator High Level
FRP-H.4	FR-H.4	Response to Loss of Normal Steam Release Capability
FRP-H.5	FR-H.5	Response to Steam Generator Low Level
FRP-P.1	FR-P.1	Response to Imminent Pressurized Thermal Shock Conditions
FRP-P.2	FR-P.2	Response to Anticipated Pressurized Thermal Shock Conditions
FRP-J.1	FR-Z.1	Response to High Containment Pressure
FRP-J.2	FR-Z.2	Response to Containment Flooding
FRP-J.3	FR-Z.3	Response to High Containment Radiation Level
FRP-I.1	FR-I.1	Response to High Pressurizer Level
FRP-I.2	FR-I.2	Response to Low Pressurizer Level
FRP-I.3	FR-I.3	Response to Voids in Reactor Vessel
PATH-1	E-0 & E-1	Reactor Trip or Safety Injection/Loss of Reactor or Secondary Coolant
PATH-2	E-3	Steam Generator Tube Rupture

NOTE: This cross reference list may change depending on future WOG ERG revisions and plant specific needs.

OS1

ATTACHMENT 2

OMM-006

EMERGENCY OPERATING PROCEDURES

WRITERS GUIDE

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

PLANT OPERATING MANUAL

VOLUME 3

PART 1

PROCEDURE TYPE: OPERATIONS MANAGEMENT MANUAL

NUMBER: OMM-006

TITLE: EMERGENCY OPERATING PROCEDURE WRITER'S GUIDE

REVISION 3

APPROVED: _____ NOV 07 1986
Signature

10-30-86
Date

TITLE: MANAGER-OPERATIONS

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1.0 PURPOSE

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

2.0 REFERENCES

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

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

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

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

Westinghouse Owners Group Emergency Response Guidelines, High Pressure Version

AP-005 Procedures Format and Preparation

AP-600 Plant Change Request

3.0 RESPONSIBILITIES

The Manager - Operations is responsible for ensuring that Emergency Operating Procedures are written in accordance with the instructions in this procedure.

4.0 DEFINITIONS/ABBREVIATIONS

4.1 CRITICAL SAFETY FUNCTION STATUS TREES

The Critical Safety Function Status Trees (CSFSTs) are a set of six flow paths (one path for each critical safety function) mounted on a single board and kept in the control room. The Critical Safety Function Status Trees allow a control room operator or shift technical advisor (STA) to systematically and explicitly determine the safety status of the plant during a casualty, and to direct the operator to the appropriate Function Restoration Procedure (FRP) if necessary.

4.2 EMERGENCY RESPONSE GUIDELINES

The Emergency Response Guidelines (ERGs) are a generic guide for writing plant-specific EOPs. They were prepared by the Westinghouse Owner's Group (WOG) for use by individual plants to write emergency procedures that allow the operator to mitigate the consequences of an emergency without first having to diagnose the event causing the emergency.

4.3 EMERGENCY RESPONSE GUIDELINES BACKGROUND DOCUMENT

The Emergency Response Guideline Background Document provides information on the analysis and reasoning used to create the ERGs. The Westinghouse Owner's Group prepared the Background Document for documenting ERG development and for use as a learning tool by the individual plants.

4.4 END PATH PROCEDURES

The End Path Procedures (EPPs) are a set of event specific recovery procedures developed from the Event Specific Guidelines and the Emergency Contingency Action Guidelines contained in the ERGs. The EPPs are kept in the control room and used by the operator to provide the optimum recovery actions. They are entered based on plant conditions, either directly, from the Flow Paths, Foldouts, or Function Restoration Procedures.

4.5 FOLDOUTS

The Foldouts are a set of time independent procedures for use by the control room operator while in an EOP. The EOP states which Foldouts apply to that EOP. Any applicable Foldouts are copied on the reverse side of all text pages of the appropriate EPP. Foldouts used by the Flow Paths are included on the Flow Path boards.

4.6 FUNCTION RESTORATION PROCEDURES

The Function Restoration Procedures are a set of recovery procedures kept in the control room and used by the operator to respond to challenges to the plant critical safety functions. The FRPs are written to restore the critical safety functions independent of the event scenario. The FRPs are entered via the Critical Safety Function Status Trees, Flow Paths, or End Path Procedures.

4.7 FLOW PATHS

The Flow Paths (PATH-1 and PATH-2) are a set of board mounted procedures kept in the control room which the operator uses following a reactor trip or safety injection. PATH-1 deals with a Reactor Trip or Safety Injection (ERG E-0) and Loss of Reactor or Secondary Coolant (ERG E-1). PATH-2 deals with a Steam Generator Tube Rupture (ERG E-3). The Flow Paths are designed to provide the operator with a smooth transition into the appropriate EPP or FRP using a systematic diagnosis of symptoms.

4.8 PATH GUIDES

The Path Guides are the written basis for PATH-1 and PATH-2 and are used by the control room operators to support the Flow Paths if necessary. The Path Guides are attachments to the User's Guide, which is kept in the control room.

5.0 PROCEDURE ORGANIZATION AND FORMAT OF EOP NETWORK

5.1 GENERAL STRUCTURE OF EOP NETWORK

5.1.1 Basis for the EOP Network

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

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

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

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

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

   a. E-0, "Reactor Trip or Safety Injection"

   b. ECA-0.0, "Loss of All AC Power"

   c. FR-S.1, "Response to Nuclear Power Generation/ATWS"

5.1 GENERAL STRUCTURE OF EOP NETWORK (cont.)

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

5.1.2 Use Of Path Guides

The Path Guides are the two-column format type procedures that are equivalent to PATH-1 and PATH-2. They are provided both as a training tool, and as a supplement to the Flow Paths. Due to size limitation, some detail is sacrificed on what indications are used to verify a given step complete on the Paths. This additional detail is provided in the Path Guides.

5.1.3 Use Of Foldouts

The EOP network uses Foldouts as unique procedures applicable to only the EOP network. Each Foldout contains operator actions that are time independent (i.e. the operator action should be performed whenever the given conditions are satisfied). When a Foldout applies to an EOP, the applicable Foldout will be identified at the beginning of the EOP.

The applicable Foldouts will be copied on the reverse side of all text pages of the appropriate EPPs. Foldouts used on the Flow Paths will be located in the lower right hand corner.

5.2 PROCEDURE ORGANIZATION AND FORMAT OF FLOW PATHS

5.2.1 Designation and Numbering

Each Flow Path shall be uniquely identified (see Attachment 6.2). This identification permits easy administration of the process of procedure preparation, review, revision, distribution and operator use. There shall be site identification but no unit identification for the Flow Path. Each Flow Path will be labeled with its associated Flow Path number blocked in the upper left area (see Attachment 6.2).

5.2 PROCEDURE ORGANIZATION AND FORMAT OF FLOW PATHS (cont.)

5.2.2 Revision and Authorization

Each Flow Path shall include the current revision number, approval date and authorized signature. This information shall be located at the upper right of each Flow Path (see Attachment 6.2).

5.2.3 Format

The Flow Paths will utilize logic symbols arranged in a "decision tree" format as shown in Attachment 6.2. The symbols should be arranged left-to-right, top-to-bottom in order to correspond to natural reading movement. Unnatural movement should be minimized, but may be used if necessary to avoid crossing of lines or provide efficient utilization of space. Directional arrows will be used to aid the operator. All symbols will be entered from the top. The average vertical separation between symbols will be approximately 3/8 inches. The average horizontal separation between symbols will be approximately 1/2 inches, with an absolute minimum of 3/16 inches.

5.2.4 Decision Symbol

The decision symbol is a diamond shape of approximately 1 1/2 x 13/16 inches. The decision symbol will contain a question which the operator is to answer YES or NO. Normally, a YES answer will exit the decision symbol from the bottom and a NO answer from the right side. There may be cases where the normal YES and NO exits cannot be used due to board space limitations or to avoid flow lines crossing. The words "YES" and "NO" will be displayed next to its corresponding exit from the decision symbol. Questions used in decision symbols shall pertain to a plant parameter, setpoint, switch position, or system condition. Attachment 6.3 gives an example of the symbol.

5.2.5 Action Symbol

The action symbol is an elongated oval shape of approximately 1 1/2 x 1/2 inches. The action symbol will contain a specific action or verification to be performed by the operator. Attachment 6.3 gives an example of the symbol.

5.2.6 Caution Symbol

The caution symbol is an enlongated hexagonal shape of approximately 1 1/2 x 13/16 inches. The caution symbol will contain critical information to assist the operator in diagnosing plant conditions. It will be placed immediately before the step to which it applies. Attachment 6.3 gives an example of the symbol.

5.2 PROCEDURE ORGANIZATION AND FORMAT OF FLOW PATHS (cont.)

5.2.7 Note Symbol

The note symbol is a rectangular shape of approximately 1 1/2 x 1/2 inches. The note symbol will contain information less critical than cautions, but still needed to assist the operator in performing Flow Path steps. It will be placed immediately before the step to which it applies. Attachment 6.3 gives an example of the symbol.

5.2.8 Arrow Symbols

Arrows will be used to direct the operator between Flow Paths, EPPs, FRPs, and Foldouts. Large shaded arrows denote Flow Path entry points, while large unshaded arrows denote Flow Path to Flow Path exit points. The small unshaded arrows denote Flow Path exit points to the EPPs and FRPs.

Exit arrows will contain the destination procedure number (e.g. EPP-5, FRP-H.1, PATH-1). In addition, the Flow Path to Flow Path exit arrows will contain a letter identifier. Destination procedure titles are not given on the Flow Paths due to space limitations. Entry arrows will contain only a letter identifier. Attachment 6.3 gives examples and size limitations of the Flow Path arrows.

Entry point arrows will be located based on minimizing clutter on the Flow Paths.

5.2.9 Connecting Lines

Line width used on the Flow Paths will be approximately 1/32 inches. The operator should follow this line always entering the symbols at the top and exiting the symbols at the side or bottom.

No line shall cross or intersect on the Flow Paths; however, two or more lines may enter the same symbol.

Normal spacing between parallel lines with different destinations will be a minimum of 1/4 inches. Parallel lines that go to the same destination will be grouped closer together in order to prevent confusion with lines going to different destinations. These lines will have a minimum of 1/16 inches separation.

5.2.10 Directional Arrows

Directional arrows will be used on connecting lines to prevent operator confusion when following long connecting lines which may be parallel to other connecting lines. Directional arrows on grouped lines will be ganged. Attachment 6.3 gives examples of connecting lines, directional arrows and ganging of directional arrows.

5.2 PROCEDURE ORGANIZATION AND FORMAT OF FLOW PATHS (cont.)

5.2.11 Entry Conditions

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

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

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

Once the entry condition is met, the operator will enter the PATH-1 entry point in the upper left hand corner.

5.2.12 Preparation, Mounting, and Location of Flow Paths

Flow Path boards will be kept in an easily identified and accessed location in the control room.

The Flow Paths will be mounted front and back on a single board.

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

The Flow Paths will be mounted on styrofoam or other lightweight boards (approximately 2 x 3 feet). Each board will be laminated or covered with a lightweight, glare-resistant plastic material. Consideration will be given to readability under normal and emergency lighting conditions.

