PROCEDURES GENERATION PACKAGE

SAN ONOFRE NUCLEAR GENERATION SITE

UNIT 1

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PROCEDURES GENERATION PACKAGE

PART A

OVERVIEW AND TECHNICAL GUIDELINES

OVERVIEW AND TECHNICAL GUIDELINES

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1.0 INTRODUCTION

1.1 Purpose

The purpose of the Procedures Generation Package (PGP) is to provide a description of the process used to upgrade the San Onofre Nuclear Generation Site, Unit 1 Emergency Operating Instructions (EOI's). The process utilizes upgraded technical, writing, validation, and training bases to develop and implement EOI's.

1.2 Scope

1.2.1 The EOI upgrade process is documented in response to Item 7.2.b, Supplement 1 of NUREG-0737, "Requirements for Emergency Response Capability," as committed to in SCE letter to Mr. D. G. Eisenhut from Mr. K. P. Baskin dated April 21, 1983. The guidance presented in NUREG-0899, "Guidelines for the Preparation of Emergency Operating Procedures," was used in developing the upgrade process. NUREG-0899 provides guidance for determining that the requirements of Title 10 Code of Federal Regulations, Part 50.34(b)(6)(ii), have been met. NUREG-0899 also provides guidance on the recommendations of NUREG-0737, Item I.C.1 "Emergency Operating Procedures."

1.2.2 The EOI's are based on Westinghouse Emergency Response Guidelines. The guidelines were determined to be acceptable for implementation as stated in NRC letter D. G. Eisenhut to J. J. Sheppard, dated June 1, 1983. The letter transmitted the Safety Evaluation (Report) by the Office of Nuclear Reactor Regulation in the Matter of Westinghouse Owners Group Emergency Response Guidelines. The EOI upgrade does not attempt to resolve any open Safety Evaluation Report issues. However, as these issues are resolved, the EOI's will be reviewed and revised as necessary to incorporate the resolutions.

1.2.3 Ongoing work by the NRC and its contractors is continuously being reviewed by the Southern California Edison Company (SCE) and industry groups such as the Institute of Nuclear Power Operations (INPO) for appropriate EOI incorporation.

1.2.4 Tasks relating to the Safety Parameter Display System; Regulatory Guide 1.97 Rev. 2, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident"; and Detailed Control Room Design Review are not required to be addressed by this package. However, results of these tasks will be incorporated into the Unit 1 EOI's as applicable.

1.2 Scope (Continued)

1.2.5 The parts of this package dealing with the Technical Guidelines, Writer's Guide, Validation Program, and Training Program are presented herein as autonomous sections. This was done to facilitate subsequent incorporation, as applicable, into the site document system. The various PGP parts may be revised before and after incorporation into the site document system. This revision process is not intended to alter nor diminish the integrity of the development process. Rather, this would be done to improve directional clarity for the ongoing revision process vice the completed upgrade process, to incorporate lessons learned in the execution of the upgrade program steps, etc.

1.2.6 Contracted assistance was obtained from Westinghouse in adapting the Emergency Response Guidelines to account for differences in plant design.

1.2.7 References stated in the Procedures Generation Package are current for the time of this submittal.

1.3 Background

- Westinghouse Owners Group (WOG)

  Following the accident at TMI-2, the NRC staff required licensees of operating plants, applicants for operating licensees, and licensees of plants under construction to perform analyses of transients and accidents, prepare emergency procedure guidelines, upgrade emergency procedures including procedures for operating with natural circulation conditions, and conduct operator retraining. Following a review of the initial responses by licensees and applicants to these requirements, the NRC staff issued clarifications and additional requirements for development of procedural guidelines. These are contained in Item I.C.1 of NUREG-0737 and in Supplement No. 1 of NUREG-0737.

  The Westinghouse owners formed a group for procedures development shortly after the TMI-2 accident. The original tasks of the group were to provide generic guidance in the areas of safety injection reinitiation/termination criteria, reactor coolant pump trip criteria, and use of multiple instrument indications to guide operator actions. This scope was expanded to reflect the NRC staff requirements, including multiple failure considerations.

1.3 Background (Continued)

- Westinghouse Owners Group (WOG) (Continued)

  The WOG responded to the NRC requirements by performing an evaluation of potential multiple failure events and their consequences using event tree methodology. This evaluation was issued in WCAP-9691, "NUREG-0578 2.1.9.c Transient and Accident Analysis." Following discussions with the NRC staff, the owners embarked on a comprehensive program of procedural guideline development.

  A significant portion of the total package of "High Pressure" Emergency Response Guidelines (ERGs) was completed and sent to the NRC staff for review in November of 1981. Portions of a second ERG "Low Pressure" version were transmitted to the NRC staff in July 1982. On January 4, 1983, the WOG transmitted to the NRC (1) additional guidelines and additional supporting background material for the low pressure version and (2) a revision of a substantial portion of the guidelines and background material for the high-pressure version. Staff evaluation of these transmittals was reported in the SER previously discussed in 1.2.2.

- San Onofre Unit 1 Upgrade

  The Unit 1 EOI set was in place for several years prior to the Three Mile Island event. As such, these EOI's were routinely revised in response to operator feedback, plant design changes, administratively required revisions as well as a variety of other sources. Following the TMI event in early 1979, the impetus for revising the EOI's came primarily from the evolving lessons learned from that event. Regulatory as well as industry efforts provided information that was reviewed and incorporated as applicable into the EOI's. Therefore, the early 1982 EOI set represented years of accumulated review and revisions as well as a great deal of feedback from the TMI event.

  As the result of previous correspondence and a meeting on March 2, 1982, the NRC forwarded a request on April 7, 1982, for additional information concerning "steam line breaks inside/outside containment." In considering the nature of the requested information, the developed condition of the WOG ERG set, and the need for supporting analysis, it was determined that Westinghouse should be contracted to assist in developing the required response. The response was to consist of new EOI's, as well as revision of existing EOI's, that incorporated the generic guidance and 2-column format of the WOG ERG set. Additionally, the response was to include supporting analysis for selected aspects of the submitted EOI's.

1.3 Background (Continued)

- San Onofre Unit 1 Upgrade (Continued)

Having identified the need to accomplish the NUREG-0737 I.C.1. EOI upgrade, an SCE project group was in the process of being formed. This project group, with Westinghouse support, was assigned to develop the needed response. The project group consisted of the following:

1 Project Manager (contract)	- Captain, USN retired, Navy Nuclear Power Program
3 Operators (1 contract)	- RO and SRO licensed on Unit 1, more than 10 years average experience at Unit 1
1 Engineer	- Site Engineering Department
1 Engineer	- Nuclear Analysis Department
1 Westinghouse onsite representative	- Westinghouse (Pittsburgh) procedural development and analysis

A telephone call to the NRC on April 6, 1982, discussing our response approach to their information request confirmed the appropriateness of our intended actions. Work was then started on the "short-term" EOI upgrade project. Short-term was utilized to internally identify the working group as well as the resulting EOI's in that all upgrade activity was scheduled to accommodate a planned startup date of June 4, 1982. A preliminary EOI set and required analysis was transmitted to the NRC by letter dated May 20, 1982. The EOI's were subsequently reviewed by Pacific Northwest Laboratory, under contract to the NRC.

The project group was augmented in mid-1982 by the addition of a contracted human factors expert. The planned startup date was rescheduled to December 1982 permitting the incorporation of human factor principals as well as pre-implementation training feedback comments into the previously transmitted EOI's. Closure of the short-term EOI upgrade was achieved with transmittal of the Onsite Review Committee approved EOI's to the NRC by letter dated September 13, 1982.

1.3 Background (Continued)

- San Onofre Unit 1 Upgrade (Continued)

  Utilizing the existing short-term EOI's and project personnel, a long-term EOI upgrade was initiated. This effort resulted in the development of an EOI set with supporting background documents. Additional (4) personnel from the site engineering department, who function as shift technical advisors, were recruited to assist in the developmental process.

  As identified in a February 10, 1983 letter to the NRC, the resources necessary to respond to the Supplement 1 NUREG-0737 requirements were being otherwise utilized to complete the seismic modifications. The EOI upgrade continued with reduced resources until October 1983 when the project working set was issued. Although not fully completed nor simulator validated, it was determined that issuance of the set represented a significant improvement in EOI structure and content. Additionally, incorporation of the upgraded EOI's into initial operator training as well as classroom and simulator retraining sessions would provide feedback for future incorporation.

  With the actions necessary to be completed for Unit 1 return to service well established, a project group was again formed in mid-1984. This group conducted a formal simulator validation of the existing EOI set followed by a revision to the EOI's incorporating validation feedback as well as comments from a variety of sources. This EOI set was issued in November 1984. These upgraded EOI's reflect completion of the overall upgrade process as described in 2.0.

In response to Item I.C.1 of NUREG-0737 as clarified in Supplement 1, and as required in Item 7.2.b, this Procedure Generation Package is submitted. It integrates the efforts of the WOG Emergency Procedure Guidelines; the Writer's Guide; and previous EOI efforts.

2.0 UPGRADE PROCESS

2.1 Resources and Organization

San Onofre Unit 1 EOI's were upgraded by a multidiscipline team familiar with the development process and the plant, and consisting of licensed operators, design engineers, and contracted Westinghouse and human factors support. A multidisciplined group is necessary to maintain compliance with the requirements set forth in the Technical Guidelines, Writer's Guide, and Validation Program.

2.2 Process Description

The upgrading and revision of EOI's is a process consisting of several steps. The process steps are: 1) establish a technical basis, 2) develop a writing method, 3) write the EOI's, 4) validate the EOI's, 5) train the operators to use the EOI's, 6) implement the revised EOI's. The process is illustrated in Figure 1. The process elements taken collectively are a description of the methods used to convert the generic guidelines to EOI's, and continuing through actual implementation of the EOI's. The elements are the WOG Guidelines, the Writer's Guide, a description of the Validation Program, and a description of the Training Program. The four elements are more fully described elsewhere in this Procedures Generation Package.

The writing of EOI's is performed in the third process step. The writer is tasked with implementing the WOG guidelines, the Writer's Guide, and operating experience thereby generating EOI's. The WOG guidelines and supporting information identify the plant objectives to be met, the systems required, the required level of performance, the required operator actions, and the strategy with which the actions are to be carried out.

The writer also identifies additional strategies, functions, tasks, and analysis needed to prepare the EOI's. The writer or writing team integrates the EOI process elements based on operating experience, writing methods, engineering, plant design features and operating characteristics. While integrating the process elements, the writer adds subsystem and component detail to the EOI. Finally, administrative requirements for emergency plant operation are incorporated into the EOI's.

2.3 Implementation and Revision

EOI implementation as well as subsequent revisions will be accomplished in accordance with the following Administrative Procedures:

- SO123-VI-0.9, "Documents - Author's Guide to the Preparation of Site Orders, Procedures and Instructions" which provides direction on site document indexing and preparation.

2.3 Implementation and Revision (Continued)

- SO123-VI-1.0, "Documents - Review and Approval Process for Site Orders, Procedures and Instructions" which provides direction on the site document review and approval process.

- SO1-VI-1.0.4, "Unit 1 Emergency Operating Instructions - Preparation, Revision and Validation" which is developed from applicable PGP parts and provides amplifying direction specific to that portion of the site document system consisting of the Unit 1 EOI's.

