PROCEDURES GENERATION PACKAGE
ALABAMA POWER COMPANY
FARLEY NUCLEAR PLANT

1. INTRODUCTION

1.1 PURPOSE

The purpose of this Procedures Generation Package (PGP) is to describe the emergency response procedures (ERPs) development for the Alabama Power Company Farley Nuclear Plants Unit 1 and Unit 2. Both units are 3 loop Westinghouse pressurized water reactors.

1.2 SCOPE

This document was developed in response to Supplement 1 to NUREG-0737, Item 7.2b, page 15.

1.3 ORGANIZATION

This document consists of the following six parts:

- Introduction
- Plant-Specific Technical Guidelines
- Writers Guide for ERPs
- ERP Verification Program
- ERP Validation Program
- ERP Training Program

Each part describes the approach taken as part of the overall ERP Implementation Plan for the Farley Nuclear Plant, Units 1 and 2.

2. PLANT-SPECIFIC TECHNICAL GUIDELINES

2.1 GENERAL

The following program for converting the Westinghouse Emergency Response Guidelines (ERGs) into ERP's has been developed and will be used by the Farley Nuclear Plant, Units 1 and 2.

The ERGs, Basic Revision, dated September 1, 1981 will be used for the initially implemented ERP's. Subsequent revisions will be incorporated using the established revision, review, and approval process per FNP-0-AP-1 (Development, Review and Approval of Plant Procedures).

The following major items were considered in the methodology to be used.

- mechanics of conversion

- location of the plant-specific technical information
- how the plant-specific technical information will be used
- the use of old EOPs
- documentation requirements
- use of the background information supplied with technical guidelines

2.2 PROGRAM DESCRIPTION

2.2.1 Mechanics of Conversion

2.2.1.1 Preparation

The designated ERP writing team will obtain and review the following plant-specific technical information (ERP source documents):

- Westinghouse Emergency Response Guidelines (ERGs) with background information
- FSAR Units 1 & 2
- Farley Nuclear Plant Writers Guide for Emergency Operating Procedures.
- Technical Specifications for Units 1 & 2
- the most current revision of existing EOPs
- as-built plant drawings

2.2.1.2 Writing ERPs

The ERP writing team will follow the ERGs step-by-step, adding footnoted information where designated. Concurrently, the writers will review appropriate ERP source documents. As each step is reviewed decisions will be made regarding its applicability to the Farley Nuclear Plant. If appropriate, corresponding ERP steps will be determined. Once reviewed a disposition will be determined to delete the step, alter the step sequence, alter the step, supply additional steps or adopt the step unchanged. This review and disposition process will be documented on Figure 1. If the step requires no changes other than basic format adjustments to comply with the writers guide formating requirements, no further documentation will be

required. If changes are necessary, a step change documentation sheet Figure 2 will be completed to document and justify the change. The justification section will provide plant-specific technical information or analysis to assist in the verification process.

2.2.2 Documentation

The completed Figures 1 and 2 will be provided as source documents to assist in the ERP verification process and in the revision, review, and approval process.

3. WRITERS GUIDE FOR ERPs

3.1 GENERAL

A writers guide for ERPs is a plant-specific document that provides instructions on writing ERPs, using good writing principles. In addition to establishing sound writing principles, the guide helps to promote consistency among all ERPs and their revisions, independent of the number of ERP writers.

The writers guide will be revised, as necessary, based on feedback from operator training, experience, and validation.

3.2 DOCUMENT DESCRIPTION

Information on the following major items is included in the plant-specific writers guide for ERPs:

- ERP format
- ERP organization
- ERP level of detail
- ERP content
- mechanics of style

The Farley Nuclear Plant Writers Guide for Emergency Response Procedures (FNP-0-AP-74 Attachment 1) is based on the industry document Emergency Operating Procedures Writing Guideline (INPO 82-017), developed by the Emergency Operating Procedures Implementation Assistance (EOPIA) Review Group and published by INPO. The writers guide is provided as Attachment 1.