5.2 PROCEDURE ORGANIZATION AND FORMAT OF FLOW PATHS (cont.)

5.2.13 Revisions to Flow Path

Flow Path revisions require the same administrative controls as all other EOPs. Revision lines will not be drawn on the Flow Paths to prevent confusion with connecting lines. When a Flow Path is revised, its corresponding Path Guide will be revised and the revisions noted in the Guide.

5.2.14 Character Type Size and Line Spacing

The type size on the Flow Paths may vary depending on space available for printing a given item. However, the pitch should not be greater than 18 characters per inch. All capital letters will be used except for plurals of abbreviations (e.g. MSIVs, RCPs).

Spacing between lines of type inside the Flow Path symbols will be no less than single spacing and no more than double spacing. Increases will be limited by available space within the symbols. Text spacing will be consistant within all symbols.

5.2.15 Use of Color

Black symbols and characters on a white background will be used for the Flow Paths. No other coloring will be used.

5.3 PROCEDURE ORGANIZATION AND FORMAT OF END PATH AND FUNCTION RESTORATION PROCEDURES

5.3.1 Cover Page

Every End Path Procedure (EPP) and Function Restoration Procedure (FRP) shall have a cover page (see Attachment 6.1). The primary purposes of this cover page are (1) to identify the procedure and (2) to identify the authorized revision. The cover page will contain the following minimum information:

1. The full name of the plant.
2. The procedure type followed by the abbreviation in parenthesis.
3. The procedure number.
4. The procedure title.
5. The latest revision number which applies to any part of the procedure.
6. The signature and title of the person approving the latest revision.
7. The date on which the latest revision of the procedure was approved.

5.3.2 List of Effective Pages

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

Example:

LIST OF EFFECTIVE PAGES

Page	Revision
1 through 9	2
10 through 16	4

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

5.3 PROCEDURE ORGANIZATION AND FORMAT OF END PATH AND FUNCTION RESTORATION PROCEDURES (cont.)

5.3.3 Procedure Body

The body of each End Path Procedure and Function Restoration Procedure will be structured to include the following sections:

1. Purpose/Entry Conditions
2. Operator Actions

5.3.4 Procedure Identification

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

1. Procedure Title

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

   b. The procedure's title will be repeated at the top of each successive page after page 2. No other carry-over information will be supplied.

2. Procedure Numbers

   Each procedure will be assigned a unique and permanent number within its associated book or volume of the Plant Operating Manual. Whenever a procedure is deleted, the associated procedure number will not normally be reassigned for the ensuing 2-year period. If reassignment is made within this period, consideration should be given to user retraining to avoid confusion or error.

5.3 PROCEDURE ORGANIZATION AND FORMAT OF END PATH AND FUNCTION RESTORATION PROCEDURES (cont.)

3. Procedure Type

The procedure type will be the title or abbreviations of the book or volume to which the procedure is assigned as determined by the Plant Operating Manual Master Index.

5.3.5 Page Identification and Numbering

Each page of each procedure will bear the procedure designation and current revision number on the bottom left hand side (except for the cover page), and page number on the bottom right hand side. The top left hand side of each page will bear the disk reference number. This will be done in accordance with AP-005.

1. Procedure Designation

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

EOP-XXX-NNN

XXX: Procedure Type Abbreviation:

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

NNN: Procedure Number:

- o 005
- o H.3

Examples:

a. EOP-EPP-005 - The fifth in a series of EOP End Path Procedures.

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

5.3 PROCEDURE ORGANIZATION AND FORMAT OF END PATH AND FUNCTION RESTORATION PROCEDURES (cont.)

2. Revision Number

This information will be supplied in the format:

Rev. YY

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

3. Page Number

The page number will appear in the format:

Page ___ of ZZ

Where "ZZ" is the total number of pages. The last page of instructions will have the word "- END -" following the last instructional step, and "FINAL PAGE" just above the page number. If pages are added to a procedure, a complete renumbering of all pages will be accomplished.

5.3.6 Identification of Revised Material

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

Marking of revisions will not normally apply to:

- Page identification data
- Cover page data
- List of Effective Pages
- Deleted pages
- Data shifted without modification of contents or sequence, as in data shifted to allow for insertion of a paragraph can result in revised pages with no vertical marking.
- Correction of typographical or semantical errors

5.4 PROCEDURE ORGANIZATION AND FORMAT OF PATH GUIDES

5.4.1 Cover Page

Each Path Guide shall have a cover page (see Attachment 6.1). The primary purpose of the cover page is to identify the procedure. The cover page will contain the following minimum information:

1. The full name of the plant.
2. The Guide type followed by the abbreviation in parenthesis.
3. The Guide number.
4. The Guide title.

5.4.2 Guide Body

The body of each Path Guide will be structured to include the following sections:

1. Purpose/Entry Conditions
2. Operator Actions

5.4.3 Guide Identification

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

The Path Guides are attachments to the EOP User's Guide and their usage is discussed in the User's Guide. The User's Guide is identified using the normal administrative requirements for Plant Operating Manual procedures.

5.4 PROCEDURE ORGANIZATION AND FORMAT OF PATH GUIDES (cont.)

5.4.4 Page Identification and Numbering

Each page of each Path Guide will bear the procedure designation and current revision number on the bottom left hand side, and page number on the bottom right hand side. The top left hand side of each page will bear the disk reference number. The top center of each page will have the Path Guide title. The attachment page number will be in the top right hand corner. This will be done in accordance with AP-005.

1. Procedure Designation

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

   EOP- USER'S GUIDE

2. Revision Number

   This information will be supplied in the format:

   Rev. YY

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

3. Page Number

   The page number will appear in the format:

   Page ____ of ZZ

   Where "ZZ" is the total number of pages of the procedure or attachment as appropriate. The last page of the Guide instructions will have the word "- END -" following the last instructional step. If pages are added to a procedure, a complete renumbering of all pages will be accomplished.

4. Path Guide Title

   PATH-X GUIDE

   Where "X" is the Flow Path number to which the Guide applies.

5.4 PROCEDURE ORGANIZATION AND FORMAT OF PATH GUIDES (cont.)

5.4.5 Identification of Revised Material

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

Marking of revisions will not normally apply to:

- Page identification data
- Cover page data
- List of Effective Pages
- Deleted pages
- Data shifted without modification of contents or sequence, as in data shifted to allow for insertion of a paragraph can result in revised pages with no vertical marking.
- Correction of typographical or semantical errors

5.5 PROCEDURE ORGANIZATION AND FORMAT OF THE CRITICAL SAFETY FUNCTION STATUS TREE PROCEDURES

5.5.1 Designation

The Critical Safety Function Status Tree (CSFST) procedure shall be uniquely identified. This identification permits easy administration of the process of procedure preparation, review, revision, distribution and operator use. There shall be site identification but no unit identification for the CSFST procedure.

5.5.2 Revision and Authorization

The CSFST Procedure shall include the current revision number, approval date and authorized signature. This information shall be located at the upper right of the procedure.

5.5.3 Format

The CSFST procedure will use a decision tree format designed to aid the operator in systematically determining the status of the plant's Critical Safety Functions and direct the operator to any Function Restoration Procedure needing to be implemented.

5.5.4 Connecting Lines

There shall be one basic line width used to guide the operator through the CSFST procedure.

All lines are equally important. They represent the many different conditions which the plant could be in.

5.5.5 Preparing and Mounting of Procedures

The CSFSTs will be mounted front and back on a single board.

CSFST procedures will be professionally drawn using standard drafting instruments.

The CSFST procedure will be mounted on styrofoam or other lightweight boards (approximately 2 x 1.5 feet). Each board will be laminated or covered with a lightweight, glare-resistant plastic material. Consideration will be given to readability under normal and emergency lighting conditions.

5.5 PROCEDURE ORGANIZATION AND FORMAT OF THE CRITICAL SAFETY FUNCTION STATUS TREE PROCEDURES (cont.)

5.5.6 Revisions to Procedure

The revision process for the CSFST procedure requires the same administrative controls as all other Emergency Operating Procedures.

5.5.7 Use of Color

Color will be used on the CSFSTs to increase the operator's awareness of challenges to the plant critical safety functions. The four colors are used as follows:

Red - Highest challenge to critical safety functions. This condition requires immediate action.

Magenta - Next highest challenge. This condition requires immediate action unless a higher challenge exists.

Yellow - Lowest challenge. This condition does not require immediate action, but the operator will use his judgement whether or not to implement the associated FRP.

Green - No challenge. The critical safety function is satisfied.

The colors are contained in the CSFST terminus points and the Pressurized Thermal Shock graph.

5.5.8 Use of Shapes

The CSFSTs will have a horizontal decision-tree format (see Attachment 6.5). Each possible condition will terminate in a colored circle that indicates CSF status and directs the operator to the appropriate FRP if required. The colored circle will also use a "shaded pie" method to further enhance the different levels of challenge:

Empty green - CSF satisfied

1/3 shaded yellow - Lowest challenge

2/3s shaded magenta - Next highest challenge

All shaded in red - Highest CSF challenge

5.7 GENERAL WRITING TECHNIQUES

The following section provides a set of standards which will be considered in the preparation of EOPs. In considering these guidelines, writers should keep in mind that some are more important than others. The writer should always consider the conditions under which the procedure will be implemented, the time available for its implementation and the possible consequences of errors in implementation.

5.7.1 Page Format

A dual-column format will be used for the EPPs, FRPs, and the Path Guides. The left-hand column is designated for operator actions and the right-hand column is designated for contingency actions to be taken when the expected response is not obtained. A sample page format is presented in Attachment 6.4. The Foldouts will use single column format. The general appearance of procedural pages contribute significantly to comprehension and the elimination of confusion and error. Information on pages will be displayed with minimum clutter, sufficient spacing between lines and adequate margins. Margins will be sufficient to ensure that binding will not interfere with reading the text and that subsequent reproduction will not cut off any of the procedure content or page identification.

5.7.2 Step Numbering and Indenting

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

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

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

3. The acceptable alpha-numeric numbering scheme is:

   a.
      1)
         (a)

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

5.7 GENERAL WRITING TECHNIQUES (cont.)

5. If sequence of performance of substeps is important, then these substeps are designated by the appropriate alpha-numeric scheme. If sequence of performance is not important, the substeps are designated by bullets (o).

5.7.3 Step Sequencing

Instructional steps will be presented in the sequence most appropriate for the situation. The following guidance should apply in priority as listed:

1. The steps should be presented in the order in which they must be performed (normally as listed in the WOG ERGs).

2. Steps should be structured to minimize the physical interference between personnel moving around the Control Room while carrying out procedure steps.

3. Steps should be organized and sequenced so operators are not overloaded or underutilized (e.g. alternate actions of RO and BOP operator).

4. Steps should be structured to avoid unintentional duplication of tasks.

5. Steps should be written so that they can be performed with the minimum Control Room staffing.

5.7.4 Caution Statements

A caution statement denotes a potential hazard to equipment or personnel associated with the subsequent action step. Cautions shall extend across the entire page and shall be highlighted as shown in the example below. Each caution statement will be located immediately before and on the same page as the applicable step. This placement of cautions ensures that the operator observes the caution before performing the step. Caution statements will not contain action steps.

Example CAUTION:

****

CAUTION

Damage to AFW pumps may occur if no alternate water source is located when CST level is low.