Following EOI implementation, the Operations Procedure Group (OPG) should assume responsibility for the EOI's. Administrative controls used by the OPG to prepare, review and issue EOI's as well as other operating instructions is contained in Operating Instruction SO1-14-24, "Operations Procedure Group Organization and Operation." Items that may affect procedure revision are forwarded to the OPG from a variety of sources. These sources include but are not limited to the following:

- Amendments to the Technical Specifications

- Amendments to the Final Safety Analysis Report

- Proposed Facility Changes

- Design Change Packages

- Temporary Change Notices

- Revision requests submitted to OPG per SO1-14-42, "Responsible Use of Procedures"

- Vendor-supplied information

- Feedback of operating experience

- Review comments from Project Support, Engineering, Management, and Bechtel Power Corporation

- Westinghouse Owners Group

Configuration Control Procedure SO123-XIV-3.1, "Configuration Document Change Control" provides an additional source of input for OPG consideration. This procedure provides a system for identifying, recording, and monitoring completion of changes to identified documents resulting from physical changes to Unit 1 and/or other Configuration Documents.

Should the information received by the OPG indicate that an EOI revision is warranted, previously discussed Administrative Procedures SO123-VI-0.9, SO123-VI-1.0, and SO1-VI-1.0.4 will be utilized in effecting the revision development and implementation.

FIGURE 1

EOI UPGRADE PROCESS

	PROCESS STEPS	ELEMENTS	SUPPORTING INFORMATION
1	TECHNICAL BASIS	WOG GUIDELINES	-- WESTINGHOUSE PLANT SPECIFIC GUIDANCE -- PREVIOUS INSTRUCTIONS -- OPERATING HISTORY -- STATION DOCUMENTATION OF CONFIGURATION -- STATION FACILITY CONFIGURATION -- WOG AND LICENSING ISSUES
2	WRITING METHOD	WRITER'S GUIDE	-- INPO WRITER'S GUIDE -- WESTINGHOUSE WRITER'S GUIDE -- HUMAN FACTORS CONSULTANT -- ADMINISTRATIVE PROCEDURES
3	EOI WRITING	-- WOG GUIDELINES -- WRITER'S GUIDE	OPERATING EXPERIENCE
4	VALIDATION	VALIDATION PROGRAM	-- INPO VALIDATION GUIDE -- INPO VERIFICATION GUIDE
5	TRAINING	TRAINING PROGRAM	-- WOG LESSON PLANS -- TRAINING MEMORANDA
6	IMPLEMENTATION		-- ADMINISTRATIVE PROCEDURES

3.0 TECHNICAL GUIDELINES

3.1 Introduction

Technical guidelines are documents that identify equipment or systems to be operated, and list the necessary steps to (1) mitigate the consequences of transients and accidents, and (2) restore safety functions. They represent the translation of engineering data derived from best estimate transient and accident analyses into information presented in such a way that it can be used to write EOI's.

3.2 Description

San Onofre Unit 1 utilized the WOG Guidelines to upgrade the current EOI's. The process used to convert the generic guidelines to plant specific EOI's is described in Section 2. The guideline information was implemented with Westinghouse having completed the following program plan:

TASK NO.	DESCRIPTION
1	a. Review existing SONGS #1 reference procedures.
	b. Review existing SONGS #1 plant-specific analysis base.
	c. Delineate technical basis of existing reference procedures.
	d. Prepare top-level logic diagrams of existing reference procedures.
2	a. Review and evaluate NRC and utility concerns with existing reference procedures.
	b. Identify areas in reference procedures which require upgrading.
3	a. Identify required plant-specific analyses support for procedures upgrade program.
4	a. Define required technical changes to procedures.
	b. Modify reference logic diagrams which were developed in Task 1d.
	c. Mark-up appropriate ERG's to replace existing SCE reference emergency procedures.

3.2 Description (Continued)

TASK NO.	DESCRIPTION
5	Write emergency procedures at site, using marked-up ERG's developed in Task 4c as basis. (This task to be carried out by SCE personnel under Westinghouse direction).
6	Prepare training package for plant operations and engineering staff. (Package will consist of summarized results of plant-specific analysis and modified logic diagrams which match the marked-up ERG's developed in 4c; general guidance on use of procedures in 2-column format will also be presented).
7	Review revised emergency procedures for technical accuracy and consistency with human factors requirements.

The results of these Westinghouse tasks is termed Westinghouse plant specific guidance on Figure 1.

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PROCEDURES GENERATION PACKAGE

PART B

EMERGENCY OPERATING INSTRUCTION WRITER'S GUIDE

EMERGENCY OPERATING INSTRUCTION WRITER'S GUIDE

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EMERGENCY OPERATING INSTRUCTION WRITER'S GUIDE

1.0 INTRODUCTION

1.1 Purpose

The purpose of this document is to provide administrative and technical guidance for the preparation and revision of Emergency Operating Instructions (EOI's) for San Onofre Unit 1.

1.2 General

- As discussed in Part A, Section 1.2.5 of this package, the contents of this part of the PGP will be incorporated into the site document system. The current identification of this document is Administrative Procedure SO1-VI-1.0.4, "Unit 1 Emergency Operating Instructions - Preparation, Revision and Validation."

- Each Emergency Operating Instruction consists of two parts:

  Operating Instruction. Step-by-step instructions directing operator actions necessary to mitigate the consequences of transients and accidents that have caused plant parameters to exceed Reactor Protection System set points or Engineered Safety Feature set points, or other established limits.

  Background Document. Provides the technical bases for the Operating Instruction.

- Critical Safety Function Status Trees (CSFST's) are a special category of EOI that review control room indications for symptoms that indicate a threat to plant safety. This EOI consists of six (6) CSFST's and a Background Document.

2.0 COVER PAGE FORMAT

Each EOI has a cover page (see Figure 1) originating from SCE form number, SCE 50-20-1. Information that is generally consistent with the guidance provided in Administrative Procedure SO123-VI-0.9, "Documents, Author's Guide to the Preparation of Site Orders, Procedures and Instructions," is entered on the cover page form for the indicated purpose as follows:

2.1 NUCLEAR GENERATION SITE

Identifies the generation site within the Southern California Edison Company to which this document applies.

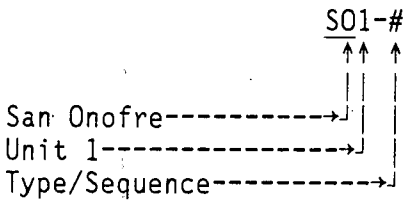
2.2 EMERGENCY OPERATING INSTRUCTION

Identifies the document type within the system site document system.

2.3 SO#-#

Uniquely identifies the document by site, unit and type/sequence number for use and retrieval purposes.

EXAMPLE:



2.4 REVISION #

Identifies the revision number.

2.5 PAGE # OF #

Identifies the page number and the total number of document pages.

2.6 TITLE

Descriptive heading of the procedure scope.

2.7 EFFECTIVE DATE _____

A date is entered in the space provided designating the effectivity of the document.

2.8 PURPOSE

Text area contains a narrative description of the procedure objectives followed by a line across the page.

2.9 Text area may include alarms, indications, operating conditions, automatic system actions, etc. indicative of the conditions for which the EOI is intended.

FIGURE 1

EXAMPLE COVER PAGE

NUCLEAR GENERATION SITE
UNIT 1

EMERGENCY OPERATING INSTRUCTION SO1-1.0-10
REVISION 1
PAGE 1 OF 60

REACTOR TRIP OR SAFETY INJECTION

EFFECTIVE DATE _____

PURPOSE

The purpose of this instruction is to verify proper response to the automatic protection systems following initiation of a REACTOR TRIP OR SAFETY INJECTION and to assess plant conditions and identify the appropriate instruction implementation for the specific condition present.

This EOI will be implemented when the Reactor trips, or should have tripped, i.e., a trip setpoint is reached but a trip has not occurred. This EOI will also be used if Safety Injection or Loss of Power occurs while the Unit is in Modes 1 through 3.

SYMPTOMS

Reactor Trip Symptoms:

1. A REACTOR TRIP ANNUNCIATOR INITIATED WITH PARTIAL TRIP ANNUNCIATORS AND PLANT INDICATIONS CONFIRMING NEED FOR UNIT TRIP.
2. REACTOR TRIP BREAKERS OPENED.
3. CONTROL RODS FULLY INSERTED.
4. NEUTRON FLUX RAPIDLY DECREASING.

Safety Injection Initiation Symptoms:

1. SAFETY INJECTION ANNUNCIATOR INITIATED.
2. SLSS LOAD GROUP LIGHTS OFF.

3.0 INSTRUCTION PAGE FORMAT

Each EOI instruction page (see Figure 2) originates from SCE form number SCE 50-20-2. Information from the cover page (2.1 through 2.6) as well as instructional direction in a two-column format is entered on the instruction page as follows:

3.1 The left-hand column is entitled ACTION/EXPECTED RESPONSE (A/ER).

- The A/ER text contains the action steps to be taken and/or the response which should be obtained after completion of the steps. The action steps consist of top-level and sub-level statements.
- The top-level portion of the action step directs broad actions. The statement begins with a capitalized action verb followed by text in which the first letter of each word is capitalized. The text is underlined and ends with a colon.
- The sub-level portion of the action step directs specific tasks. The statement begins with the first letter of the first word capitalized followed by text.
- When a desired action or response is not obtained, the operator looks to the right-hand column for further direction.

3.2 The right-hand column is entitled RESPONSE NOT OBTAINED (RNO).

- The RNO text contains the contingency action steps to be taken if an ACTION/EXPECTED RESPONSE is not obtained. The need for contingency action occurs in conjunction with tasks involving verification, observation and confirmation. Where an appropriate contingency action is not possible or desired, no RNO will be specified for the step or substep.
- RNO's should be specified for each circumstance in which the A/ER might not be achieved. RNO's should provide appropriate directions to override automatic controls and to initiate manually what is normally initiated automatically.
- At the completion of the RNO step or substep, or if the RNO step or substep cannot be satisfied, the operator returns to the A/ER column and proceeds with the next step or substep, as appropriate, unless specifically directed to another point.