4. ERP VERIFICATION PROGRAM

4.1 GENERAL

ERP verification is the evaluation performed to confirm the written correctness of the procedure and to ensure that applicable generic and plant-specific technical information has been incorporated properly. This evaluation also checks that the human factors aspects presented in the writers guide for ERPs have been applied.

4.2 PROGRAM DESCRIPTION

When developing this ERP verification program, the following major items were considered:

- how ERP verification will be performed
- how completion of the ERP verification process will be documented

- what process will be used in resolving discrepancies

The verification program will be based on the industry document Emergency Operating Procedures Verification Guideline (INPO 83-004), developed by the EOPIA Review Group and published by INPO.

The Farley Nuclear Plant Verification Procedure for Emergency Response Procedures, will address the following objectives:

- ERPs are technically correct, i.e., they accurately reflect the technical guidelines and other ERP source documents.

- ERPs are written correctly, i.e., they accurately reflect the plant-specific writers guide.

- The language and level of information presented in the ERPs are compatible with the qualifications, training, and experience of the operating staff.

- Correspondence exists between the procedures and the control room/plant hardware.

5. ERP VALIDATION PROGRAM

5.1 GENERAL

ERP validation is the evaluation performed to determine that the actions specified in the procedure can be performed by the operator to manage the emergency conditions effectively. The methodology for ERP validation utilizes present, available methods at the Farley Nuclear Plant while recognizing and allowing for future improvements. It will validate that part of the ERP not covered by any technical validation of generic technical guidelines.

5.2 PROGRAM DESCRIPTION

When developing this ERP validation program, the following major items will be considered:

- how ERP validation will be performed

- how to appropriately use simulators, walk-throughs, or table-top methods of validation

- how operating and training experience will be integrated into the program evaluation

- the evaluation criteria to be applied and the methods to be followed in resolving discrepancies

- how completion of the ERP validation process will be documented.

The program will be based on the industry document Emergency Operating Procedures Validation Guideline (INPO 83-006), developed by the EOPIA Review Group and published by INPO. The Farley Nuclear Plant Validation Procedure for Emergency Response Procedures will address the following objectives:

- ERPs are usable, i.e., they can be understood and followed without confusion, delays, and errors.

- A correspondence exists between the procedures and the control room/plant hardware.

- The instructions presented in the ERPs are compatible with the shift manpower, qualifications, training, and experience of the operating staff.

- A high level of assurance exists that the procedures will work, i.e., the procedures guide the operator in mitigating transients and accidents.

6. ERP TRAINING PROGRAM

6.1 GENERAL

The ERP training will be developed to support implementation of the ERPs. The ERP writer will interface with the Training Department to ensure a supportive program.

6.2 PROGRAM DESCRIPTION

When developing the ERP training program, the following major items will be considered:

- what type of operator training should be provided (initial, refresher)

- what method of operator training should be followed

- what operator knowledge and skill level is desired

- what procedure tasks exist that require operator decision-making

- what training material is needed to support EOP training requirements

- what current operator licensing requirements exist

- what method should be provided for operator feedback into the training program and ERP development

- what will be the effect on current plant operation while training operators on ERPs not yet in place at the plant

This description outlines the approach to be used to train licensed operators on ERPs and to ensure that operators will be informed and knowledgeable of future changes to the ERPs.

6.3 TRAINING PROGRAM GOALS

The initial, overall training goals for the ERP training program are as follows:

- to enable the operators to understand the structure of the ERPs
- to enable the operators to understand the technical bases of the ERPs
- to enable the operators to have a working knowledge of the technical content of the ERPs
- to enable the operators to use the ERPs under emergency conditions

Training program objectives to support these goals will be developed for each lesson plan.

6.4 INITIAL ERP TRAINING METHODS

The ERP training program will be established to instruct operators in the ERPs. Initial Training for License candidates will consist of classroom instruction, control room walk-throughs, and simulator exercises. Training for Licensed Operators will consist of classroom instruction and plant specific simulator exercises.