****

5.7 GENERAL WRITING TECHNIQUES (cont.)

5.7.5 Notes

A note provides descriptive or explanatory information not as critical as a caution statement, but still intended to aid personnel in performing a subsequent action step. Notes shall extend across the entire page and shall be highlighted as shown in the example below. Each note will be located immediately before and on the same page as the applicable step. Notes will not contain action steps.

Example NOTE:

NOTE: RCPs should be run in order of priority to provide normal pressurizer spray.

5.7.6 Calculations

Mathematical calculations should be avoided in EOPs. If a value must be determined in order to perform a procedural step, a chart or graph should be provided.

5.7.7 Referencing and Branching

Referencing is the use of additional procedures, attachments, or steps as a supplement to the procedure presently being used. Referencing other steps within the procedure in use should be minimized. When only a few steps are involved in the referencing, the steps should be stated in the procedure wherever they are needed. Referencing is generally used to accomplish required actions for which a standard procedure already exists. Referencing allows the operator at the control board to perform tasks in parallel with EOP mitigation actions.

Referencing examples:

Establish conditions for running RCPs using OP-100, "REACTOR COOLANT SYSTEM" while continuing in this procedure.

NOTE: GP-007, "NORMAL PLANT COOLDOWN" should be referenced during this procedure.

5.7 GENERAL WRITING TECHNIQUES (cont.)

In the first example above, it is expected that the Reactor Operator will use OP-100 (a procedure he is already familiar with) and accomplish the specified actions while the Senior Control Operator and the Balance of Plant Operator continue on with EOP actions. In the second example, the operator can use GP-007 if he needs it. Referencing in this manner also has the advantage of reducing the physical content of the EOP network. Because the examples may appear in numerous locations throughout the EOP network, repeating the guidance of OP-100 or GP-007 in all these locations would not be efficient. Referencing will be accomplished by the use of the following words:

Reference ...
Refer to ...
Use ...
Using ...

Branching is when the operator leaves one procedure and goes to another procedure, or goes to another step within a procedure. Branching will be done with the words "GO TO," "RETURN TO," or "Continue with." The operator will know to leave the present step and not return unless directed by the words "RETURN TO," or to go back and perform skipped steps when conditions are met following a "Continue with."

When branching within a procedure, no procedure number and title will be given because it is understood that the command applies to the current procedure. When branching to other EOPs, the procedure number, procedure title, and the step number should be given. The exception to this is in the Flow Paths where only the procedure number is required; the title is not given due to space limitations and the step number is not given because the operator understands to go to Step 1 when branching from the Paths. When referencing, the procedure number and title are adequate references.

Quotation marks will be used to emphasize the title of the referenced or branched procedure.

Branching examples:

GO TO EPP-20, "LOCA OUTSIDE CONTAINMENT," Step 1.

GO TO Step 9.

RETURN TO Step 16.

Continue with Step 19. WHEN pressure less than 2000 psig, THEN perform Steps 18b, c, and d.

5.7 GENERAL WRITING TECHNIQUES (cont.)

5.7.8 Style of Expression

Style of expression refers to the way in which instruction steps are written. Instruction steps will be written in a style that presents information in a simple, familiar and clear manner. The following guidance should be followed:

1. Use words that are common in ordinary conversation.

2. Use terms personnel are trained to use and which are standard in the industry.

3. Use action verbs that describe exactly what the user is to do. Ensure that these verbs are understood and used consistently throughout the procedures. Samples of action verbs are given in Attachment 6.6.

5.7 GENERAL WRITING TECHNIQUES (cont.)

4. Capitalization used in the End Path and Function Restoration Procedures for emphasis will be limited to the following cases in order to avoid overuse:

   a. Logic terms will be capitalized and underlined (e.g. IF ...THEN, AND, OR).

   b. The words "AND" and "OR" will be capitalized but not underlined when used as conjunctions.

   c. Expected responses are capitalized (e.g. Verify pressure - STABLE).

   d. Titles of procedures will be capitalized (e.g. NATURAL CIRCULATION COOLDOWN, etc.).

   e. Abbreviations are commonly capitalized. Plurals for abbreviated components will end in lower case (e.g. RCPs, MSIVs).

   f. The branching words "GO TO" and "RETURN TO" will be capitalized.

   g. The first letter of every word in every high level instruction in the instruction column will be capitalized.

5. When there are two or more objects of an action verb, list them below the instruction step rather than in the step. Alphanumeric substeps or bullets are not used in this case.

   Example: Open the following valves:

   1CS-240
   1BD-10

6. Avoid adverbs that have imprecise meanings.

   Example: Use "every 5 minutes until ..." rather than "frequently until ...".

5.7 GENERAL WRITING TECHNIQUES (cont.)

7. Use short direct sentences. Establish a style of sentence construction suitable for the procedure type and use it consistently.

8. Instructions steps will be limited to one required action wherever possible. Where two actions are included in one step, use the connective AND rather than two sentences.

9. Action steps should be written as directives.

   Example: Use "start one CSIP ..." rather than "one CSIP should be started ...".

10. Phrases such as "Check If" should not be used since the If is redundant.

11. When using phrases such as "as necessary" or "as required," provide guidance to clearly define when or why the actions are necessary or required.

12. Action steps should contain complete instructions that clearly define what is to be done.

13. Action steps can vary in type (verification, continuous or periodic, alternate actions acceptable, concurrent with other steps). When writing an action step, its type is determined by content, not format.

5.7.9 Instrumentation Values

When specifying instrumentation values, an appropriate range, tolerance, or limit will be used rather than a a single point value. If the instrumentation value is the value used during normal plant operations, then the normal control setpoint will be used. Avoid the use of carats ($\leq$' $\neq$) in specifying these ranges. Instead, use phrases such as "greater than", "less than", and "between".

5.7 GENERAL WRITING TECHNIQUES (cont.)

5.7.10 Identification of Equipment, Controls and Display

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

Example:

8. Open Charging Valve:

1CS-240

5.7.11 Abbreviations, Letter Symbols and Acronyms

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

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

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

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 contained in the Dictionary of Acronyms and Abbreviations for Shearon Harris.

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 mathematic ideas.

5.7 GENERAL WRITING TECHNIQUES (cont.)

5.7.12 Level of Detail

Excessive detail in EOPs should be avoided in the interest of being able to effectively execute the instructions in a timely manner. This is especially important for the Flow Paths which cannot present as much detail as can be efficiently presented in written procedures. The level of detail in the Flow Paths shall not be so great that they are cluttered and unusable. The level of detail required in EOPs is the detail that a newly trained and licensed operator would desire during an emergency condition. The Path Guides are written to provide an equivalent level of detail as other two column format procedures to supplement the Flow Paths.

To assist in determining the level of EOP detail, the following general rules apply:

1. 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, "Shut Feed Pump A Suction Valve." Recommended action verbs are as follows:

   a. For power-driven rotating equipment, use Start, Stop.

   b. For valves, use Open, Shut, Throttle Open, Throttle Shut, Throttle.

   c. For power distribution breakers, use Close, Open, Trip.

2. Standard practices of 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.

5.7 GENERAL WRITING TECHNIQUES (cont.)

5.7.13 Instructional Step Length and Content

Instruction steps will be short and exact. General rules to be used in meeting these objectives are as follows:

1. High level instruction steps should deal with only one idea.

2. A high level instruction step composed of complex evolutions should be broken down into a series of substeps, with each substep limited to one action.

3. Short, simple, sentences should be used. Do not use long, compound, or complex sentences.

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

5. Limits should be expressed quantitatively whenever possible (Refer to Subsection 5.9.5).

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

7. Identification of components and parts should be complete.

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

9. Expected results of non-routine tasks will be stated and capitalized.

10. After the reset or restoration of an alarm or trip, list the expected results immediately following the action if it would be beneficial to the operator.

11. When system response dictates a time frame within which the instruction must be accomplished, define the time frame. Minimize using time to initiate operator actions. Operator actions should be related to plant parameters.

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

5.7 GENERAL WRITING TECHNIQUES (cont.)

5.7.14 Instruction Column

The left-hand column of the two-column format will contain the operator instruction steps and expected responses. The following rules are established for the instruction column, in addition to the general rules above.

1. Expected results of non-routine tasks will be stated and capitalized.

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

3. Left-hand column tasks should be specified in sequence as if they could be performed in that manner. The user would normally move down the left-hand column when the expected response to a particular step is obtained.

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

5. Routine single action steps or substeps do not normally require an expected response.

6. Use of logic terms in the Instructions column will be minimized by structuring. If logic terms must be used, the guidelines of Section 5.7.16 will apply.

5.7 GENERAL WRITING TECHNIQUES (cont.)

5.7.15 Response Not Obtained Column

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

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

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

3. The user is expected to proceed to the next numbered step or substep in the left-hand column after taking contingency action in the right-hand column.

4. All contingent transitions to other guidelines are to occur from the right-hand column.

5. If a contingency action cannot be completed, the user is expected to proceed to the next step or substep in the left-hand column unless specifically instructed otherwise. When writing the procedure, this rule of usage should be considered in wording subsequent left-hand column instructions.

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

7. Expected results of tasks will be stated and capitalized.

8. Do not repeat instruction column actions.

9. RNO column actions will be structured to minimize use of logic terms, which may lead to operator confusion. If logic terms must be used, the guidelines of Section 5.7.16 will apply.

5.7 GENERAL WRITING TECHNIQUES (cont.)

5.7.16 Use of Logic Terms

The logic terms AND, OR, NOT, IF, IF NOT, WHEN and THEN may be necessary to describe a precise set of conditions or sequence of actions. All logic terms shall be capitalized, and also underlined in order to clearly emphasize them from non-logical terms (e.g. the conjunctions "AND" & "OR").

Use logic terms as follows:

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

   Examples: IF PRZ pressure less than 2335 psig, THEN shut PRZ PORVs.

   WHEN ruptured SG pressure less than 1145 psig, THEN shut SG PORV.

2. Only logical AND or OR will appear in the antecedent of an IF ... THEN or WHEN ... THEN statement.

3. The use of AND & OR within the same antecedent shall not be used in order to avoid confusion.

4. The use of AND & OR within the same antecedent will be limited to connecting two conditions. Three or more connected conditions will be handled in a list format as in the following examples.

   Example of AND list:

   IF all the following conditions occur:

   - PRZ level - LESS THAN 25%
   - PRZ pressure - LESS THAN 1500 PSIG
   - PRZ temperature - LESS THAN 596°F

   THEN secure PRZ heaters.

5.7 GENERAL WRITING TECHNIQUES (cont.)

Example of OR list:

IF any of the following conditions occur:

- o PRZ level - LESS THAN 25%
- o PRZ pressure - LESS THAN 1500 PSIG
- o PRZ temperature - LESS THAN 596°F

THEN secure PRZ heaters.

4. Use of IF NOT should be minimized, and it will 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 condition. IF NOT should be used to specify the negative of the condition and follows immediately after the consequent of the first statement.

   Example: IF letdown in service, THEN use auxiliary spray. IF NOT, THEN use one PRZ PORV.

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

5.7 GENERAL WRITING TECHNIQUES (cont.)

5.7.17 Use of Conjunctive AND & OR

Use of conjuntive "AND" & "OR" will be minimized by structuring of the steps.

The use of "AND" and "OR" within the consequent of an IF ... THEN or WHEN ... THEN statement will be minimized, and limited to connecting two items. More than two items will be listed as in the following examples.