3.3 Action steps are identified by Arabic numerals aligned under the STEP heading.

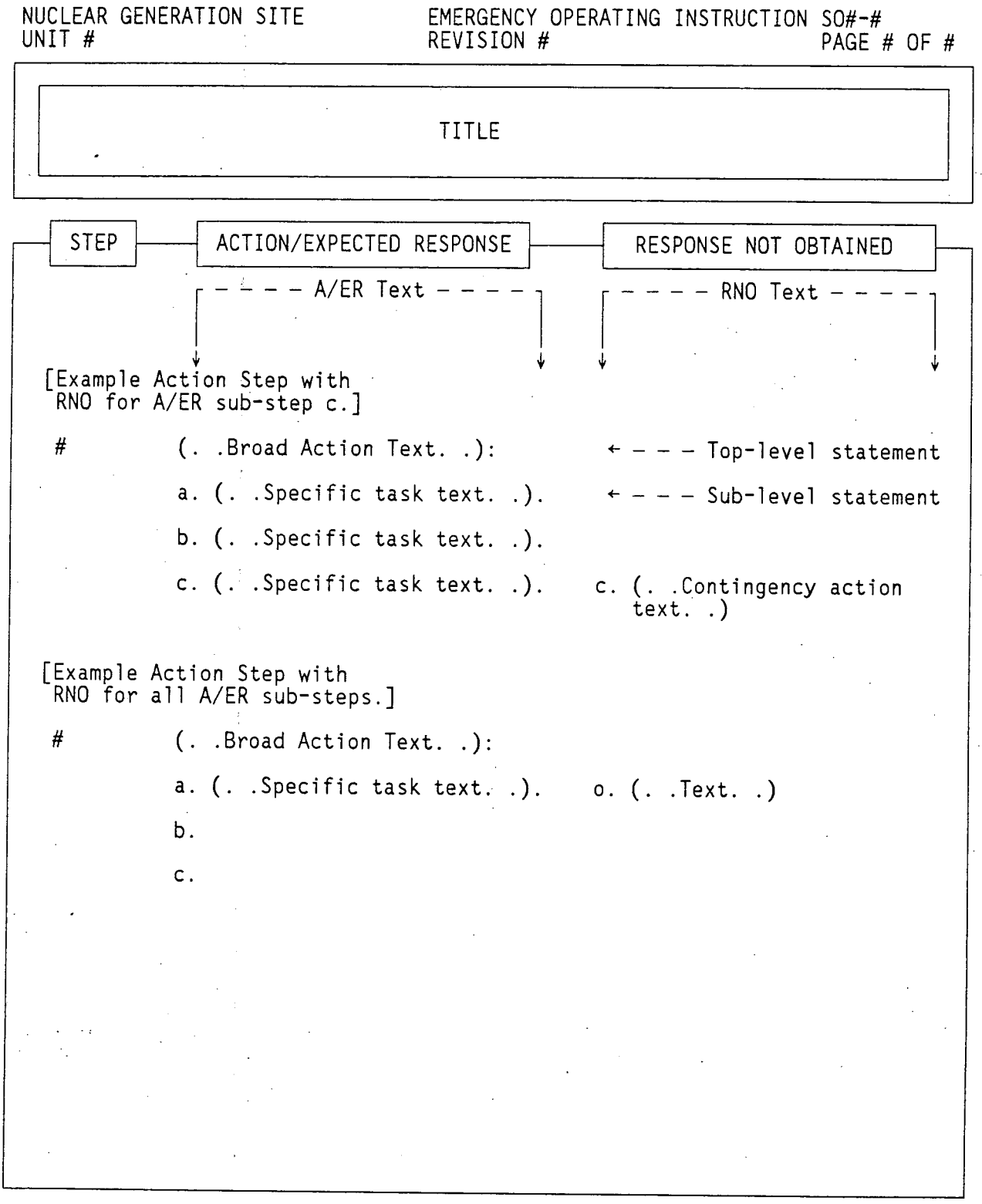
- Multiple sub-level statements are identified by lower case letters, aligned under the top-level statement. The same lower case letters identify corresponding sub-steps in both columns. For example, sub-step "c." in the right hand column is the contingency action for sub-step "c." in the left hand column.

- When multiple left hand column A/ER sub-steps exist, and the right hand column RNO sub-step(s) are applicable to all A/ER sub-steps, the RNO sub-step is not rewritten for each A/ER sub-step, but is written only once and identified with a bullet (o).

- Step numbers in the opening sequence of SO1-1.0-10, Reactor Trip or Safety Injection are circled to designate them as Immediate Operator Actions. These actions generally verify the actuation of safety systems and are to be performed without delay. Operators are to be able to carry out these steps without necessarily having to refer to the instruction.

FIGURE 2

EXAMPLE INSTRUCTION PAGE



4.0 WRITING INSTRUCTIONAL STEPS

4.1 General

Instruction steps should be short and exact. The following general rules should be used to meet these objectives:

- Instruction steps should deal with only one idea.
- Short, simple sentences should be used in preference to long, compound, or complex sentences.
- Complex evolutions should be prescribed in a series of steps, with each step made as simple as practicable.
- Objectives of operator actions should be specifically stated; that is, identify exactly that which needs to be done, and to what.
- The objects should be listed for instructional steps that involve an action verb relating to three or more objects.
- Limits should be expressed quantitatively whenever possible.
- Expected results of routine tasks need not be stated.
- When system response dictates a time frame within which the instruction must be accomplished, prescribe that time frame. However, when possible, avoid using time to initiate operator actions. Operator actions should be related to plant parameters.
- When additional confirmation of system response is considered necessary, required backup readings should be prescribed.

4.2 Level of Detail

Excessive detail in the EOI's should be avoided in the interest of timely and effective execution of the instructions. The level of detail desired is that amount a newly trained and licensed operator would need during an emergency condition. The following general rules should be used to meet this objective:

- For control circuitry that executes an entire function upon initiation by the control switch, use the action verb appropriate to the component without further amplification of how to manipulate the control device. Recommended action verbs are as follows:

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

  -- For valves, use Open, Close, Throttle Open, Throttle Close, Throttle.

  -- For power distribution breakers, use Close and Trip.

- For control switches, use the verb "Select" along with the engraved name of the desired position fully capitalized.

  EXAMPLE: Select AUTO on the Steam Dump Mode Selector Switch.

- Standard practices used to observe abnormal results need not be prescribed within procedural steps. For example, observation of noise, vibration, erratic flow, or discharge pressure need not be specified in steps that start pumps.

- Equipment, controls, and displays should be identified in operator language (common usage) terms. These terms should be the same as the panel engraved names.

  -- If the component is seldom used, or if the component would be difficult to find, location information should be given in parentheses following the identification or represented in a plant arrangement drawing.

4.3 Cross-referencing Within and Among Procedures

Information necessary to perform a task should be consolidated in one place, if possible. The need to go from one procedure (or part) to another during a sequence of actions is disruptive and can cause errors or unnecessary delays. Consequently, once the sequence of actions has begun they should continue without interruption. When the expected sequence of actions in the A/ER column is disrupted, the operator enters the RNO column for additional direction. Therefore, the bulk of cross-referencing occurs here in an effort to fully apprise the operator of alternative actions. The cross-referencing actions may require the operator to skip steps, return to an earlier step, go to another instruction, or perform a step or instruction in parallel with the step being performed. The following rules should be utilized when the need for cross-referencing occurs:

- Transitioning to other steps or instructions from the A/ER column should generally be avoided unless the direction to do so appears as the last substep of an A/ER step.
- The RNO cross-referencing direction should be positioned in the last line of text.
- When cross-referencing to another step within the EOI, it is not necessary to utilize the term "of this instruction."
- Direction to a step should be positioned such that the word step and corresponding identification information are on the same line of text.
- Direction to another instruction should contain the document identification information as well as the title fully capitalized.

4.4 Logic Statements

4.4.1 The logic terms AND, OR, NOT, IF, WHEN, and THEN are often necessary to describe precisely a set of conditions or sequence of actions. When logic statements are used, the logic terms should be highlighted so that the conditions are clear to the operator. Emphasis is achieved by capitalization, underlining, and positioning.

EXAMPLE: IF (. . text . . NOT . . text . .),

THEN (. . text . .).

4.4 Logic Statements (continued)

4.4.2 When action steps are contingent upon certain conditions or combinations of conditions, the step should begin with the words IF or WHEN followed by a description of the condition followed by the action to be taken.

- IF is used for an unexpected but possible condition.
- WHEN is used for an expected condition.
- The logic word THEN should not be used at the end of an action to instruct the operator to perform another action within the same step, because it runs actions together. Actions which are embedded in this way (1) may be overlooked and not be performed, (2) make it difficult to verify the performance of each action step and, (3) can be confused with a logic statement.

EXAMPLE: (Bad Practice) Verify normal charging flow path path isolated, THEN cooldown pressurizer with auxiliary spray.

4.4.3 When attention should be called to combinations of conditions, the word AND should be centered between the description of each condition.

EXAMPLE: (. . . Description Text . . .)

AND

(. . . Description Text . . .)

- In order to simplify a long sequence of conditions, the word AND should not be used to join more than four conditions. If more than four conditions need to be joined, a list format should be used.

EXAMPLE: IF all of the following conditions are met:

(. . Condition 1 Text . .)
(. . Condition 2 Text . .)
(. . Condition 3 Text . .)
(. . Condition 4 Text . .)
(. . Condition 5 Text . .)
:
:

THEN (. . . Action Text . . .)

4.4 Logic Statements (continued)

- When used as a simple or compound conjunction, the word "and" need not be emphasized (e.g., to connect actions in a step, as in: "stop SI pumps and place them in standby").

4.4.4 When attention should be called to alternative combinations of conditions, the word OR should be centered between the description of each condition.

- The use of the word OR, for conditions, should be in the inclusive sense, i.e., any one or all conditions may be present.

- For alternative actions, the use of OR should be minimized and priorities should be established where possible. If priorities cannot be established, and alternative actions are equally acceptable, then it is necessary to specify and qualify the exclusive "or".

  EXAMPLE: Start either A pump OR B pump, but not both.

4.4.5 Conditional Statements

Since logic statements supply conditional information, the operating instructions should provide statements which describe the condition of the plant, system or device being operated.

Condition words are highlighted for operator recognition with emphasis achieved by hyphenation, spacing and capitalization.

EXAMPLE: Check containment pressure
- LESS THAN 10 PSIG.

The volume of conditional statement words should be limited so as to obtain uniformity in their usage and meaning as well as action step execution.

The following is a list of the preferred Condition Words to be used, and their definitions:

AT PRESET POSITION - pre-established position, i.e., position of AFW control valves for automatic operation.

AVAILABLE - a system, subsystem, train, component, or device is operable and can be used as desired; however, it need not be operating.

4.4.5 Conditional Statements (continued)

AUTO	- system is functioning without manual action being required.
BLOCK	- switch position to defeat a signal from initiating some further action.
CLOSED	- fully closed; for a breaker position means power going to the component.
DEENERGIZED	- power removed from.
DECREASING	- lowering or becoming less in magnitude.
ENERGIZED	- power supplied to.
GREATER THAN	- of larger magnitude.
INCREASING	- raising or becoming greater in magnitude.
INITIATED	- system or component functioning as a result of meeting some start criteria.
INSERTED	- fully in place i.e., control rods fully inserted.
IN SERVICE	- system or component in use.
LESS THAN	- of less magnitude.
ON/OFF	- switch positions to supply or remove power, respectively.
OPEN	- fully open; for a breaker position means no power going to the component.
OPERATING	- a system, subsystem, train, component, or device is in operation and is performing its specified function(s).

4.4.5 Conditional Statements (continued)

RESET - breaker or control circuit repositioned to prepare for future operation.

RUNNING - component which is functioning or operating.

STABLE - condition in which there is no significant deviation.

TRENDING TO - parameter increasing or decreasing in a controlled manner to a stated value.

4.5 Caution and Note Statements

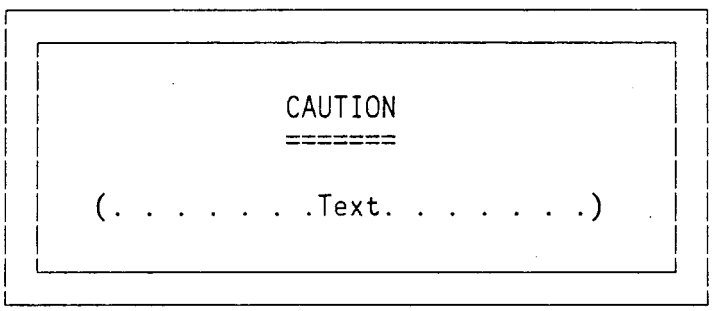
4.5.1 Cautions

- Caution statements should contain information used to prevent actions which could injure plant personnel, damage equipment, or endanger public health and safety. The following general rules should be considered in developing cautions:
  - -- The text should be accurate and concise.
  - -- The text should contain only information relevant to the caution.
  - -- The text should not contain operator actions.
- Highlighting the caution statements ensures the operator will observe the caution before performing the step(s). The following general rules for formatting should be used to meet this objective:
  - -- Cautions which apply to the entire instruction should be positioned on the first instruction page before the first action step.
  - -- Cautions that refer to action step(s) should be positioned immediately before the step(s) and on the same page, whenever possible.
  - -- The caution text is positioned within a double lined box, centered on the page.

4.5.1 Cautions (continued)

-- The word "CAUTION" is positioned within the box, centered, capitalized and underlined with two broken lines.