6.4.1 Classroom Instruction

Classroom instruction sessions will be conducted. The information presented during this method will include the following:

- the logic behind the development of ERPs
- the process used to develop the ERPs
- the ERPs themselves, including supporting technical and human-factors information

6.4.2 Control Room Walk-Throughs

An important part of the instruction on ERPs will be the practical experience gained through control room walk-throughs or simulator exercises. During this method of training, the team approach to using ERPs will be used. This walk-through training will also concentrate on information flow and interactions of the operators in the control room.

6.4.3 Simulator Exercises

Training on the ERPs will be conducted for all licensed operators using scenarios on a control room simulator. The scenarios will be reviewed for applicability on the present generic simulator being used. Training will be conducted with all operators performing their normal control room functions. Additional training will be conducted where the members of a crew alternate responsibilities. This additional training is important to promote understanding of the other operators' responsibilities in the overall conduct of the actions, and it should lead to enhanced communications within the control room. Until the plant-specific simulator is completed, complicated scenarios will be discussed during classroom instruction and control room walk-throughs.

6.5 REFRESHER TRAINING

All licensed operators will conduct control room walk-throughs using the ERPs during refresher training. The walk-throughs will be conducted either in the control room or on the plant-specific simulator. Realistic scenarios, to the extent determined by Farley simulator capabilities, will be developed to ensure that the critical aspects of the ERPs are exercised.

Training on ERPs will be conducted in such a manner that each crew conducts the walk-throughs with each operator simulating the actions that he normally would be responsible for during an emergency incident. Licensed operators not assigned to a shift will participate in the walk-throughs as part of the training program.

The plant training and operations staffs will participate in the development and execution of refresher training. The training staff is responsible for developing the scenarios, observing and evaluating the walk-throughs, and critiquing the results. Any additional training needs will be determined from the performance of the operators.

The scenarios will be varied sufficiently to ensure the operators do not develop a set pattern of responses to incidents but are able to respond to the symptoms as they develop.

6.6 TRAINING ON REVISIONS

Training on important minor procedure revisions will be conducted through a program of pre shift briefings or required readings (self-taught), or lectures in the requalification program. Training on major revisions will be conducted by the use of classroom instruction and walk-throughs in the control room or on the plant-specific simulator. If operational considerations do not allow control room walk-throughs, and the plant-specific simulator is not available, training on major revisions will be conducted during classroom instruction.

6.7 INPUTS INTO TRAINING PROGRAM CHANGES

6.7.1 Supporting Training Material Changes

Changes to supporting training material will be factored into updated lesson plans and operator memos. Some of the supporting material identified to date is as follows:

- ERGS
- background information
- associated WCAPs

6.7.2 Operator Feedback

Operator feedback resulting from ERP verification, ERP validations, and training critique forms will be used to keep the training program and ERPs current and relevant.

6.8 EVALUATION

An evaluation will be used to ensure that the training program goals have been accomplished.

FIGURE 1

ERG REVIEW/DISPOSITION SHEET

ERG STEP		ERP STEP	ERG STEP REVIEW								ERG STEP DISPOSITION						
			IS FUNCTION OF STEP REQ'D. AT FNP		DOES STEP COMPLY WITH FNP DESIGN AND WRITERS GUIDE		IS STEP SEQUENCE APPROPRIATE TO FNP DESIGN		ADDITIONAL STEPS REQ'D. TO COMPLY WITH FNP DESIGN		STEP NOT REQ'D. (DELETE STEP)	STEP SEQUENCE CHANGE REQ'D.	STEP ALTER REQ'D.	ADDITIONAL STEPS REQ'D.	STEP ADEQ AS IS	STEP CHANGE DOCUMENTATION SHEET IF STEP NOT ADEQUATE AS IS	REMARKS
			YES	NO	YES	NO	YES	NO	YES	NO							