Example of "AND" list:

IF PRZ level less than 25%, THEN perform the following actions:

a. Open 1CS-123

b. Close 1CS-456

c. Operate 1CS-789 to raise PRZ level to 50%

Example of "OR" list:

IF SG level less than 25%, THEN perform one of the following actions:

- Start a feedwater pump
- Start an MDAFW pump
- Start the TDAFW pump

5.7.18 Use of Underlining

Underlining will be limited to emphasis of logic terms, CAUTION headings, and NOTE headings in order to avoid overuse.

5.7 GENERAL WRITING TECHNIQUES (cont.)

5.7.19 Component Identification

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

1. Equipment, controls and displays will be identified in operator language (common usage) terms. These terms should match engraved names on panels and equipment.

2. 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.

3. 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.

4. If the component is seldom used or it is felt that the component would be difficult to find, location information should be given in parentheses following the identification.

5.8 PRINTED OPERATOR AIDS

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. EOPs that refer the operator to a printed operator aid must have the aid attached in the back of each procedure to which it applies, or else give the location of the aid (e.g. Reference Attachment 6 of OMM-004, "POST TRIP/SAFEGUARDS REVIEW," for a list of affected components and required status).

5.8.1 Units of Measure

Units of measure on figures, tables and attachments should be given for numerical values that represent observed or calculated results. A virgule (slant line) should be used instead of "per"; examples: ft/sec, lbs/hr.

5.8.2 Figure, Table and Attachment Numbering

Sequential Arabic numbers should be assigned to figures, tables and attachments in separate series and placed at the top of its associated page. 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: Table 1, Table 2, etc.
Figure 1, Figure 2, etc.
Attachment 1, Attachment 2, etc.

Page identification for attachments, figures and tables should consist of the following information that identifies (1) procedure number, (2) attachment number, (3) page number and (4) revision number. Page numbering of attachments should meet the requirements of Subsection 5.3.5. In addition, if an Attachment consists of more than one page, the page number of that Attachment should be at the top right hand side of each page in the Attachment.

5.9 MECHANICS OF STYLE

5.9.1 Spelling

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

5.9.2 Hyphenation

Hyphens are used between elements of a compound word when usage calls for it. The following rules should be followed for hyphenation.

1. When doubt exists, the compound word should be restructured to avoid hyphenation.
2. In compound numerals from twenty-one to ninety-nine (e.g. one hundred thirty-four).
3. In fractions (e.g. one-half, two-thirds).
4. In compounds with "self" (e.g. self-contained, self-lubricated).
5. When misleading or awkward consonants would result by joining the words (e.g. bell-like).
6. To avoid confusion with another word (e.g. re-cover to prevent confusion with recover, pre-position to avoid confusion with preposition).
7. When a letter is linked with a noun (e.g. X-ray, O-ring, I-bolt, I-beam).
8. To separate chemical elements and their atomic weight (e.g. Uranium-235, U-235).

5.9 MECHANICS OF STYLE (cont.)

5.9.3 Punctuation

Punctuation should be used only as necessary to aid reading and prevent misunderstanding. Word order should be selected to require a minimum of punctuation. 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:

1. Brackets

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

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

2. Colon

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

   Example: Restore cooling flow as follows:

3. 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 too complex.

   Use a comma after condition phrases for clarity and ease of reading.

   Example: WHEN level decreases to 60 inches, THEN start pump.

4. Period

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

5.9 MECHANICS OF STYLE (cont.)

5.9.4 Vocabulary

Words used in procedures should convey precise understanding to the trained person. The following rules apply:

1. Use simple words. Simple words are usually short words of few syllables. Simple words are generally common words.

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

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

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

5. Verbs with specific meaning should be used. Examples are listed in Attachment 6.6.

6. Equipment status should be denoted as follows:

   a. Operable - Means that a system, subsystem, train, component, or device is capable of performing its specified function(s) and all necessary attendant instrumentation, controls, electrical power, cooling or seal water, lubrication or other auxiliary equipment required for the system, subsystem, train, component, or device to perform its function(s) are also capable of performing their related support function(s).

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

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

5.9 MECHANICS OF STYLE (cont.)

5.9.5 Numerical Values

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

1. Arabic numerals should be used.

2. For numbers less than unity, the decimal point should be preceded by a zero (e.g. 0.1).

3. 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.

4. Acceptance values will be specified in such a way that addition and subtraction by the user are avoided. This will be done by stating acceptance values as limits. Do not use .

   Examples: 510°F maximum, 300 psig minimum, between 580°F and 600°F

5. 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.

5.10 TYPING FORMAT

5.10.1 Page Arrangement

1. Page margins are specified to be 1.5 inches on the left-hand side, 1.5 inches on the right-hand side, and 1 inch at the top and bottom.

2. Page identification information (refer to Subsection 5.3.5) will be in the bottom left corner.

3. The 8.5 inch edges shall constitute top and bottom of pages and text. Tables and figures shall be readable with the page so arranged. Rotation of printed matter should be avoided for emergency operating procedures. Refer to Subsection 5.10.4 if rotation is necessary.

5.10 TYPING FORMAT (cont.)

5.10.2 Heading and Text Arrangement

1. Section numbers shall be typed at the left-hand margin.
2. Two line spaces shall be allowed between headings and respective text.
3. Three line spaces shall be allowed between steps whenever possible.
4. Text will be typed using single line spacing.
5. Each action substep, caution, and note shall be wholly contained on a single page.
6. No part of the EOPs shall be handwritten with the exception of the preparer's initials, which are required for temporary and advance changes.

5.10.3 Breaking of Words

Breaking of words (hyphenated and continued on the next line) shall be avoided to facilitate operator reading.

5.10.4 Rotation of Pages

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

1. The top of the page with rotated print is the normal left-hand edge.
2. The page margins do not rotate.
3. Page identification and numbering will not be rotated.

5.10.5 Printed Operator Aids

Figures include graphs, drawings, diagrams and illustrations. The following rules are established:

1. The figure number and its title are placed three line spaces above the figure field (refer to Subsection 5.8.2).
2. The figure field must not violate specified page margins.
3. The figure field should be of sufficient size to offer good readability.

5.10 TYPING FORMAT (cont.)

4. The essential message should be clear; simple presentations are preferred.

5. Numbered grid lines should be bolder than unnumbered grid lines.

6. Labeling of items within the figure should be accompanied by arrows pointing to the item.

7. The items within the figure should be oriented naturally insofar as possible. For example, height on a graph should be along the vertical axis.

8. In general, items within the figure should be labeled. Typed labels should be used.

9. All lines in figures should be reproducible.

5.10.6 Typing Rules for Tables

1. Type style and size should be the same as that for the rest of the procedure.

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

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

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

5. Tabular headings should be aligned as follows:

   a. horizontally by related entries

   b. vertically by decimal point for numerical entries

   c. vertically by first letter for word entries; however, run-over lines should be indented three spaces

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

5.10 TYPING FORMAT (cont.)

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

5.10.7 Cautions and Notes

All notes and cautions should be distinguishable from the rest of the text by using the following format:

1. The heading CAUTION should be capitalized, centered and placed two lines spaces below the preceding text.

2. The text of the caution should be block format with single line spacing. The caution text will extend from margin-to-margin and two line spaces below the heading.

3. The text of the note should be block format with single line spacing. The note text is preceded by the word NOTE in capital letters and underlined. Note margins are the same as the page margin. The note text will begin two line spaces below the preceding step.

4. Cautions shall be further highlighted by a line of asterisks one line space above the heading and one line space below the text.

5. Notes shall be further highlighted by a line one space above and below the text.

6. Examples are presented in Subsection 5.7.4 and 5.7.5.

5.11 USE OF OPERATOR AIDS

Operator aids will be used to assist the operator in carrying out the required EOP action.

5.11.1 Checkoffs

In light of the fact that the operator must have a method of keeping track of the current step of the EOP while they are performing the designated action; a set of mylar-coated Flow Paths will be available in the Control Room with a grease pencil or water marker to checkoff the designated operation action.

5.11.2 Supporting Material/Background Material

Material needed to carry out actions in the EOPs, but which cannot be included, should be appended to it.

5.12 MAINTENANCE OF EOP NETWORK

5.12.1 A Change to the Emergency Operating Procedures Is Identified

1. If the change is a result of generic changes to the Emergency Response Guidelines, then go to Subsection 5.12.2.

2. If the MCB has been modified and a change to the Emergency Operating Procedures is needed, go to Step 3. Otherwise go to Subsection 5.12.3, Step 8.

3. A plant specific change to the Emergency Operating Procedures is desired.

   a. Evaluate the proposed change against the generic guidelines (Emergency Response Guidelines Executive Volume and Background Documents) to determine if the intent of the generic guidelines is altered. If the generic intent is not altered, go to Subsection 5.12.3.

   b. If the intent of the generic guidelines is altered, the proposed change must be reevaluated to resolve the discrepancy between the generic guideline and the proposed change. The proposed change must be modified so that it does not alter the intent of the mitigating strategies of the generic guidelines.

4. Go to Subsection 5.12.3.

5.12.2 Generic Changes to the Emergency Response Guidelines

1. Evaluate the effect of the generic change on the SHNPP Emergency Operating Procedure. If the generic change has no effect on emergency operating procedures, then perform the following:

   a. Update the Emergency Response Guidelines.

   b. Update the EOP Transition Document.

2. If the generic change affects the SHNPP Emergency Operating Procedures, then perform the following:

   a. Update the Emergency Response Guidelines.

   b. Go to Subsection 5.12.3.

5.12 MAINTENANCE OF EOP NETWORK (cont.)

5.12.3 Processing an Emergency Operating Procedure Change

1. Prepare the change using the following for guidance:

   - AP-005, "Procedures Format and Preparation"
   - OMM-006, "Emergency Operating Procedures Writer's Guide"
   - Emergency Response Guidelines, High Pressure

2. Determine if the proposed change affects the placement or removal of EAL Flags in the Emergency Operating Procedure network. If the EAL flags are affected, update the "Explanation for Emergency Action Level Flags in SHNPP EOPs" document.

3. If the Critical Safety Function Status Trees will be changed, fill out a Plant Change Request, per AP-600, to have the SPDS updated. The procedure version should be implemented with the SPDS.

4. Compare the proposed change to existing Emergency Operating Procedures for consistency in style and format.

5. Perform a human factors evaluation of the proposed change to verify the change is acceptable.

6. Process the change in accordance with AP-006, "Procedure Review and Approval".

7. Once approved, the change must be evaluated to see if any Verification and Validation is required. Refer to Section 5.13 and update the "Determination of Any Additional Verification and Validation" book as appropriate.

8. Update the applicable sections of the SHNPP EOP Transition Document.

9. Determine if the change to the Emergency Operating Procedures has affected any instrumentation or controls previously identified in the EOP Transition Document. If change adds, deletes or alters any instrumentation or controls, then the SHNPP Task Analysis Documentation must be updated.

5.13 VERIFICATION AND VALIDATION PROGRAM FOR CHANGES TO THE SHNPP EOPS

1. The Operations Engineer is responsible.

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

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

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

   b. That EOPs are written correctly (i.e. they accurately reflect the SHNPP Emergency Operating Procedure Writer's Guide).

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

   d. That there is a correspondence between the procedures and the control room/plant hardware (i.e. control equipment/indications that are referenced are available both inside and outside of the control room, use the same designation, use the same units of measurement, and operate as specified in the procedures).