EXAMPLE:



4.5.2 Note Statements

- Note statements remind operator(s) of supplemental information such as correct sequence. The following general rules should be considered in developing notes:

  -- The text should be accurate and concise.

  -- The text should contain only information relevant to the note.

  -- The text should not contain operator actions.

- Highlighting the note statements ensures the operator will observe the note before performing the step(s). The following general rules for formatting should be used to meet this objective:

  -- Notes which apply to the entire instruction should be positioned on the first instruction page before the first action step.

  -- Notes that refer to action step(s) should be positioned immediately before the step(s) and on the same page, whenever possible.

  -- The note text is positioned within a single-lined box, centered on the page.

4.5.2 Note Statements (continued)

-- The word "NOTE" is positioned within the box to the left of the first line of text, capitalized and followed with a colon.

EXAMPLE:

NOTE: (. . . Text . . .)

4.6 Use of Recurrent, Time Dependent and Diagnostic Steps

4.6.1 Recurrent Steps

Recurrent steps are defined as steps requiring an operator to repeatedly perform a given action (typically, monitoring or controlling a given plant parameter) for a number of cycles or over a specified length of time.

When a recurrent step is used, direction should be provided as to when or how often the step is to be performed and under what conditions to stop.

4.6.2 Time Dependent Steps

The EOI's rarely require the use of time dependent steps. These are steps required of an operator at some specified time interval, or some time after an action has taken place. An operator aid such as a checklist or graph may be used to clarify the step to the operator.

The EOI's may provide critical time information in a CAUTION.

EXAMPLE:

CAUTION ======= If RCS cold leg temperatures are less than 350°F, it is important to Reactor Vessel Integrity that SI be terminated immediately when SI termination criteria is met.

4.6.3 Diagnostic Steps

With the exception of SO1-1.0-10, REACTOR TRIP OR SAFETY INJECTION, the EOI's do not utilize diagnostic steps, per se. However, the Critical Safety Function Status Trees assist the operator in diagnosing the loss of a critical safety function and provide clear and unambiguous referencing to the appropriate EOI.

5.0 MECHANICS OF STYLE

5.1 Vocabulary

The simplest, most familiar, and most specific words that accurately convey the intended meaning should be used. Operators should understand all words used in the procedures. To achieve this overall objective, the following guidance should be followed:

- Use short words that are common in ordinary conversation.
- Use simple well-defined words.
- Use words and meanings consistently throughout the instructions.
- Use words with unambiguous meanings.
- Use concrete and specific words that describe precisely what the operator is to do or observe.
- Use nomenclature and idioms that the operator is trained to use and which are standard in the nuclear power industry.
- Use words which are familiar to control room operators.
- Use units of measure that are familiar to the operator. The operator should be able to relate the units to those referenced on plant instrumentation without conversion, translation or mental manipulation.
- Avoid using adverbs that are difficult to define in a precise manner (e.g., frequently, slowly) unless the alternative is more confusing.
- See Table 5-1 at the end of this section for a list of preferred verbs that should be used.

5.2 Abbreviations And Acronyms

The use of abbreviations and acronyms should be minimized as they may be confusing to those who are not thoroughly familiar with them. They may be used where necessary for time and space considerations provided their meaning is clear to the operator without the use of a glossary. The following general rules should be used to meet this objective:

- Where applicable, use the same abbreviations and acronyms as marked on equipment.
- Uniformly capitalize all letters within abbreviations and acronyms. Omit the periods except in cases where the omission might result in confusion.
- Pluralization of abbreviations/acronyms should be accomplished by following the last letter with an apostrophe and then a lower case letter "s".
- See Table 5-2 at the end of this section for a list of preferred abbreviations and acronyms.

5.3 Spelling And Hyphenation

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

5.3.2 The following rules should be used for hyphenation:

- Hyphens should be used between elements of a compound word when usage calls for it. When doubt exists, restructure the compound word to avoid hyphenation.
- In compound numerals from twenty-one to ninety-nine
- In fractions; e.g., one-half, two-thirds
- In compounds with "self"; e.g., self-contained, self-lubricated
- When the last letter of the first word is the same vowel as the first letter of the second word. As an alternative, use two words; e.g., fire-escape or fire escape

5.3.2 (continued)

- When misleading or awkward consonants result by joining the words; e.g., bell-like
- To avoid confusion with another word; e.g., re-cover to avoid confusion with recover, pre-position to avoid confusion with preposition
- When a letter is linked with a noun; e.g., X-ray, O-ring, U-bolt, I-beam
- To separate chemical elements and their atomic weight; e.g., Uranium-235, U-235
- A hyphen with a space on both sides is utilized for emphasis in conditional statements (see 4.4.5).
- A hyphen should not be used in front of a number where it could be confused as a minus sign, e.g., -5%.

5.4 Punctuation

The rules of punctuation for standard American English should be used as necessary to aid reading and to prevent misunderstanding. Punctuation helps to reveal the precise relationship among thoughts and communicate the writer's intention. Accordingly, consistent and proper use of punctuation will lessen the chances that operators might misinterpret what the writer intended to say. The following general rules should be used to meet this objective:

- Text should be selected to require a minimum of punctuation. When extensive punctuation is necessary for clarity, the text should be rewritten.
- A colon should be used to end all top-level statements, and to indicate that a list of items follows.
- Commas should be used to separate instruction designators from the instruction title.

  EXAMPLE: SO1-#, LOSS OF REACTOR COOLANT.

5.5 Numerical Values

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

- Arabic numerals should be used.
- For numbers less than one, the decimal point should be preceded by a zero.
- 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.
- Units of measure should be specified for numerical values of process variables. They should be the same units used on the control room displays.
- References to partial-hour time limits in time dependent steps should be expressed in fractional from. Write out fractions as hyphenated numbers.

  EXAMPLE: 1-1/2 Hours, NOT 1.5 Hours

- Acceptance values should be specified in such a way that addition and subtraction by the user is avoided if possible. This can generally be done by stating acceptance values as limits, thereby avoiding use of the symbol ±.

  EXAMPLE: Between 31% AND 35%

- Numerical values from twenty-one to ninety-nine as well as fractions should be hyphenated when written out.
- The numerical value and associated unit of measure should be positioned on the same line of text.
- A hyphen should not be used in front of a number where it could be confused as a minus sign, e.g., -5%.

5.6 Calculations

The operator's use of formulas and need for calculations within the EOI's should be minimized because of the time they require and because they increase the possibility of operator error. The following general rules should be used to meet this objective:

- When calculations are required they should be as simple as possible, and space should be provided for the calculations.
- Consideration should be given to utilizing a chart or graph in lieu of a calculation.

TABLE 5-1

PREFERRED VERBS

PREFERRED VERB	DEFINITION
ALIGN	- To arrange a system for operation, or to adust an electronic system to a set of standards.
ATTEMPT TO	- To make an effort to do.
CHECK	- To determine what condition exists. Implies any of the conditions described could be expected.
CLOSE	- For valves, to position fully shut; for electrical devices, to make a connection to a power supply.
DEPRESS	- To press down.
ENSURE	- To verify a specified condition exists, and if it does not, to manually take the necessary steps to establish the condition.
ESTABLISH	- To take the necessary steps to obtain the desired condition.
EVALUATE	- To assess conditions based upon observations, outside inputs, and experience.
GO TO	- To leave this instruction step and follow referenced instruction until directed back to this or another instruction.
IMPLEMENT	- To place an instruction into effect in parallel with this instruction.
ISOLATE	- To set apart or separate from a system in use.
LOCALLY	- To take an action outside the control room.
LOWER	- To reduce in magnitude.
MAINTAIN	- To keep in certain condition or position.
MONITOR	- To observe for conditions or trends.
OPEN	- For valves, to position for full flow; for electrical devices, to separate from a power supply.
RAISE	- To increase in magnitude.

TABLE 5-1
(Continued)

PREFERRED VERBS

PREFERRED VERB	DEFINITION
RECORD	- To write down manually or via an automatic device.
RE-EVALUATE	- To evaluate again.
RESET	- To reposition a breaker or control circuit for possible future operations.
RETURN TO	- To transition to a previous step within this instruction.
SELECT	- To manipulate controls or switches to a desired condition.
START	- To perform actions necessary to set into operation.
STOP	- To cause to cease operating.
TERMINATE	- To bring to an end; to stop.
THROTTLE	- To position so as to limit flow to less than full.
TRANSFER	- To shift electrical or fluid supply from one source to another.
TRIP	- To bring to an abrupt and complete cessation; to manually activate a semi-automatic feature, or to open an electrical breaker.
VERIFY	- To confirm that an expected condition exists.

TABLE 5-2

PREFERRED ABBREVIATIONS AND ACRONYMS

ABBREVIATION/ACRONYM	DEFINITION
AFW	- Auxiliary Feedwater
BAST	- Boric Acid Storage Tank
CCW	- Component Cooling Water
CIS	- Containment Isolation Signal
CSAS	- Containment Spray Actuation Signal
CSFST	- Critical Safety Function Status Tree
CST	- Condensate Storage Tank
CV	
°F	- Degrees Fahrenheit
FCV	- Flow Control Valve
GPM	- Gallons Per Minute
LCV	- Level Control Valve
LOCA	- Loss of Coolant Accident
LOP	- Loss of Power
LVDT	- Linearly Variable Differential Transformer
MOV	- Motor Operated Valve
NIS	- Nuclear Instrumentation System
PORV	- Power Operated Relief Valve
PRT	- Pressurizer Relief Valve
PSIG	- Pounds Per Square Inch Gauge
PZR	- Pressurizer
RCP	- Reactor Coolant Pump
RCS	- Reactor Coolant System
RHR	- Residual Heat Removal
RTD	- Resistance Temperature Detector
RWST	- Refueling Water Storage Tank
SG	- Steam Generator
SGTR	- Steam Generator Tube Rupture
SIS	- Safety Injection System
SLSS	- Safeguard Load Sequence System
STA	- Shift Technical Advisor
T	- Temperature, e.g., Delta T
Tave	- Average Temperature
TC	- Thermocouple
TSC	- Technical Support Center
VCT	- Volume Control Tank

6.0 OPERATOR AIDS

6.1 Figure Development

Figures may include graphs, drawings, diagrams, illustrations, flowcharts and decision aids. These aids should be self-explanatory, legible, and readable under the expected conditions of use and within the reading precision of the operator. The following rules should be considered in figure development.

- Capitalization should be used for references to figures and their titles within text material.
- Sequential arabic numbers should be assigned to figures. 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.

  EXAMPLE: Figure 1, Figure 2, etc.

- Figures should be located on the page following their reference where practicable. Commonly used figures should be located following the end of the action steps.
- The figure number and title should be centered above the figure using standard station word processing equipment.
- The figure should be positioned within the page margins.
- The figure should be of sufficient size to offer good readability.
- The figure presentation should be clear and simple.
- Typed labels with arrows should be used to identify items within the figure. Handwritten labels should be printed, using all capitals, with letters and numbers at least 1/8-inch high.
- Figure elements should be oriented naturally. For example, height on a graph should be along the vertical axis.

6.2 Table Development

The following rules should be considered in table development.

- Capitalization should be used for references to tables and their titles within text material.

6.2 Table Development (continued)

- Sequential arabic numbers should be assigned to tables. 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.

  EXAMPLE: Table 1, Table 2, etc.

- Tables should be located on the page following their reference where practicable. Commonly used tables should be located following the end of the action steps.

- The table number and title should be centered above the figure using standard station word processing equipment.

- Standard site word processing equipment should be used for entering table text.

- Each column should contain a centered heading. The first letter of each word in the column headings should be capitalized.