ERP_____ Rev._____

Page_____ of _____

Basis Guideline ERG_____ Rev._____

FIGURE 1

ERP _____ REV. _____
Sheet_____ of _____

STEP CHANGE DOCUMENTATION

ERP STEP:

ERG STEP:

JUSTIFICATION OF DIFFERENCES:

ERP WRITER _____ DATE _____

FIGURE 2

ATTACHMENT 1
(TO PROCEDURES GENERATION PACKAGE)

FARLEY NUCLEAR PLANT
EMERGENCY RESPONSE PROCEDURES WRITER'S GUIDE

ATTACHMENT 1

EMERGENCY RESPONSE PROCEDURES WRITER'S GUIDE

1.0 Purpose

1.1 General

The purpose of this Writer's Guide is to provide guidance in writing Emergency Response Procedures.

1.2 Scope.

This guide provides information for use in the preparation of Emergency Response Procedures (ERP's) to ensure their "UTILITY." Utility being defined as that property of a procedure which measures its usefulness to the operator. Utility includes such subjects as a procedures completeness, readability, convenience, accuracy, etc.

This guideline is not intended to provide Technical information or bases for the ERPs. It does however, provide the mechanism to convert the applicable Technical data into finalized procedures.

1.3 Applicability

This guideline is applicable to FNP Unit 1 and Unit 2 Emergency Response Procedures.

2.0 References

2.1 Emergency Operating Procedures Writing Guideline, INPO 82-017.

2.2 NUREG-0899, Guidelines for the preparation of Emergency Operating Procedures.

2.3 NRC Staff recommendations on the requirements for Emergency Response Capability, March 10, 1982.

2.4 NUREG-0737, Clarification of TMI Action Plan Requirements.

2.5 INPO 82-016, Emergency Operating Procedures Implementation Guideline.

2.6 Westinghouse Owners Group Emergency Response Guideline Volumes I, IIA, IIB, and III.

3.0 ERP Administrative Control

3.1 Title Page

Each ERP will be prefaced by a title page. The title page will provide information regarding the procedure number/unit, title, current revision number, date of the revision approval and

approval status. The list of effective pages may be presented on the title page or may be presented on a separate page following the title page.

3.2 Procedure Designation

The Emergency Response Procedures will consist of two major categories, event related optimal recovery procedures and function related procedures. The optimal recovery procedures (ORPs) will be comprised of three series:

- Nominal Emergency/Upset Response (EEP-Series)

- Event Specific Subprocedures (ESP-Series)

- Emergency Contigency Action (ECP-Series)

The function related procedures will be comprised of two series:

- Critical Safety Function Status Trees (CSF-Series)

- Function Restoration Procedures (FRP-Series)

3.3 Procedure Numbering

Each Emergency Response Procedure will be assigned its own unique number designation. Each unit will have its own distinct procedures maintained in separate binders. The number designator will consist of "FNP-", followed by the applicable unit designation. This will be followed by the appropriate series designation. Finally a number designator will be provided to identify the specific procedure within the series (e.g., FNP-2-ECP-3.3).

3.4 Page Identification and Numbering

Each procedure page will have its own heading (see Figure 1). The heading will contain the procedure number, the procedure title, and the latest revision contained on that page. The bottom of each page will provide the page number and total number of pages in that procedure.

3.5 Revision Numbering and Designation

Procedure revisions will be given a sequential integer number. The portions of the page affected by the current revision only will be annotated using a vertical line drawn next to the associated steps. This line will be located in the left margin for changes affecting the left column of the procedure, and in the right margin for changes affecting the right column. If a change affects the entire page, the revision number may be annontated as a General (Gen.) Revision and the vertical lines omitted. The revision number corresponding to the latest revision for a particular page will be indicated in the Heading.

4.0 Procedure Sections/Construction

4.1 Procedure Organization

The Emergency Response Procedures will be constructed and comprised of the following sections:

4.1.1 Title/LOEP Page(s)

Each procedure will be prefaced by a title page and a list of effective pages (see Figures 2 and 3). The title shall be a short word heading which is descriptive of the procedure's purpose or function.