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

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

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

   a. Simulator
   b. Table-Top
   c. Control Room Walk Through

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

6.0 ATTACHMENTS

6.1 COVER PAGE

6.2 FLOW PATH EXAMPLE

6.3 PATH SYMBOLS

6.4 PAGE FORMAT

6.5 CSFST EXAMPLE

6.6 AUTHORIZED VERB LIST

Attachment 6.1: COVER PAGE

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

PLANT OPERATING MANUAL

VOLUME 3

PART 4

PROCEDURE TYPE: EMERGENCY OPERATING PROCEDURE (EOP)
END PATH PROCEDURE (EPP)

NUMBER: EOP-EPP-002

TITLE: LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED

REVISION 1

APPROVED: _____ 08 MAY 1986
Signature Date 4-29-86

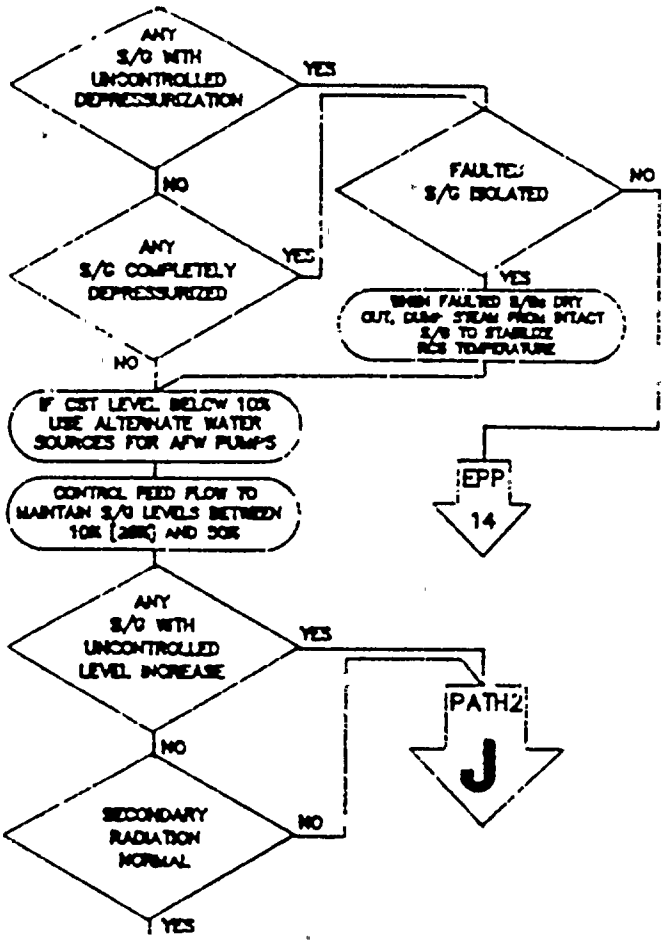
TITLE: MANAGER-OPERATIONS

CONTROLLED COPY NO. 16

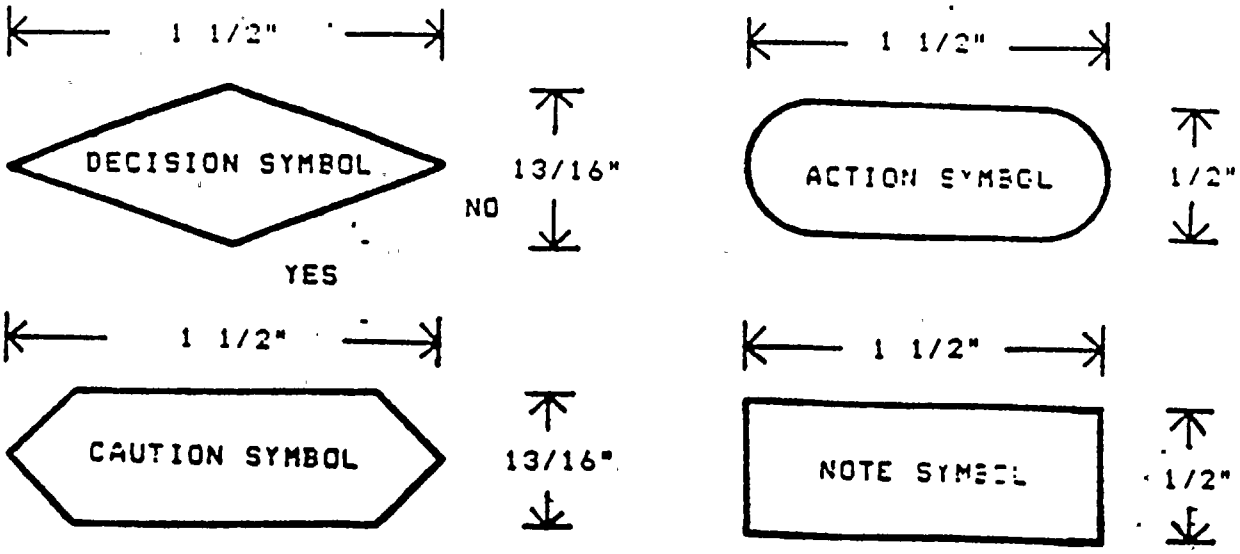
Attachment 6.2: FLOW PATH EXAMPLE

PATH-1

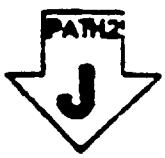
SHEARON HARRIS NUCLEAR POWER PLANT		
REVISION		APPROVAL
NO	DATE	SIGNATURE:
		TITLE:



Attachment 6.3: PATH SYMBOLS



PATH ENTRY POINT ARROW



PATH-TO-PATH EXIT ARROW

PATH-TO-EPP EXIT ARROW

PATH-TO-FRP EXIT ARROW

GANGED CONNECTING LINES WITH DIRECTIONAL ARROWS

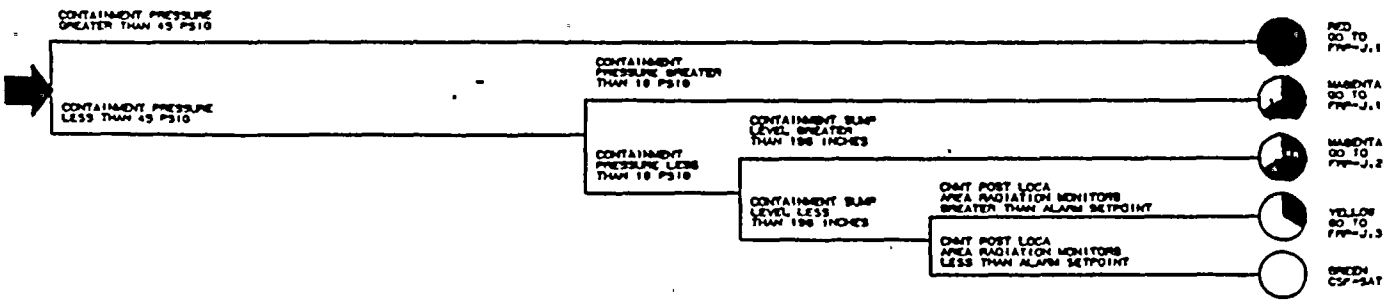
Attachment 6.4: PAGE FORMAT

PATH-1 GUIDE

	Instructions	Response Not Obtained
5.	b. AC emergency busses 1A-SA AND 1B-SB - ENERGIZED	b. Continue actions to restore power to deenergized AC emergency bus while continuing with this procedure.
6.	Check SI Actuation: Check any one of the following - LIT: ALB 11 - 2-2 ALB 11 - 5-1 ALB 11 - 5-3 ALB 12 - 1-4	Check whether SI is required by observing any one of the following: o CNMT pressure - GREATER THAN 3.0 PSIG o PRZ pressure - LESS THAN 1850 PSIG o Steam line pressure - LESS THAN 601 PSIG IF SI is required, THEN actuate SI AND GO TO Step 7. Implement Function Restoration Procedures as required AND GO TO EPP-004, "REACTOR TRIP RESPONSE," Step 1.

Attachment 6.5: CSFST EXAMPLE

CONTAINMENT CSF-5



Attachment 6.6: AUTHORIZED VERB LIST

Verb	Meaning/Application
Actuate	To put a component or system into action Example: Actuate SI.
Add	To include or unite Example: Add boron to the RCS.
Adjust	To regulate or bring to a desired state Example: Adjust charging line flow to 100 gpm.
Align	To place a system in proper or desired configuration for an intended purpose Example: Align the charging system for normal charging.
Allow	To permit a stated condition to be achieved prior to proceeding Example: Allow discharge pressure to stabilize.
Block	To inhibit an automatic action Example: Block SI actuation.
Borate	To cause boron to be injected into a system Example: Borate the RCS.
Calculate	To determine or compute a value Example: Calculate total mass of boron injected into the reactor.
Check	To examine a plant parameter or system in order to obtain a definite status Examples: Check PRZ pressure - LESS THAN 2000 PSIG Check AFW Valve Alignment
Close	To place a breaker or electrical switch in a position to allow current flow Example: Close the EDG breaker.

Verb	Meaning/Application
Collapse	To cause the failure of something Example: Collapse the steam void in the reactor.
Commence	To begin or start Example: Commence depressurizing all SGs.
Complete	To accomplish specific procedural requirements, to finish Example: Complete valve checkoff list "A".
Consult	To ask the advice or opiniion of Example: Consult with plant operations staff.
Continue	To maintain without interruption Example: Continue with RCS cooldown to cold shutdown.
Control	To change or maintain plant parameters to or at a desired condition Example: Control pressurizer level between 25% and 75%.
Cool	To remove heat from Example: Cool down the RCS.
Coordinate	To work with another in order to accomplish a task Example: Coordinate with Radwaste operators.
Cycle	To cause to go through an operation Example: Cycle the PRZ PORV.

Verb	Meaning/Application
Decrease	To reduce in value Example: Decrease RCS pressure.
Deenergize	To secure power to an electrical device or component Example: Deenergize PRZ heaters.
Defeat	To override a protective interlock Example: Defeat the undervoltage trip on the breaker.
Depressurize	To lower the pressure of Example: Depressurize the RCS.
Determine	To find out or come to a decision by investigation, reasoning, or calculation Example: Determine whether RCPs can be started.
Direct	To instruct a person to do something Example: Direct the AO to shut the valve locally.
Dispatch	To send a person to do something Example: Dispatch an operator to shut the valve locally.
Do	To perform a task or action Example: Do Steps 15a, b, and c.
Dump	To discharge (usually used with steam) Example: Dump steam from intact SGs.

Verb	Meaning/Application
Energize	To line up power to an electrical device or component
	Example: Energize the AC emergency busses.
Ensure	To make certain
	Example: Ensure the system is lined up prior to operation.
Equalize	To cause parameters to have the same value
	Example: Equalize pressure.
Establish	To make arrangements for a stated condition
	Example: Establish communication with control room.
Evaluate	To estimate of the status of something
	Example: Evaluate plant conditions.
Exceed	To go above a given value (usually used in the negative sense)
	Example: Do not exceed 500°F.
Exit	To leave
	Example: Exit this procedure.
Fill	To put into, to increase level
	Example: Fill the SGs.
Go	To move to another place
	Example: GO TO Step 16.
Heat	To add heat to
	Example: Heat up the RCS.