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

- Tabular headings should be aligned as follows:

  --horizontally by related entries.

  --vertically by decimal point for numerical entries.

  --vertically by first letter for word entries.

- Double spacing should be used between horizontal entries to separate them. Use horizontal lines also, if desired, but if used, draw double horizontal lines above and below the column headings.

- Table cells should not be vacant. If no entry is necessary, "N.A." should be entered to indicate not applicable.

6.3 Fold-out Pages

The fold-out page is intended for the display of information that would be appropriate to have available throughout the EOI usage period. As such, the fold-out page should follow the last instruction page. The format and spacing of the contents on the fold-out page vary according to the quantity of information required on the page.

6.4 Place-Keeping Aids

It is important that operators have a means of keeping track of the current step while they are performing the designated actions. Various recordation needs associated with monitoring and timing activity steps also demonstrate the need to write on the EOI's. To satisfy these needs, EOI pages should be placed in sheet protector that can be marked on with a grease pencil.

6.5 Rotation of Pages

If pages need to be rotated (turned sideways), follow these rules.

- Place the top of the rotated page at the normal lefthand edge.
- Do not rotate the page margins.
- Do not rotate page identification and numbering.

6.6 Reduced Pages

Avoid using reduced pages as they are more difficult to read. If used, the final size of reduced pages should be standard page size to improve readability.

6.7 Attachments

Attachments may be in the form of figures, tables, fold-out pages, amplifying task discrete action steps or other information determined to be necessary for proper EOI execution. The following rules should be considered in attachment preparation:

- Sequencing of the attachments should consider their order of use within the EOI, their frequency of use as well as their useability.
- Sequential arabic numbers should be assigned to the attachments. The symbol "#" and abbreviation "No." are unnecessary and should not be used. The number alone suffices.

  EXAMPLE: Attachment 1, Attachment 2, etc.

- Attachment formatting should be consistent with the applicable writer's guide section(s), e.g., figures should be formatted in accordance with Section 6.1.

6.8 High-level Step Executive Summary

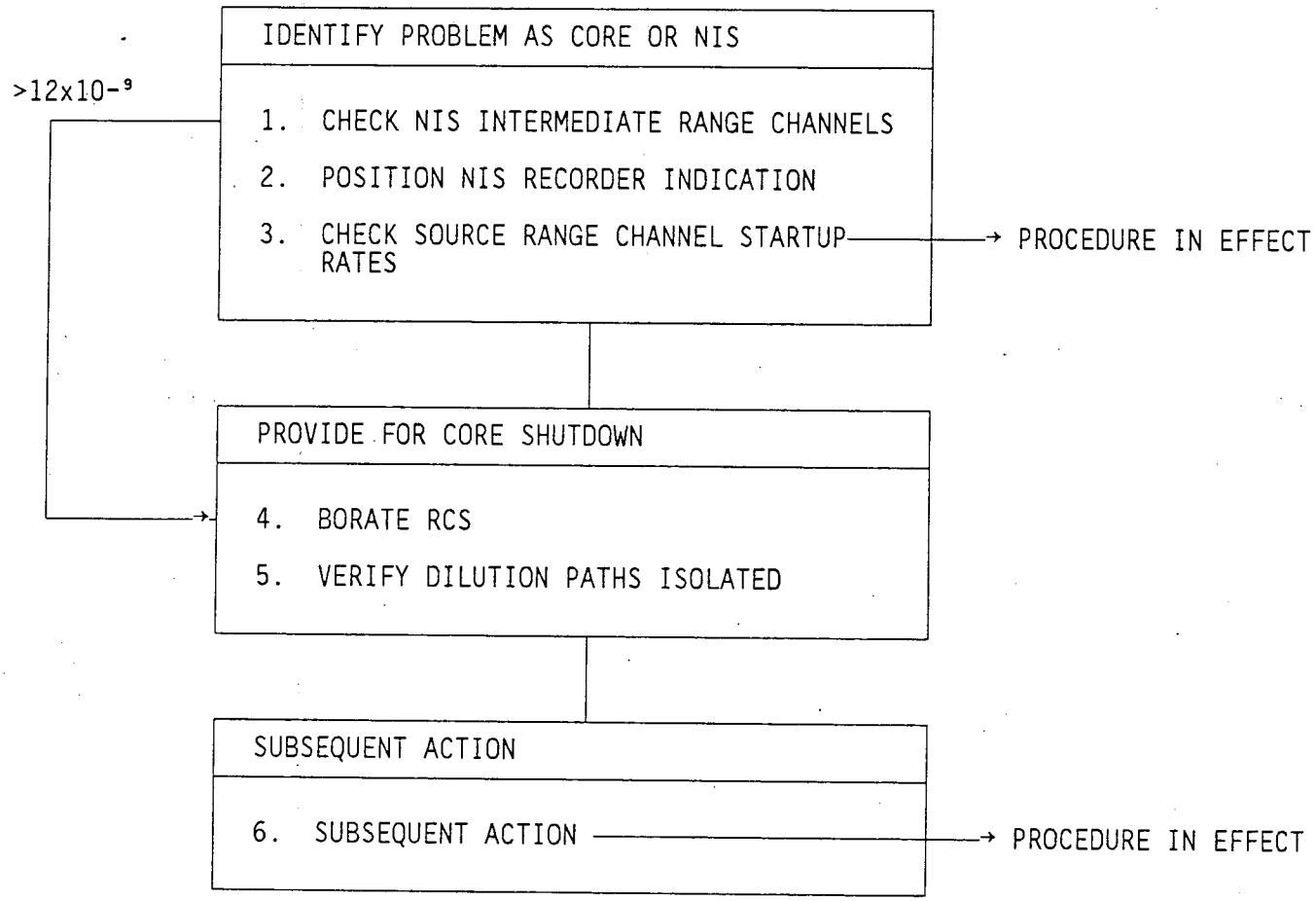
Some instructions have many steps and multiple transitions. It may also be difficult at times to grasp the significance of one step, or set of steps, in relation to a given instruction, or even the entire EOI procedure set. To aid the operator in gaining a broader point of view relative to procedural strategy, an executive summary of the high-level steps within a given instruction is provided on the reverse of each page of the instruction. This summary, an example of which is provided in Figure 3, will allow operators to orient themselves within the instruction at a single glance. Each summary should include the following features:

- General descriptions for blocks of steps which serve a common function.
- Inter-procedural transitions.
- Intra-procedural transitions, with brief words or symbols to indicate why the tansition is occurring, if appropriate.

FIGURE 3

EXAMPLE EXECUTIVE SUMMARY

S01-1.1-2, RESPONSE TO POTENTIAL LOSS OF CORE SHUTDOWN
EXECUTIVE SUMMARY



7.0 TYPING FORMAT

7.1 General Typing Instructions

The following general rules should be used to obtain uniformity in the presentation, clarity, and readability of EOI typed contents:

- Text should be entered onto preprinted form SCE 50-20-1 and SCE 50-20-2 as applicable.
- Typing should be accomplished utilizing standard station word processing equipment.
- Breaking of words should be avoided.
- Steps should be completed on the same page they begin.
- Capitalization, underlining, positioning and punctuation are methods of highlighting instructional text and should therefore be typed as indicated by the author.

7.2 Text Positioning

7.2.1 The contents of the cover page and instruction page should be positioned in accordance with the following:

- Cover Page Contents:

Line 1	NUCLEAR GENERATION SITE EMERGENCY OPERATING INSTRUCTION SO#-#
Line 2	UNIT # REVISION # PAGE # OF #
Line 5	TITLE
Line 9	EFFECTIVE DATE _____ (Cover page only)
Line 12	PURPOSE
Line 14	Text Area
Line 21	SYMPTOMS
Line 23	Text area

7.2.1 (Continued)

- Instruction Page Contents:

  Line 1 NUCLEAR GENERATION SITE
  EMERGENCY OPERATING INSTRUCTION
  SO#-#

  Line 2 UNIT #
  REVISION #
  PAGE # OF #

  Line 5 TITLE

  Lines 12 Action Step Text through 62

7.2.2 Horizontal text positioning should be accomplished in accordance with the following rules:

- Page margins are specified by the printed borders. Allow at least two typed spaces between the text and borders.
- The step number should be aligned under the STEP column.
- The A/ER and RNO text should be aligned under their respective column titles.

8.0 REPRODUCTION AND DOCUMENT CONTROL

Reproduction and document control should be in accordance with existing Station Administrative Controls.

9.0 BACKGROUND DOCUMENTS

9.1 Organization

Background Documents are part of the EOI's and contain the following sections:

- Introduction
- Event Description (when applicable)
- Transient Analysis (when applicable)
- Recovery Technique
- Flow Diagram
- Basis for EOI Steps
- References

9.1.1 Introduction

The introduction section identifies the plant conditions for entering the EOI, briefly describes what is to be accomplished by the EOI, and defines the expected plant conditions at the time of exiting the EOI.

9.1.2 Event Description

The event description section identifies the accident, transient or loss of safety function as well as the consequences. This description includes a discussion of the relevant SONGS-1 responses.

9.1.3 Transient Analysis

The analysis section presents the results of quantitive analysis of the accident, transient or loss of safety function.

Because of the complexity of the material in the analysis section, the following format is generally used:

Cases Analyzed - This subsection defines the cases being analyzed. For example:

Case 1 - Double Ended Steamline Break at Hot Standby

Case 2 - Double Ended Steamline Break at Full Power

.....etc.

Analysis Assumptions - This subsection specifies the assumptions made prior to case analysis. Assumptions normally include system or component data such as pressure, temperature, flow rates, trip set points, physical dimensions, power levels, operator actions, response times, and any other assumptions that will have a significant effect on analysis results.

Analysis Results - This subsection presents the results of the analysis performed for each case above. This is typically done by explaining significant portions of computer code plots or printouts.

9.1.4 Recovery Technique

The Recovery Technique section describes the flow of operator and plant system actions used as the basis for the development of the EOIs. The recovery technique is illustrated by a flow chart, representing necessary operator actions to restore the unit to a safe condition.

9.1.5 Flow Charts

Each EOI contains a flow chart (see Figure 4) in the accompanying Background Document. The flow chart depicts the procedural flow path following in sequence the steps of the instruction found in the A/ER column. The contingency RNO actions appear as looped actions in the A/ER flowpath.