4.1.2 Purpose/Symptoms Page(s)

Page 1 (and additional pages, if necessary) of each procedure will contain the purpose section (see Figure 4). Following the purpose, if applicable, will be the symptoms section.

The purpose will consist of a brief statement regarding the intended function or use of the procedure.

The symptoms will consist of a prescribed set of initiating events or procedure entry conditions. The symptoms will key the operator as to the applicability of the procedure for a given set of plant conditions. Although some redundancy of initiating symptoms is required, this section will be limited to major initiating events. Listing of large numbers of symptoms containing expected actions resulting from the initiating event shall be avoided.

If the sole means of entry into a procedure is from a previous procedure, then an additional set of symptoms or entry conditions would not be required. For example; since entry into the "Loss of Reactor Coolant" (EEP-1) procedure is only via the Reactor Trip or Safety Injection (ELP-0) procedure, a seperate set of entry conditions for the EEP-1 procedure is not required. Additionally, the structure of the critical safety function status trees is such that the symptoms are incorporated into their instructions. Therefore, a separate set of symptoms will not be required for the critical safety functions.

4.1.3 Operator Actions

Following the purpose/symptoms page will be the Main Body of the procedure consisting of a numbered set of operator actions (see Figure 5). The instructions will utilize a dual column format. The left hand column, headed "Action/Expected Response", will contain operator actions which would generally be the expected progression of events/actions for the given emergency. The right hand column, headed "Response Not Obtained", will provide contingency actions to be taken. The operator actions page formating will contain border and column designations as shown in Figure 5.

The operator actions will be composed of a set of concise and specific operator instructions. These will normally be in the form of written word type instructions. They may also be presented using a logic tree type format as in the case of the critical safety function status trees.

4.1.4 Step Numbering

Each major step will be assigned a sequential number 1, 2, 3, etc. (under the column headed "Step"). First order substeps of a major step will be indented. They will be assigned a number consisting of the associated major step followed by a decimal and a sequential number (i.e., 1.1, 1.2, 1.3, etc.). Second order substeps will be further indented from first order substeps. They will be assigned a number consisting of the associated first order step number followed by a decimal and a sequential number (i.e., 1.1.1, 1.1.2, etc.). Further order substeps should be avoided.

4.1.5 Prerequisite Step Numbers

Procedure steps should be presented in the expected sequence of performance, and the general flow should be from top to bottom. In order to provide additional flexibility and guidance, however, a prerequisite numbering system can be specified. Under each major step number a prerequisite step number may be provided in parenthesis. While operator actions are presented in the generally expected order of completion, it is recognized that strict performance of the procedures in numerical sequence may not always be plausible or desirable. Therefore, to assist the operator in determining when a step may be performed, the number of the step which is the final prerequisite for performance of the current step may be provided. For example, if the step number (20) is provided in parenthesis below step number 25, then step number 25 may be performed after step 20 has been completed even if steps 21 through 24 have not been completed. If no prerequisite step number is specified, then the steps should be performed in the order presented. Substeps of a major step will generally be performed in order. If, however, the order of substep performance is unimportant, a black dot will be used to identify the steps. In all cases, substeps can only be performed after the prerequisites for their associated major step have been completed.

4.1.6 Cautions

Information which contains conditions, practices or procedures which must be observed to avoid personal injury, loss of life, or damage to equipment will be presented in caution statements. Such information should be applicable to a specific step or portion of the procedure and the caution should be placed just prior to the applicable step(s). Caution statements will not be used instead of instruction steps and will not contain

any directed operator actions. Caution statements shall be wholly contained on a single page to avoid confusion and possible errors when changing pages. Caution statements will be centered between the left and right columns to preclude confusion with the procedure steps. The word "CAUTION" will be capitalized and underlined. The caution statement will be segregated using asterisks on the top and bottom for emphasis.