Verb	Meaning/Application
Identify	To recognize a specific something Example: Identify any faulted SG.
Implement	To carry out a set of actions or a procedure Example: Implement FRPs if necessary.
Increase	To raise in value Example: Increase RCS temperature.
Initiate	To begin a process Example: Initiate boron injection.
Insert	To place inside of Example: Insert all control rods.
Isolate	To shut one or more valves in a system for the purpose of separating or setting apart a complete system or a portion of the system from the rest Example: Isolate instrument air header.
Load	To place one or more electrical devices on a power source Example: Load the EDGs.
Lock	To place in a condition where something cannot be operated easily or by accident Example: Shut and lock 1CS-123.

Verb	Meaning/Application
Maintain	To keep in an existing state or set of conditions Example: Maintain SG level between 25% and 75%.
Maximize	To operate in a manner that achieves the largest result Example: Maximize dumping steam.
Minimize	To operate in a manner that achieves the smallest result Example: Minimize loss of coolant.
Monitor	To keep track of Example: Monitor PRT conditions.
Notify	To inform Example: Notify the Shift Foreman.
Observe	To see through direct attention Example: Observe CAUTION prior to Step 19.
Obtain	To get by direct action Example: Obtain SG samples.
Open	To change the physical position of a valve such that it allows flow, or to change the physical condition of an electrical device such that it prevents passage of electrical current Example: Open 1FW-123.
Operate	To manipulate plant devices in order to control plant components or parameters Example: Operate the flow control valve to maintain tank level between 25% and 75%.

Verb	Meaning/Application
Perform	To carry out actions or a procedure Example: Perform the following:
Place	To put in a particular position or condition Example: Place steam dump in pressure control mode.
Plot	To put data points on a graph Example: Plot cooldown rate.
Pressurize	To cause a system or component to increase in pressure Example: Pressurize the system to RCS pressure.
Rack out	To place a breaker in an inoperative condition Example: Rack out the pump breaker.
Raise	To increase a parameter value Example: Raise flow to 100 gpm.
Realign	To line up a system in a certain configuration again Example: Realign the charging system for normal operation.
Record	To document specified condition or characteristic Example: Record discharge pressure.
Reduce	To cause a parameter to decrease in value Example: Reduce steam generator pressure using PORVs.
Reestablish	To make arrangments for a stated condition again Example: Reestablish normal charging flow.
Refer	To look at for information Example: Refer to OP-100, "REACTOR COOLANT SYSTEM."

Verb	Meaning/Application
Reference	To look at for information Example: Reference OP-100, "REACTOR COOLANT SYSTEM."
Refill	To fill again Example: Refill SGs as necessary.
Repeat	To perform an action or series of actions again Example: Repeat actions as necessary to start the EDGs.
Repressurize	To pressurize again Example: Repressurize the accumulators.
Reset	To place back into a normal condition, to remove a locked in signal Example: Reset SI.
Restart	To start again Example: Restart the pump.
Restore	To return a system, component, or parameter to normal Example: Restore normal charging flow.
Return	To go back to a step in a procedure, or to restore a system, component, or parameter to normal Examples: RETURN TO Step 16. Return the charging lineup to normal.
Run	To operate a system or component Example: Run the pump as necessary to maintain level.
Run back	To cause a rapid decrease in the power output of the main turbine Example: Run back the turbine.

Verb	Meaning/Application
Sample	To obtain a specimen Example: Sample SGs.
Secure	To stop a device or process Example: Secure dumping steam.
Set	To adjust a plant parameter or device to a specified value or condition Example: Set turbine generator speed to 1800 rpm.
Shut	To change the physical position of a valve such that it prevents flow Example: Shut 1FW-123.
Shut down	To secure a device or process Example: Shut down the reactor.
Stablize	To cause a parameter or conditions to be steady and controlled Example: Stablize RCS pressure.
Start	To energize an electro-mechanical device Example: Start one feedwater pump.
Stop	To deenergize an electro-mechanical device Example: Stop the RCP.

Verb	Meaning/Application
Terminate	To stop a process or parameter Example: Terminate flow.
Throttle	To operate a valve in an intermediate position to obtain a desired flow rate or condition Example: Throttle open 1CS-240 to maintain 100 gpm flow.
Transfer	To shift a device to another input, output, or mode of operation Example: Transfer the nuclear recorder to the source range scale.
Trip	To activate a semi-automatic device that stops current flow or shuts down a component Examples: Trip the EDG breaker. Trip the reactor.
Unblock	To remove the inhibit on an automatic action Example: Unblock SI.
Unlock	To place in a condition where something can be operated Example: Unlock and open 1CS-123
Use	To employ Examples: Use OP-100, "REACTOR COOLANT SYSTEM." Use auxiliary spray.

Verb	Meaning/Application
Vent	To permit a gas or liquid confined under pressure to escape Example: Vent the pressurizer with the PRZ PORVs.
Verify	To observe a component or parameter in a given condition, and placing it in that given condition if not already there by manual or local action as required Example: Verify 1CS-123 - OPEN
Wait	To delay an action until a condition is satisfied Example: Wait for the system to be lined up prior to continuing this procedure.
Withdraw	To remove from inside of Example: Withdraw control rods.
Zero	To set a device to the zero value Example: Zero the meter.

ATTACHMENT 3

VERIFICATION AND VALIDATION PROGRAM FOR SHNPP

Table of Contents

1.0 PURPOSE

This document outlines the process for Verification and Validation (V&V) of advance changes and revisions to the SHNPP EOPs.

Verification and Validation are two separate processes providing complimentary information on the EOPs; thus, these two independent phases provide a comprehensive review of the EOPs for continued accuracy and usefulness throughout their lifetime.

Because this evaluation is based on a set of implemented EOPs which were evaluated prior to implementation, the process described here differs from a pre-implementation V&V program for EOPs. The intent of this program is to ensure that modifications to the EOPs maintain or improve the level of accuracy and usability established in the initial V&V.

The Verification and Validation process incorporates consideration for Human Factors concerns in each part of the process. This is accomplished primarily through the inclusion of Human Factors related items in the relevant criteria checklists and through consistent use of the EOP Writer's Guide.

The Verification phase provides feedback on the following issues:

- Are the changes to the EOPs technically accurate, e.g. do they accurately reflect the technical guidelines and other EOP source documents?
- Does the hardware called for in the EOP changes correspond to the hardware available for the operator's use?
- Are the EOP changes written correctly, e.g. do the changes accurately reflect the EOP Writer's Guide?

The Validation phase provides feedback on these additional issues:

- Are the revised EOPs usable, e.g. can they be understood and followed without confusion or errors?
- Are the revised EOPs compatible with the minimum number, qualifications, training and experience of the operating staff?
- Is there a high level of assurance that the procedures will work with the plant, e.g. that the procedures correctly guide the operator in mitigating actual plant transients and accidents?

2.0 REFERENCES

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

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

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

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

INPO 83-004, March 1983, "Emergency Operating Procedures Verification Guidelines."

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

INPO 83-007, February 1983, "Emergency Operating Procedures Generation Package Guidelines."

Westinghouse Owners Group (WOG) Emergency Response Guidelines (ERGs), High Pressure Version.

AP-005, Procedures Format and Preparation.

AP-006, Procedure Review and Approval.

AP-007, Temporary and Advance Changes to Plant Procedures.

AP-600, Plant Change Request.

OMM-006, Emergency Operating Procedures - Writer's Guide.

3.0 RESPONSIBILITIES

The Manager - Operations has overall responsibility for the Verification and Validation process since he is the individual responsible for the entire EOP Network.

Both phases of the V&V process require operations-experienced personnel who have a good understanding of plant hardware, the EOP background documentation, and the EOP Writer's Guide. If possible, the reviewers should also include a person with some background in Human Factors. The specific goal of the Verification phase of the evaluation is to ensure accuracy of the EOPs from both a technical and written standpoint. The Validation phase ensures the usability of the EOPs and draws heavily on resources from the Operations Unit and the Training Unit. Implementation of the Verification and Validation program is assigned to the Operations Support Supervisor.

4.0 VERIFICATION AND VALIDATION PROCEDURE

4.1 Identifying Changes to EOP Network

There are three major factors that could potentially result in EOP changes:

1. Plant equipment modifications

2. WOG ERG revisions

3. Other forces causing desired EOP changes (i.e., Operator input, corrections, audits, etc.)

Changes or modifications to plant equipment can require changes to the EOPs. Alterations to the main control board (sometimes as a result of plant equipment modifications) can also necessitate changes to the EOPs.

Since the WOG ERGs form the basis for the plant-specific EOPs, any revisions to the WOG ERGs will probably result in changes to the EOPs.

Other factors can cause changes to be made to components of the EOP Network. For example, operator input can initiate changes to make the EOPs read or work better. Audits performed by various groups can result in directing changes to the EOPs.

4.2 Verification & Validation Methodology

4.2.1 Verification Phase

Changes to the EOP Network are processed in accordance with AP-006, Procedure, Review and Approval, and AP-007, Temporary and Advance Changes to Plant Procedures. The verification phase for each EOP revision or advance change will be completed as part of the procedure review and approval process.

AP-006 requires each procedure to receive two Technical Reviews as part of the approval process. A separate EOP Verification Checklist (Attachment 5.2) will be completed by each of the Technical Reviewers as part of the Technical Review. The completed Verification Checklist is retained as an attachment to the Technical Review Comment Sheet. Any discrepancies identified will be resolved in accordance with AP-006. This process provides assurance that every change to the EOP network will receive proper verification. In addition, the verification documentation will become an integral part of the approved procedure package.

4.2.2 Validation Phase

The EOP validation phase consists of two components; and ongoing validation of the EOP's and pre implementation validation for major revisions to the EOP Network.

Ongoing Validation

The ongoing validation is coordinated with the Training Unit with a goal of providing a documented validation of each EOP every two years. As part of the Operator Training and Retraining Program, each EOP will be discussed in the classroom by a shift of Licensed Operators or License Training Class (RO and/or SRO). The evaluator(s) will complete the Table Top Validation Checklist (Attachment 5.3) and forward it to the Operations Support Supervisor.

The Operations Support Supervisor (or his designee) will complete the resolution section of the Validation Checklist resolving any identified discrepancies. If the resolution results in an advance change or revision to the procedure, the Validation Checklist will be added to the procedure approval package. If a procedure change is not required, the Operations Support Supervisor (or his designee) will retain the completed Validation Checklist until the two-year review becomes due on the affected procedure or a change to the procedure is executed. When either of these events occurs, the completed Validation Checklist will be forwarded to documentation with the approved revision or procedure review form as applicable.

In addition to the "tabletop" type of review, each EOP will be evaluated on the SHNPP simulator at least once every two years. This validation will be accomplished using either a shift of Licensed Operators or a shift of License Candidates (RO and/or SRO). This validation will be accomplished as part of the Simulator Training Program.

When an EOP is exercised for the purpose of validation, the following process will take place. The Simulator Training Staff will select a scenerio that will require entry into the EOP to be validated. When the scenerio is run for validation purposes, it will be videotaped, if possible. In addition, the Simulator Validation Checklist will be completed by the evaluator(s).

Immediately following the validation exercise, the operators will critique the procedure with the evaluator(s) using the Simulator Validation Checklist. The evaluator(s) will forward the completed Simulator Validation Checklist and the videotape (if applicable) to the Operations Support Supervisor.