9.1.6 Basis For EOI Steps

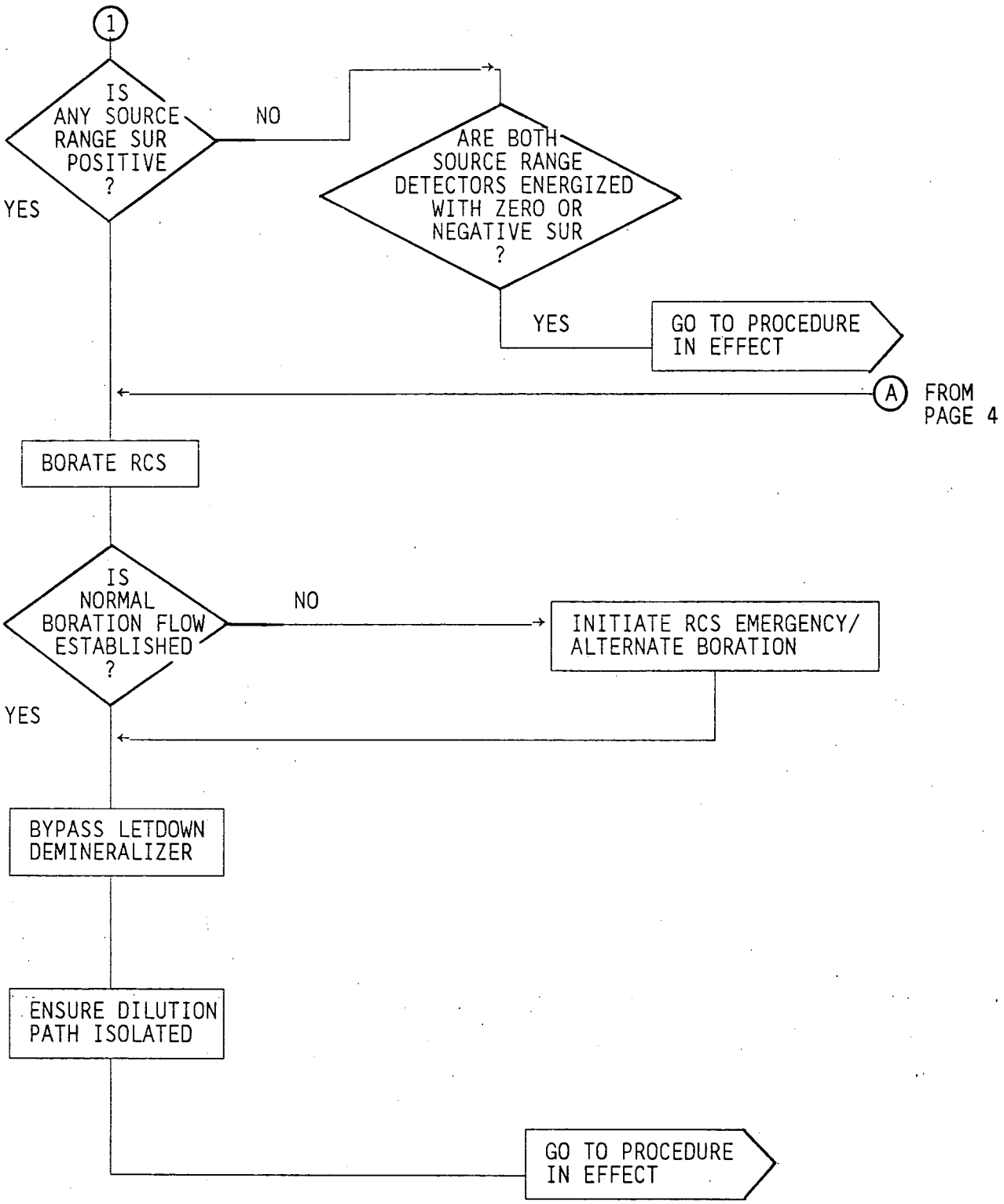
This section provides a descriptive explanation for each EOI step as well as each CAUTION and NOTE statement.

9.1.7 References

References used in the development of a background document are listed in this section by document number, author, title, date and revision as appropriate.

FIGURE 4

EXAMPLE FLOW CHART



10.0 CRITICAL SAFETY FUNCTION STATUS TREES

10.1 Technical Basis

The "defense in depth" concept, which is defined as multiple barriers to the release of radioactive material, forms the basis for the status tree(s). These multiple barriers include the fuel matrix and clad, the reactor coolant system pressure boundary and the containment. For each of the barriers there is a set of Critical Safety Functions that must be monitored, on a designated basis, if that barrier is to remain intact or be restored.

The association of these Critical Safety Functions with the barriers is as follows:

Barrier	Critical Safety Function
Fuel Matrix and Fuel Clad	Maintenance of Subcriticality (minimize energy release in the fuel) Maintenance of Core Cooling (provide adequate heat removal from the fuel) Control of Reactor Coolant Inventory (maintain coolant available for effective heat removal)
Reactor Coolant System Pressure Boundary	Maintenance of Reactor Coolant System Integrity (prevent overpressurization of the RCS) Maintenance of a Heat Sink (provide adequate heat removal from the RCS) Control of Reactor Coolant Inventory (prevent flooding or loss of pressure control)
Containment Sphere	Maintenance of Containment Integrity (prevent overpressurization of containment sphere)

Therefore, there are 6 Critical Safety Function Status Trees, prioritized as follows:

Subcriticality	Priority 1
Core Cooling	Priority 2
Heat Sink	Priority 3
Integrity	Priority 4
Containment	Priority 5
Inventory	Priority 6

Each CSFST represents one of these critical safety functions. Prioritizing of operator actions to restore an unsatisfied Critical Safety Function is established by the order in which the diagrams are listed above and by a color coding scheme within each tree.

10.2 Presentation of Information

The Critical Safety Function Status Trees are contained in a single EOI with a Background Document containing their bases.

The CSFST's are represented by a tree-like logic structure diagram (see Figure 5) which is read from left-to-right. The CSFST diagram structure is developed so that a unique path through each tree corresponds to each unique combination of conditions that define the plant.

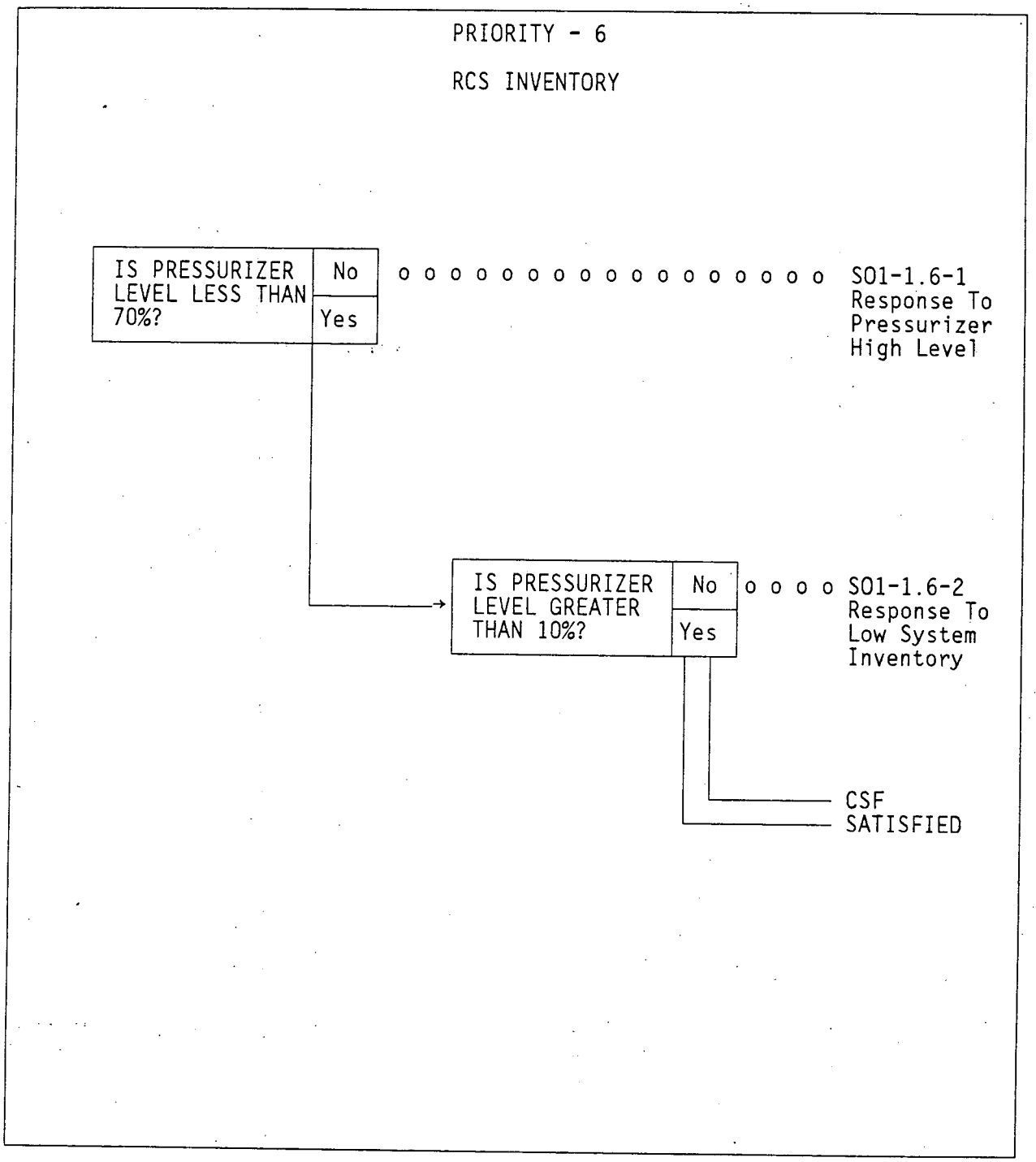
Entry into each CSFST is always at the point indicated by the arrow at the left side of the tree. The user then works through the tree, choosing at each branch point that branch which represents the actual condition existing in the plant. Statements should be worded so that they are clear to the user to ensure the exit from each branch point is made correctly, and quickly.

Exit from the CSFST is always by way of a color coded or line-pattern coded branch which indicates either satisfaction of the Critical Safety Function or directs the user to the proper EOI necessary to restore the Critical Safety Function. The various terminus points are color-coded to reflect the priority of response required to re-establish the Critical Safety Function. Termini order from top to bottom on the logic diagram should be RED-ORANGE-YELLOW-GREEN.

Color	Pattern	Action Priority
Red	solid line	The critical safety function is in extreme jeopardy. Immediate operator action is required.
Orange	broken line	The critical safety function is under severe challenge. Prompt operator action is necessary and should be taken as soon as it is assured that a higher priority condition does not exist.
Yellow	dotted line	The critical safety function is not fully satisfied. Operator action may be needed.
Green	parallel lines	The critical safety function is satisfied. No operator action is required.

FIGURE 5

EXAMPLE CSFST DIAGRAM



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PROCEDURES GENERATION PACKAGE

PART C

VALIDATION PROGRAM DESCRIPTION

VALIDATION PROGRAM DESCRIPTION

TABLE OF CONTENTS

LIST OF FIGURES

VALIDATION PROGRAM DESCRIPTION

1.0 INTRODUCTION

1.1 Purpose

The purpose of the Validation Program is to verify that the EOI's can be accurately and efficiently carried out and are adequate to mitigate transients and accidents.

1.2 General

As discussed in Part A, Section 1.2.5 of this package, the contents of this part of the PGP will be incorporated into the site document system. The current identification of this document is Administrative Procedure SO1-VI-1.0.4, "Unit 1 Emergency Operating Instructions - Preparation, Revision and Validation."

1.3 Scope

The validation should verify that the following objectives are met:

a) The EOI's accurately reflect the WOG Guidelines.

b) The EOI's accurately reflect the Writer's Guide.

c) The EOI's use language and level of information presentation that is compatible with the minimum number, qualifications, training, and experience of the licensed operators.

d) The EOI's reference controls, equipment, and hardware that are available. This equipment uses the same designation, units of measure, and operation that is specified in the EOI's.

e) The EOI's can be understood and followed without confusion, delays, or errors.

f) The EOI's are assured to guide the licensed operator in mitigating transients and accidents.

These objectives are met through a process of several EOI reviews for content and format accuracy, followed by dynamic testing on a generic simulator.

2.0 EOI REVIEW PROCESS

2.1 Desk Top Review

Desk top reviewers should consist of licensed operators, engineers, and other personnel familiar with the EOI subject matter and Writer's Guide. To increase the probability of detecting discrepancies between the written Operating Instructions and Background Documents, the review should include persons other than the person(s) who wrote or revised the documents, and preferably include a person from another discipline, i.e., Operations produced documents should be reviewed by Engineering. Reviewer selection should be based on:

- operating and/or engineering experience
- understanding of plant hardware
- understanding of the Technical Guidelines
- familiarity with the Writer's Guide
- familiarity with licensing commitments

Desk top reviews involve evaluation of the EOI for technical accuracy and compliance with the Writer's Guide. Consistent adherence to the Writer's Guide will ensure readability, convenience, understanding and accessibility of information. Technical accuracy is achieved by weighing the document against the plant configuration and applicable technical support documents. Desk top reviews should be performed by comparing the EOI's against the criteria provided in Figure 1. Desk top review comments should be documented utilizing the format illustrated in Figure 2.