Ongoing Validation (continued)

The Operations Support Supervisor (or his designee) will review all of the documentation and resolve any identified procedure discrepancies. If a videotape of the scenerio is available, it may be reviewed along with the completed Simulator Validation Checklist. Additions or other pertinent comments will be added to the Checklist Comment Sheet during the videotape review.

The completed Simulator Validation Checklist and videotape will be transmitted to the Document Control system in the same way as the Validation Checklist described above.

Pre-Implementation Validation

Prior to implementation, an extensive validation program was conducted on the EOP Network (Described in Attachment 5.1). The EOPs were also fully exercised during Cold License Simulator Training which resulted in many enhancements. In addition to the above, CP&L has agreed to conduct additional simulator validation of the EOP Network during 1987 (currently scheduled for the July - August time frame).

The above validation program coupled with the "ongoing" validation program provides assurance that the EOP Network has and will maintain the necessary accuracy and usefulness needed to mitigate an accident. Minor changes to the network will be validated thru the ongoing validation program.

Major revisions will receive pre-implementation validation. A major revision to the EOP Network is defined as changes that would add or delete procedures or change the mitigating strategies of a major portion of the EOP Network.

This type of revision would most likely be recommended by the Westinghouse Owners Group with NRC concurrence. If this event occurred, the extent of the validation program would be recommended by the Owner's Group, when the revision is issued. SHNPP would justify any deviation from the Owner's Group recommended validation program.

If CP&L determines that the addition or deletion of a procedure in the EOP Network is necessary, validation of the procedure change will be done. This validation would, as a minimum, consist of tabletop type of discussions using licensed operators, followed by simulator validation completely exercising the new procedure (or area affected by the deletion of a procedure).

Pre-Implementation Validation (continued)

The validation would be accomplished after the verification program was completed. The change (addition or deletion) would not be implemented until the validation program was complete. The documentation for this validation would be the same as is used for the ongoing validation. The completed checklists would be transmitted to the Document Control system as part of the approved procedure package.

5.0 ATTACHMENTS

5.1 Initial V&V of EOP Network

5.2 Verification Checklist

5.3 Tabletop Validation Checklist

5.4 Simulator Validation Checklist

Attachment 5.1: Initial V&V of EOP Network

Because the SHNPP reactor plant was under construction, the initial V&V of the SHNPP EOPs was performed using all three methods:

1. Simulator Testing
2. Tabletop Reviews
3. Control Room Walk-Throughs

The simulator testing of the EOP Network was performed using the original Harris simulator (83,84) and EAL Validation was performed at the Seabrook simulator (3/85).

VERIFICATION CHECKLIST

This list summarizes the results of the Verification Process. Using the Verification description as a guide, verify the proposed EOPs accuracy. Initial each item as it is completed. Circle the item number for any item that does not meet the requirements of the Verification description. Explain each deviation in the comment section and attach the completed checklist to the Technical Review form.

Part A - Technical Accuracy

_____ Item 1. Entry conditions/symptoms information

_____ Item 2. Instruction step, Caution, or Note information

_____ Item 3. Derived quantitative information

Part B - Hardware Accuracy

_____ Item 1. Equipment availability

_____ Item 2. EOP/Control Room compatibility

Part C - Written Accuracy

_____ Item 1. New page content, format, and readability

_____ Item 2. Instruction step content and format

_____ Item 3. Caution and Note content and format

_____ Item 4. Transition step content and format

Comments: _____

_____

_____

_____

_____

_____

_____

VERIFICATION DESCRIPTION
PART A
TECHNICAL ACCURACY

1. Entry conditions/symptoms information

   Does the EOP revision/change result in the deletion of an ERG-based enter condition?

   1) Evaluate the affected EOP to determine if the deletion of an ERG-based entry condition affects the basis for the EOP, e.g. does the deletion of the entry condition limit operator entry into the procedure when use of the procedure is required.

   Does the EOP revision/change result in the addition of an entry condition not based on the ERGs?

   1) Evaluate the affected EOP to determine if the added entry condition is appropriate in the context of the procedure basis.

   2) Evaluate the affected EOP to determine if the addition of an entry condition results in an excessive number of entry conditions for the procedure.

2. Instructional step, Caution, or Note information

   a. Does the EOP revision/change result in the addition to, deletion from, or reordering of information from the ERGs?

      1) Evaluate the affected EOP to determine if the change affects the basis of the EOP as defined by the ERGs.

      2) Ensure that adequate justification has been provided for the change.

      3) Ensure that the justification has been documented in the Step Deviation Document.

   b. Does the EOP revision/change modify the information as presented in the ERGs?

      1) Evaluate the affected EOP to determine if the modification affects the basis of the EOP as defined by the ERGs.

      2) Ensure that adequate justification has been provided for the change.

VERIFICATION DESCRIPTION
PART A
TECHNICAL ACCURACY
(continued)

3) Ensure that the justification has been documented in the Step Deviation Document

c. Does the EOP revision/change introduce additional information regarding plant-specific systems, instrumentation, controls, indications, or limits?

1) Evaluate the affected EOP to determine if the revision/change affects the basis of the EOP as defined by the ERGs.

2) Evaluate the affected EOP to determine if the revision/change is correct with respect to the source documents on which the revision/change is based.

d. Does the revision/change affect a licensing commitment?

1) Ensure that a justification has been provided.

2) Ensure that the justification has been documented.

3. Derived quantitative information

a. Evaluate the affected EOP to determine if the derived values and tolerance bands are correct with respect to the source documents.

b. Evaluate the affected EOP to determine if plant-specific values used in the EOPs are computed accurately.

c. Does the revision/change include equations for required calculations?

1) Evaluate the affected EOP to determine if the equation could be replaced with a table or graph which could serve the same purpose.

2) Evaluate the affected EOP to determine if the equation includes all necessary information.

VERIFICATION DESCRIPTION Page 3 of 5
PART B
HARDWARE

1. Equipment availability

   a. Evaluate the affected EOP to determine if the additional equipment referenced in the EOP revision/change is available to the operator in the Control Room or plant.

2. EOP/Control Room compatibility

   a. Evaluate the affected EOP to determine if the designation used corresponds to the designation used in the plant.

   b. Evaluate the affected EOP to determine if the units of measurement used are the same as those on the plant instrumentation.

   c. Evaluate the affected EOP to determine if the values used fall within the range of the plant equipment.

   d. Evaluate the affected EOP to determine if the values can be read to the necessary precision on the plant instrumentation.

   e. Evaluate the affected EOP to determine if the plant equipment referenced operates as indicated in the procedure.

VERIFICATION DESCRIPTION
PART C
WRITTEN ACCURACY
(continued)

1. New page content, format, and readability

   a. Evaluate the affected EOP to determine if the format of the revision/change is consistent with the organization and page layout of the EOP Network as outlined in the Writer's Guide.

   b. Evaluate the affected EOP to determine if the necessary identification information is present as outlined in the Writer's Guide, e.g. a complete and accurate cover page for each procedure; procedure designation, revision number, and page ___ of ___ on each page except for the cover page and list of effective pages.

   c. Evaluate the affected EOP to determine if, on a subjective basis, all pages of the revision/change are readable - for text, tables, graphs, figures, and charts.

2. Instruction step content and format

   a. Evaluate the affected EOP to determine if instruction steps are numbered correctly.

   b. Evaluate the affected EOP to determine if the style of information presentation in the modified instruction step is consistent with the rest of the EOP Network, as outlined in the Writer's Guide.

   c. Evaluate the affected EOP to determine if step construction is consistent with the EOP Network format, as outlined in the Writer's Guide.

   d. Evaluate the affected EOP to determine if the sequencing of instruction steps is clear.

   e. Evaluate the affected EOP to determine if, when the sequence of actions is optional, it is clear to the operator.

   f. Evaluate the affected EOP to determine if the transitions for the unchanged parts of the EOP Network have been evaluated for impact.

VERIFICATION DESCRIPTION
PART C
WRITTEN ACCURACY
(continued)

3. Caution and Note content and format

   a. Evaluate the affected EOP to determine if the Note and Caution formats are consistent with the EOP Network format, as outlined in the Writer's Guide.

   b. Evaluate the affected EOP to determine if Notes and Cautions avoid inclusion of operator actions.

4. Transition step content and format

   a. Evaluate the affected EOP to determine if references and branches are used correctly and consistently with the EOP Network format.

   b. Evaluate the affected EOP to determine if referenced/branched procedures are in place prior to implementation of the revision/change.

   c. Evaluate the affected EOP to determine if references and branches redirect the operator without jumping over important information, e.g. Notes or Cautions.

   d. Evaluate the affected EOP to determine if conditions are consistent between the exit point and entry point of transitions.

TABLE TOP VALIDATION CHECKLIST

PROCEDURE NUMBER _____ REV. ____

TITLE _____

_____

	NAME/TITLE	NAME/TITLE
PARTICIPANTS:	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

	NAME/TITLE	SIGNATURE
EVALUATORS	_____	_____
	_____	_____
	_____	_____

Attach a copy of the marked up procedure pages, if changes are identified, to the completed checklist.

Route the completed package to the Operations Support Supervisor

___ Pages Attached

TABLE TOP VALIDATION CHECKLIST

This form guides the evaluation of the performance deviations identified by the Tabletop Validation method. As each main category is considered, answer the question YES or NO. If the answer is YES, complete the sub-category questions on the attached pages. The completed sub-category questions for each item answered YES must be attached to the checklist. Identify the affected part(s) of the procedure for each YES answer, in the comment section.

ITEM	CATEGORY	YES/NO
1.	An operator considered an action not specified by the procedure. If YES, complete items 1a through 1e of this checklist.	_____
2.	An operator would have performed appropriate actions in the wrong sequence. If YES, complete items 2a through 2c of this checklist.	_____
3.	An operator made an incorrect transition. If YES, complete items 3a through 3e of this checklist.	_____
4.	An operator did not operate equipment as directed by the procedure. If YES, complete items 4a through 4c of this checklist.	_____
5.	An operator selected the wrong procedure. If YES, complete items 5a through 5c of this checklist.	_____
6.	An operator recorded an inappropriate value. If YES, complete items 6a through 6d of this checklist.	_____
7.	An operator failed to perform an action specified by the procedure. If YES, complete items 7a through 7e of this checklist.	_____

TABLE TOP VALIDATION CHECKLIST (continued)

ITEM	CATEGORY	YES/NO
8.	An operator did not make a transition when required.	_____
	If YES, complete items 8a through 8d of this checklist.	
9.	An operator failed to record a required value.	_____
	If YES, complete items 9a through 9d of this checklist.	
10.	An operator was not able to complete required actions in time.	_____
	If YES, complete items 10a through 10j of this checklist.	
11.	An operator could not locate required equipment.	_____
	If YES, complete items 11a of this checklist.	
12.	An operator recorded a value after time limit.	_____
	If YES, complete items 12a through 12d of this checklist.	