2.2 Plant/Control Room Review

This review evaluates the correspondence between the Operating Instructions and plant hardware, and the adequacy of EOI's/CSFST's relative to event sequence and personnel involved in the performance of tasks. The review can be accomplished by the EOI/revision author, or any personnel meeting the general qualifications described in Section 2.1. Plant/Control Room Reviews should be performed by comparing the EOI's against the criteria provided in Figure 3. Plant/Control Room review comments should be documented utilizing the format illustrated in Figure 2.

2.3 Round-table Review

These reviews are similar to desk top reviews except that several reviewers participate at one time. As this is a manpower intensive as well as time consuming task, it is not readily accomplished as a separately scheduled function. However, each EOI training session provides a ready forum to conduct a round-table review. Licensed operator training, including EOI training, is scheduled on a shift (crew) basis meaning that each class contains a number of licensed personnel that perform as a crew in implementing the EOI actions. As separate EOI training is not normally provided to other site personnel, each operator class may also be attended by licensed as well as non-licensed personnel from training, engineering,

2.3 Round-table Review (continued)

management and other staff positions. It is this broad cross-section of personnel with varying background and experience levels that should be used for the round-table review process.

Round-table reviews may use the criteria provided in Figure 1 as a stimulus to guide the review discussion. However, a variety of other techniques may be used and in fact are encouraged to generate discussion. For example, the EOI's could be reviewed utilizing piping and instrumentation diagrams (P&ID's), executive summaries, background document flow charts, etc. As was previously discussed, the classroom training sessions offer additional discussion generators evolving from the techniques used to teach the EOI's.

Round-table review comments should be documented utilizing the format illustrated in Figure 2. Comments generated during training may be processed as described in Operating Instruction SO1-14-42, "Responsible Use of Procedures."

2.4 Additional Reviews

2.4.1 Westinghouse Review

Westinghouse will conduct a review of all upgraded EOI's and accompanying Background Documents for consistency with the Westinghouse strategy, technical adequacy, and operator usability. This review is particularly important since it serves as the key mechanism for validating those EOI's (or portions thereof) which cannot be fully exercised on the simulator. The review effort will culminate in a Findings Letter to document Westinghouse's assessment. As appropriate, these review comments may be documented utilizing the format illustrated in Figure 2.

2.4.2 Interdisciplinary Review

Incident to execution of station Administrative Procedure SO123-VI-1.0, "Documents - Review and Approval Process for Site Orders, Procedures and Instructions," is the performance of the following minimum additional reviews for technical adequacy, consistency, and administrative procedural compliance:

- SCE Quality Assurance
- Shift Technical Advisors, Unit 1

These reviews are documented using a Routing and Document Control Form SO(123) 109.

2.5 Incorporation of Review Feedback

The incorporation of resolutions to pre-simulator validation review feedback should occur prior to the formal simulator validation. In this manner questions of EOI accuracy, readability, and completeness will generally already have been addressed when dynamic testing occurs. Issues of accuracy, readability, and completeness should not be ignored during simulator testing, but the emphasis will largely be on usability and plant parametric response.

3.0 SIMULATOR TESTING

3.1 Generic Simulator Usage

Simulator operations should be conducted to evaluate EOI execution. During generic simulator operations the EOI's are examined for adequacy of event addressal and usability by operators under a dynamic and stressful situation. Although San Onofre Unit 1 does not have a plant specific simulator, generic simulator operations will provide significant information on some aspects of EOI/CSFST usability. It is recognized that the generic simulator does not completely conform to the physical control room layout nor operating characteristics of Unit 1. However, the simulator chosen will be adapted to conform to Unit 1 to the extent reasonably possible.

3.2 Control Room Staffing Philosophy

In order that EOI's can be satisfactorily validated, it is necessary to establish the minimum staffing requirement and define the responsibilities of the individual team members.

3.2.1 Staffing For EOI Use

Per the requirements of NUREG-0737 I.A.1.3, there will be 1 SRO and 1 RO in the control room at all times.

- Licensed SRO's have the responsibility to maintain the broadest perspective of operational conditions affecting the safety of the plant, as a matter of highest priority, at all times when on duty in the control room. During emergencies the SRO with the Control Room Command Function will assume responsibility for directing (coordinating) operations, including implementation of the EOI set.

- The Control Operator, who is a licensed RO, has the authority and responsibility to shut down the reactor if he determines that the safety of the plant is in jeopardy.

It is this combination of personnel who will at a minimum be initially available in the control room to use the EOI's.

3.2.2 Division Of Responsibilities For EOI Use

The EOI's require parallel utilization of the Operator's Instructions (comprised of Optimal Recovery and Function Restoration Instructions) and the Critical Safety Function Status Trees. Figure 4 shows the interaction between the ORI's, FRI's and the CSFST's.

At the onset of an emergency the RO would perform the Immediate Actions. The SRO in the control room or Shift Technical Advisor, when available, would begin monitoring the CSFST's after the transition from SO1-1.0-10, REACTOR TRIP OR SAFETY INJECTION, or when directed to any other EOI while performing SO1-1.0-10. In an emergency or transient the Shift Technical Advisor (STA) immediately reports to the control room to assist the Shift Superintendent.

The Team/Crew responsibility concept would then be fully employed (individual responsibilities of the team members are exercised during EOI training and re-training sessions). Once the control room is optimally staffed, the division of responsibilities will be as follows:

IMMEDIATE ACTIONS - 1 Reactor Operator (RO)
STATUS TREES - Shift Technical Advisor (STA)
FRI's - ORI's - 1 or both RO's
Site Emergency Procedures/Assist the Shift Superintendent - Control Room Supervisor (SRO)
Overall direction of EOI's and Site Emergency Procedures - Shift Superintendent (SRO)

3.3 Simulator Exercises

3.3.1 Personnel

- The simulator exercise observation team should consist of licensed operators, engineers, trainers, and simulator experts familiar with the EOI subject matter. The observation team should be familiar with the simulator, the exercise scenarios, and the observation criteria prior to running the exercises.

- The minimum complement of control room staff as discussed in Section 3.2 should be used for the exercises. The control room team should be briefed on the EOI's and their use prior to the start of the simulator exercises. They should not be briefed on the scenarios to be run or the expected operator performance.

3.3.2 Exercises

- Simultaneous, sequential multiple failures as well as uncomplicated events should be selected to exercise the maximum number of EOI's. The following scenario selection criteria should be used to meet this objective:

  a) exercise to the extent possible all EOI entrances, exits, and branches.

  b) exercise the EOI diagnostic for all optimal recovery instructions.

  c) exercise the functional recovery EOI's.

  d) exercise the use of the functional recovery instruction for sequential or simultaneous failures.

  d) exercise the EOI's during time dependent operations.

  f) exercise the EOI's to assess satisfaction of the criteria in Figure 5, Simulator Exercise Criteria.

- Any simulator configuration differences from SONGS-1 should be reviewed by the observation team and control room team during exercise briefing and debriefing sessions.

- The observation and control room teams should be debriefed after the simulator exercise for the purpose of identifying and defining comments as well as possible resolutions. The observation team leader will moderate the discussion, employing the following process or equivalent:

  a) allow operators to provide unsolicited feedback regarding EOI procedural adequacy or the ability to use the EOI's.

  b) present problems noted by observation team and possible cause.

  c) discuss/note potential solutions to problems.

3.3.3 Documentation

- Simulator exercise scenarios should be documented as illustrated in Figure 6. The simulator events/comments section should consist of applicable information tracking the event development from initiation to termination. The source of this information should be both available automatic simulator recordation documentation (attached to the documentation form) and composite observer notes/comments. Additionally, debriefing highlights can be placed in this section, along with reference to any Discrepancy Documentation forms which are generated as a result of the simulator exercise.

- Discrepancy feedback should be documented in the format illustrated in Figure 2. Discrepancies must be resolved prior to the EOI/Revision being issued. If the resolution involves a substantive change to the instruction/support document technical content, previously performed portions of the Section 2 review process and another simulator run may need to be repeated (unless the resolution is designated as a future, or post-implementation item).

4.0 VALIDATION PROGRAM DOCUMENTATION

Documentation associated with the EOI Validation Program consists primarily of the previously mentioned reviews and simulator records.

5.0 VALIDATION OF REVISIONS

Subsequent to approval and implementation of the EOI's, the need may arise to revise the instructions due most likely to the following:

- NRC approval of succeeding revisions to the Westinghouse Owner's Group Emergency Response Guidelines.

- Plant configuration changes/design modifications.

- Operator requalification training and simulator feedback.

Except where a small project team might be formed to undertake the incorporation of a complete ERG revision, the EOI's should be administered and revised by the Unit 1 Operations Procedure Group.

All revisions to EOI's must undergo all, or a portion of, the validation process as described in this Attachment. The extent of the validation (in particular whether or not Westinghouse involvement is required) should be determined by the Unit 1 Supervisor of Plant Coordination or his designee.

FIGURE 1

WRITER'S GUIDE ADHERENCE/TECHNICAL REVIEW

I. EOI NUMBER _____ REV _____

EOI TITLE _____

II. REVIEWER _____ _____
Signature/Discipline Date

III. Acceptability with regard to the following was considered in the review:

A. FORMAT

1. The cover page includes the following information:

____ a. Instruction title
____ b. Instruction number and changes incorporated

2. Each page includes the following information:

____ a. Instruction title
____ b. Page number
____ c. Instruction number

____ 3. Background Document includes the following:

____ a. Introduction
____ b. Event Description (when applicable)
____ c. Transient Analysis (when applicable)
____ d. Recovery Technique
____ e. Flowchart
____ f. Basis for EOI steps
____ g. References/Appendices

____ 4. Caution and Note statements stand out from the text.

____ 5. Caution statements precede the applicable step.

____ 6. Note statements precede the applicable step, when appropriate.

____ 7. Referenced documents are identified by both title and number.

FIGURE 1

WRITER'S GUIDE ADHERENCE/TECHNICAL REVIEW
(Continued)

B. STYLE AND CONTENT

____1. Ambiguous words and phrases are avoided.

____2. The action to be taken is specifically identified (open, close, rack in, etc.)

____3. Instruction steps appear as short, concise statements (not paragraphs).

____4. Statements within the instruction are written with the action verb followed by an object.

____5. Positive or affirmative sentences are used rather than negative ones, whenever possible.

____6. Text stipulates precisely what actions or decisions are required.

____7. Limits and tolerances are expressed quantitatively (930-940 PSIG, etc.).

____8. Only abbreviations, acronyms, and symbols appearing in the Writer's Guide are used.

C. TECHNICAL DECISIONS

____1. The instruction has a unique number.

____2. The instruction has a descriptive title.

____3. The purpose statement clearly specifies the function of the instruction.

____4. The instruction provides symptoms of the emergency (if desirable).

____5. Symptoms are listed with the most important parameters appearing at the top of the list, where possible (instruction).

____6. Sequence of steps is logical and accurate.

FIGURE 1

WRITER'S GUIDE ADHERENCE/TECHNICAL REVIEW
(Continued)

____7. Precautions which must be observed are written in caution statements.

____8. Informational material is written in note statements.

____9. Title and number references are correct.

____10. Priority of the various status trees is clearly marked on the CSFST and is technically correct (complies with Background Document).