TABLE TOP VALIDATION CHECKLIST (continued)

ITEM	CATEGORY	YES/NO
1a.	Information necessary to management of the emergency condition is missing.	_____
1b.	The wording is ambiguous or obscure.	_____
1c.	There are alternate success paths that are not included.	_____
1d.	There is information or equipment required to accomplish a task not specified sufficiently.	_____
1e.	There is action information in a Caution or Note.	_____
2a.	The makeup of the operating shift prevents them from following the designated action step sequence.	_____
2b.	The design of the Control Room promotes deviations from the specified sequence	_____
2c.	There is insufficient information to perform the specified actions in the required sequence.	_____
3a.	There is insufficient information for a decision at the transition.	_____
3b.	The alternatives are not adequately described at the decision point.	_____
3c.	The wording of the transition is ambiguous or obscure.	_____
3d.	If transition made to wrong procedure, there is insufficient information for the operator to find the correct procedure.	_____
3e.	If transition made to wrong step, the destination is not specified sufficiently and clearly enough to guide the operators to the correct step.	_____

TABLE TOP VALIDATION CHECKLIST (continued)

ITEM	CATEGORY	YES/NO
4a.	The labeling, abbreviations, symbols and location information in the procedure and on the equipment is insufficient for the operator to perform the required action.	_____
4b.	There is insufficient information to perform the specified actions.	_____
4c.	The Cautions and Notes are not clearly and correctly identified and understandable.	_____
5a.	The observable plant symptoms lead the operator to an inappropriate procedure.	_____
5b.	There is insufficient information for the operator to select the correct procedure.	_____
5c.	The Cautions and Notes are not clearly and correctly identified and understandable.	_____
6a.	Figures and tables are inadequately identified, or are not understandable, or readable.	_____
6b.	Values on figures and charts are difficult to determine.	_____
6c.	The operator cannot obtain the information specified in the procedure from the plant instrumentation that is provided.	_____
6d.	The instrument readings and tolerances for plant instruments are inaccurate.	_____
7a.	There is insufficient information to perform the specified actions.	_____
7b.	The makeup of the operating shift prevents them from performing the specified steps.	_____
7c.	It inadequately coordinates actions when the actions are assigned to specific shift personnel.	_____
7d.	The plant responses do not agree with the EOP basis.	_____
7e.	The Cautions and Notes are not clearly and correctly identified and understandable.	_____

TABLE TOP VALIDATION CHECKLIST (continued)

ITEM	CATEGORY	YES/NO
8a.	There is insufficient information for a decision at the transition.	
8b.	The alternatives are inadequately described at the decision point.	
8c.	The wording of the transition is ambiguous or obscure.	
8d.	The Cautions and Notes are not clearly and correctly identified and understandable.	
9a.	Figures and tables are inadequately identified, or are not understandable, or readable.	
9b.	Values on figures and charts are difficult to determine.	
9c.	The operator cannot obtain the information specified from the plant instrumentation that is provided.	
9d.	The Cautions and Notes are not clearly and correctly identified and understandable.	
10a.	There is insufficient information to perform the specified actions in time.	
10b.	The labeling, abbreviations, symbols and location information is insufficient for the operator to perform the required actions in time.	
10c.	There is information necessary to management of the emergency condition missing.	
10d.	The makeup of the operating shift prevents them from performing the procedure action steps within or at the designated time intervals.	
10e.	The procedure inadequately coordinates actions when the actions are assigned to specific shift personnel.	
10f.	The design of the control room prevents the operators from performing the designated sequence in time.	
10g.	The operator cannot obtain the information specified from the plant instrumentation that is provided.	
10h.	There is information or equipment not specified which is required to accomplish a task.	
10i.	The plant responses do not agree with the EOP basis.	
10j.	The actual instrument readings and tolerances are not consistent with the values stated.	

TABLE TOP VALIDATION CHECKLIST (continued)

ITEM	CATEGORY	YES/NO
11a.	The labeling, abbreviations, symbols and location information is not sufficient for the operator to find the needed equipment.	_____
12a.	The labeling, abbreviations, symbols and location information is not sufficient for the operator to find the needed equipment.	_____
12b.	Figures and tables are inadequately identified, or are not understandable, or readable.	_____
12c.	Values on figures and charts are difficult to determine.	_____
12d.	The operator cannot obtain the information specified from the plant instrumentation that is provided.	_____

TABLE TOP VALIDATION CHECKLIST
COMMENT SHEET
(Attach Additional Pages if necessary)

OPERATOR DEBRIEFING _____

EVALUATOR COMMENTS (Mandatory For Items Answered YES)

Signature/Date

RESOLUTION (Mandatory For Deficiencies Noted Above)

Signature/Date

SIMULATOR VALIDATION CHECKLIST

PROCEDURE NUMBER _____ REV. ____

TITLE _____

_____

	NAME	SHIFT POSITION
PARTICIPANTS:	_____	SHIFT FOREMAN
	_____	SRO
	_____	RO
	_____	BOP
	_____	STA

	NAME	SIGNATURE
EVALUATORS	_____	_____
	_____	_____
	_____	_____

☐ This session is being videotaped

☐ This session is not being videotaped (EXPLAIN)

_____

_____

_____

Attach the following information to the completed checklist:

1. Simulator Scenario
2. Marked up procedure pages, if changes are identified
3. Videotape of session (If used)

Route the completed package to the Operations Support Supervisor
___ Pages Attached

SIMULATOR VALIDATION CHECKLIST

This form guides the evaluation of the performance deviations identified by the Simulator validation method. As each main category is considered, answer the question YES or NO. If the answer is YES, complete the sub-category questions on the attached pages. The completed sub-category questions for each item answered YES must be attached to the checklist. Identify the affected part(s) of the procedure for each YES answer in the comment section.

ITEM	CATEGORY	YES/NO
1.	An operator performed an action not specified by the procedure. If YES, complete items 1a through 1e of this checklist.	_____
2.	An operator performed appropriate actions in the wrong sequence. If YES, complete items 2a through 2c of this checklist.	_____
3.	An operator made an incorrect transition. If YES, complete items 3a through 3e of this checklist.	_____
4.	An operator did not operate equipment as directed by the procedure. If YES, complete items 4a through 4c of this checklist.	_____
5.	An operator selected the wrong procedure. If YES, complete items 5a through 5c of this checklist.	_____
6.	An operator recorded an inappropriate value. If YES, complete items 6a through 6d of this checklist.	_____
7.	An operator failed to perform an action specified by the procedure. If YES, complete items 7a through 7e of this checklist.	_____

SIMULATOR VALIDATION CHECKLIST (continued)

ITEM	CATEGORY	YES/NO
8.	An operator did not make a transition when required.	_____
	If YES, complete items 8a through 8d of this checklist.	
9.	An operator failed to record a required value.	_____
	If YES, complete items 9a through 9d of this checklist.	
10.	An operator was not able to complete required actions in time.	_____
	If YES, complete items 10a through 10j of this checklist.	
11.	An operator could not locate required equipment.	_____
	If YES, complete items 11a of this checklist.	
12.	An operator recorded a value after time limit.	_____
	If YES, complete items 12a through 12d of this checklist.	

SIMULATOR VALIDATION CHECKLIST (continued)

ITEM	CATEGORY	YES/NO
1a.	Information necessary to management of the emergency condition is missing.	_____
1b.	The wording is ambiguous or obscure.	_____
1c.	There are alternate success paths that are not included.	_____
1d.	There is information or equipment required to accomplish a task not specified sufficiently.	_____
1e.	There is action information in a Caution or Note.	_____
2a.	The makeup of the operating shift prevents them from following the designated action step sequence.	_____
2b.	The design of the Control Room promotes deviation from the specified sequence.	_____
2c.	There is insufficient information to perform the specified actions in the required sequence.	_____
3a.	There is insufficient information for a decision at the transition.	_____
3b.	The alternatives are not adequately described at the decision point.	_____
3c.	The wording of the transition is ambiguous or obscure.	_____
3d.	If transition made to wrong procedure, there is insufficient information for the operator to find the correct procedure.	_____
3e.	If transition made to wrong step, the destination is not specified sufficiently and clearly enough to guide the operators to the correct step.	

SIMULATOR VALIDATION CHECKLIST (continued)

ITEM	CATEGORY	YES/NO
4a.	The labeling, abbreviations, symbols and location information in the procedure and on the equipment is insufficient for the operator to perform the required action.	
4b.	There is insufficient information to perform the specified actions.	
4c.	The Cautions and Notes are not clearly and corrected identified and understandable.	
5a.	The observable plant symptoms lead the operator to an inappropriate procedure.	
5b.	There is insufficient information for the operator to select the correct procedure.	
5c.	The Cautions and Notes are not clearly and correctly identified and understandable.	
6a.	Figures and tables are inadequately identified, or are not understandable, or readable.	
6b.	Values on figures and charts are difficult to determine.	
6c.	The operator cannot obtain the information specified in the procedure from the plant instrumentation that is provided.	
6d.	The instrument readings and tolerances for plant instruments are inaccurate.	
7a.	There is insufficient information to perform the specified actions.	
7b.	The makeup of the operating shift prevents them from performing the specified steps.	
7c.	It inadequately coordinates actions when the actions are assigned to specific shift personnel.	
7d.	The plant responses do not agree with the EOP basis.	
7e.	The Cautions and Notes are not clearly and correctly identified and understandable.	

SIMULATOR VALIDATION CHECKLIST (continued)

ITEM	CATEGORY	YES/NO
8a.	There is insufficient information for a decision at the transition.	
8b.	The alternatives are inadequately described at the decision point.	
8c.	The wording of the transition is ambiguous or obscure.	
8d.	The Cautions and Notes are not clearly and correctly identified and understandable.	
9a.	Figures and tables are inadequately identified, or are not understandable, or readable.	
9b.	Values on figures and charts are difficult to determine.	
9c.	The operator cannot obtain the information specified from the plant instrumentation that is provided.	
9d.	The Cautions and Notes are not clearly and correctly identified and understandable.	
10a.	There is insufficient information to perform the specified actions in time.	
10b.	The labeling, abbreviations, symbols and location information is insufficient for the operator to perform the required actions in time.	
10c.	There is information necessary to management of the emergency condition missing.	
10d.	The makeup of the operating shift prevents them from performing the procedure action steps within or at the designated time intervals.	
10e.	The procedure inadequately coordinates actions when the actions are assigned to specific shift personnel.	
10f.	The design of the Control Room prevents the operators from performing the designated sequence in time.	
10g.	The operator cannot obtain the information specified from the plant instrumentation that is provided.	
10h.	There is information or equipment not specified which is required to accomplish a task.	
10i.	The plant responses do not agree with the EOP basis.	
10j.	The actual instrument readings and tolerances are not consistent with the values stated.	

SIMULATOR VALIDATION CHECKLIST (continued)

ITEM	CATEGORY	YES/NO
11a.	The labeling, abbreviations, symbols and location information is not sufficient for the operator to find the needed equipment.	_____
12a.	The labeling, abbreviations, symbols and location information is not sufficient for the operator to find the needed equipment.	_____
12b.	Figures and tables are inadequately identified, or are not understandable, or readable.	_____
12c.	Values on figures and charts are difficult to determine.	_____
12d.	The operator cannot obtain the information specified from the plant instrumentation that is provided.	_____

SIMULATOR VALIDATION CHECKLIST
COMMENT SHEET
(Attach Additional Pages if necessary)

OPERATOR DEBRIEFING _____

EVALUATOR COMMENTS (Mandatory For Items Answered YES)

Signature/Date

RESOLUTION (Mandatory For Deficiencies Noted Above)

Signature/Date