____11. Action set points within CSFST's are technically correct (comply with Background Document).

____12. Priority of operator action on each status tree branch is properly color and pattern coded.

____13. EOI designations at end of each status tree branch are correct.

____14. Extracted information/justifications from reference materials are accurate and appropriate (Background Document).

____15. Westinghouse event recovery strategy preserved where applicable.

____16. Event description and analysis accurate/logical (Background Document).

D. COMMENTS/RESOLUTIONS ON ATTACHED SHEETS

FIGURE 2

DISCREPANCY DOCUMENTATION

DISCREPANCY NUMBER: _____

TITLE _____
(EOI #/REV. #)

DISCREPANCY DESCRIPTION:

_____

_____

_____

_____

_____

OBSERVER/OPERATOR: _____ DATE: _____
(Printed Name)

REVISION REQUIRED: _____NO _____YES: _____ Prior to implementation
_____ Future

RESOLUTION:

_____

_____

_____

_____

_____

_____

_____

EOI REVISED BY: _____ DATE: _____
(Printed Name)

cc: OBSERVER/OPERATOR

FIGURE 3

PLANT/CONTROL ROOM REVIEW CHECKLIST

I. EOI/CSFST NUMBER _____ REV _____

TITLE _____

II. REVIEWER _____ _____
Signature/Discipline Date

III. Acceptability with regard to the following was considered in the review:

CRITERIA

____1. Each step is written to the appropriate level of detail. There are no extra or missing substeps.

____2. Each step is located appropriately within the sequence of events.

____3. Where sequence of steps is not important, steps have been ordered so that left to right, or right to left, flow can be followed along the control board.

____4. Action steps are written in the order in which tasks are actually performed.

____5. Each step is concise, readable, and understandable.

____6. The instruction is easy to follow, and a smooth flow through the instruction is possible.

____7. There is no uncertainty or confusion concerning required actions or which step to go to next.

____8. The instruction does not cause operators to be in one another's way due to concurrent actions in the same location.

____9. Nomenclature used in the step matches control room or local labeling.

____10. Controls, displays, and other equipment mentioned are available and located where specified.

____11. All necessary references and materials are available in the instruction or are readily available in the control room.

____12. Descriptions in the instruction match actual units of measurement, engineering parameters, and functions of controls and displays.

IV. COMMENTS/RESOLUTIONS ON ATTACHED SHEETS

FIGURE 4

INTERACTION FLOW CHART

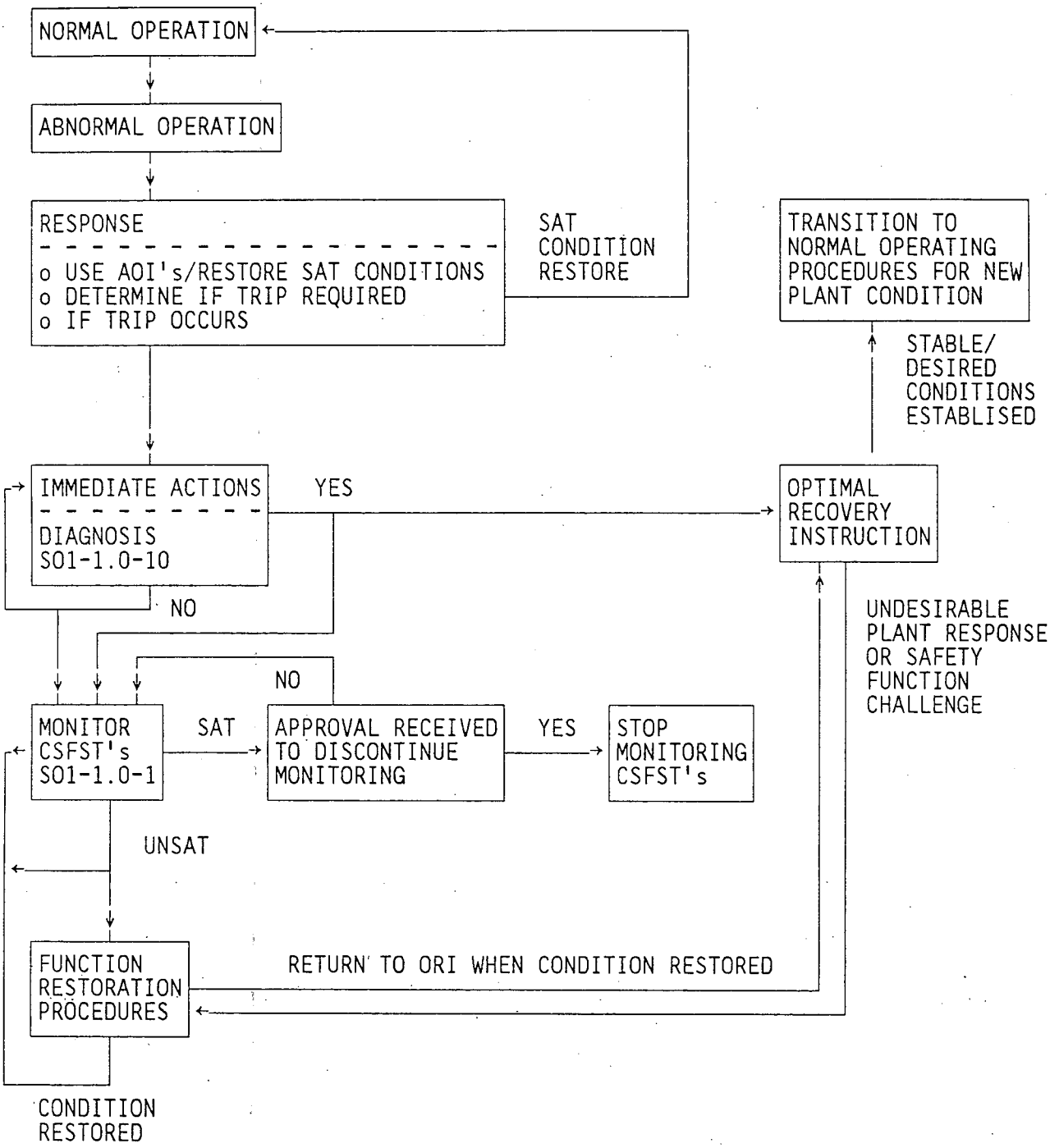

FIGURE 5

SIMULATOR EXERCISE CRITERIA

I. USABILITY

A. LEVEL OF DETAIL

1. Was there sufficient information to perform the specified actions at each step?

2. Could the operator use labeling, abbreviations, and location information as provided in the EOI's to find the needed equipment?

3. Were the EOI's missing information needed to manage the emergency condition?

4. Were the contingency actions sufficient to address the symptoms?

5. Could the operator use the titles and numbers to find referenced and branched procedures?

B. UNDERSTANDABILITY

1. Was the EOI read easily?

2. Was there confusion or uncertainty concerning required actions?

3. Were caution and note statements complied with?

4. Were the EOI steps complied with?

II. WORKABILITY

A. PLANT COMPATIBILITY

1. Were the actions specified in the procedure able to be performed in the designated sequence?

2. Did the operator find alternate success paths not included in the EOI's?

3. As specified in the EOI's, could the operator obtain the necessary information from the plant instrumentation that is provided?

FIGURE 5

SIMULATOR EXERCISE CRITERIA
(Continued)

4. Did the symptoms and diagnostic sequence provide adequate guidance for the operator to select the applicable EOI?

5. Were the EOI entry conditions appropriate for the plant symptoms seen by the operator?

6. Did the operator have to use information or equipment not specified in the EOI's to accomplish the task?

7. Did the plant responses agree with the EOI basis?

B. OPERATOR COMPATIBILITY

1. If time intervals are specified, were the procedure action steps able to be performed on the plant within or at the designated time intervals?

2. Were the procedure action steps able to be performed by the operators?

3. Was minimum shift manning sufficient to carry out all procedural tasks?

4. Were the operators able to follow the designated action step sequences?

5. Could the operator find the particular step or set of steps when required?

6. Could the operator return to an instruction exit point without omitting steps when required?

7. Could the operator enter the branched procedure at the correct point?

8. Could the operator exit from a given EOI at the correct point?

9. Were action steps sequenced to avoid unintentional duplication?

FIGURE 6

SIMULATOR EXERCISE DOCUMENTATION

DATE: _____

SHIFT HOURS: _____

SCENARIO DESCRIPTION: _____

_____

_____

_____

_____

_____

EOI's/FEATURES TO BE EXERCISED: _____

_____

_____

_____

_____

INITIAL CONDITIONS: _____

_____

_____

CONTROL ROOM TEAM (Name/Position)	OBSERVATION TEAM (Name/Signature)
_____	_____ /
_____	_____ /
_____	_____ /
_____	_____ /
_____	_____ /

SIMULATOR EVENTS/COMMENTS (post-exercise): _____

_____

_____

(attach Continuation Sheet)

WMcGHEE:0258G

PROCEDURES GENERATION PACKAGE

PART D

TRAINING PROGRAM DESCRIPTION

TRAINING PROGRAM DESCRIPTION

TABLE OF CONTENTS

TRAINING PROGRAM DESCRIPTION

1.0 INTRODUCTION

1.1 Purpose

The purposes of this program are to:

- Enable the operators to understand the structure and format of the upgraded Emergency Operating Instructions (EOI's).
- Enable the operators to understand the technical bases of the upgraded EOI's.
- Provide the operator with a working knowledge of the technical content of the upgraded EOI's.
- Enable the operators to use the upgraded EOI's under operational conditions.

1.2 Scope

Personnel licensed on San Onofre Unit 1 shall receive training on the upgraded EOI's in accordance with Section 2.0 and prior to EOI implementation.

2.0 PROGRAM DESCRIPTION - INITIAL TRAINING

2.1 Classroom Training

Classroom training shall consist of a series of lectures and discussions. These should cover the logic behind development of the EOI's, the process used to develop EOI's, and the EOI's themselves, including supporting technical and human factors information.

2.2 Simulator Training

As San Onofre Unit 1 does not have a plant-specific simulator, EOI upgrade training will be folded into the existing licensed operator requalification program and accomplished utilizing previously purchased retraining machine time. To maintain operational skills during an extended plant outage, the volume of purchased simulator time for 1983 and 1984 was doubled. Portions of this additional simulator time was devoted to training on the upgraded EOI's.

- Training conducted on the simulator shall consist of a combination of simulated events and walk-throughs to exercise the EOI's.
- A wide variety of scenarios including multiple and sequential failures should be used to exercise the EOI's.

2.2 Simulator Training (continued)

- Training should be conducted with shift personnel exercising the EOI's to stress operator roles, interaction, and team training. Crew members should train by performing their normal control room functions.

- Differences between Unit 1 and the training simulator should be addressed during training sessions.

2.3 Operational Feedback

Operational feedback to improve EOI usage and content will be encouraged during the training described in Section 2.0. Operating Instruction SO1-14-42, "Responsible Use of Procedures," provides the necessary guidance for formalizing and processing these feedback comments.

3.0 RETRAINING

Following the initial training described in Section 2.0, retraining on the upgraded EOI's will be conducted as part of the Operator Requalification Program in accordance with the Licensed Operator Requalification Program (Training Program Description OP5).

4.0 INITIAL TRAINING EVALUATION

The operators' knowledge and understanding of the EOI's shall be evaluated. This evaluation should be done in accordance with the following:

- A written examination should be conducted at the completion of the classroom training described in Section 2.1.

- The simulator instructors should evaluate individual performance during each of the training scenarios performed on the simulator.

5.0 DOCUMENTATION

Documentation of operator training shall be maintained in accordance with the Training Division Training Records Information Management System (TRIMS).

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