4.1.7 Notes

If additional information is necessary to support an instruction or portion of a procedure but such information does not meet the criteria for a caution statement, a note will be used. Like caution statements, notes shall be placed just prior to their associated step(s). Notes will not contain directed operator action and will not be used instead of procedure instruction steps. Notes will be centered between the left and right hand columns to preclude confusion with actual procedure steps. The word "NOTE" will be capitalized. Notes will be enclosed on the top and bottom with straight lines. More than one item of information may appear within one Note heading. If such is the case, however, separate information items will be anotated with a black dot.

4.1.8 Check Off Provisions

Check off lines will be provided for all first order and greater substeps.

4.1.9 Procedure Completion

After the final operator action statement the word "END" will be provided. This will assure the operator that he has completed the final step in the procedure.

4.1.10 Foldout Page

The final page for the "EEP" and "ESP" series procedures will be a foldout page. Other procedures may also utilize a foldout page as appropriate. This page will foldout to permit frequent review by the operator as the main body of the procedure is performed. The foldout page will contain vital parameters and criteria which should be frequently monitored by the operator. The foldout page will conform to the same rules which apply to the main text.

5.0 Procedure Writing (excluding Critical Safety Function Status Trees)

5.1 Style

5.1.1 Length

Instruction steps shall be concise and precise. That is, procedural wording should be brief but well defined.

5.1.2 Content

Instruction steps shall be limited to a single idea or action.

5.1.3 Assumed User

Instruction content shall be written to communicate to the user. The user being an individual with the minimum level of training and experience required to perform as an operator.

5.1.4 Complex Evolutions

Complex evolutions shall be broken down into a series of single steps, with each step as simple as practicable.

5.2 Level of Detail

5.2.1 Excessive Detail

Too much detail should be avoided in order to promote effective performance in a timely manner. The level of detail shall be the detail a newly trained and licensed operator would desire during an emergency condition.

5.2.2 Expected Results

Expected results of routine tasks need not be stated.

5.2.3 Objects of Operator Actions

Objects of operator actions shall be specifically stated. This shall be done with sufficient detail to explicitly define what is to be done and to what.

5.2.4 Component/Handswitch Operation Instructions

IF operation of a component is performed using a standard switch with unambiguous switch positions, THEN operation of the component may be specified by detailing the desired state of the component. Reference to the operation of the switch is not required. In such instances, however, the desired state of the component must correspond precisely to a specific position of the control switch or device. For example, "start CCW Pump 1A", is acceptable without specifying how to manipulate the handswitch. It is important when using this type of instruction that "CCW Pump 1A" correspond precisely to the nameplate nomenclature and that there is a "START" position on the switch.

5.2.5 Specifying Locations

If a component or control is to be operated and is rarely used or difficult to find, location information shall be given in parenthesis following the component or control name. As a general practice this would apply to operation of equipment outside the "At the Controls Area."

5.2.6 Common Engineering/Operations Practices

In conjunction with the minimum training standards of the operator, actions or responses of equipment or systems which are commonly considered as part of normal engineering practice need not be stated in the instructions. For example, observation of extinguishing of the green indicating light and illumination of the red running light would be normal practice when starting a pump. As such, to include these actions as part of the procedure would not be required or desirable.

5.3 Mechanics of Grammer and Syntax

5.3.1 Sentence Structure

Sentences, clauses, and phrases shall be short and written in a common American English Structure. Instructions requiring operator action(s) shall be written as a directive (imperative mode). In general operator actions are most effectively presented in sentence fragments or properly structured phrases, rather than long sentences or paragraphs. Use of articles, pronouns, and superfluous adjectives or adverbs shall be avoided.

5.3.2 Action Verbs

Only verbs which are commonly understood by an inexperienced operator shall be used. Use of a particular action verb shall be consistent. Refer to Table 1 for a standardized list of common action verbs. Action verbs which are easily confused with other action verbs shall be avoided. For example, increase and decrease should not be used. Adverbs can change the meaning of action verbs and therefore shall be avoided. If an instruction contains an action verb with three or more objects, the objects shall be segregated from the verbage and placed in list form with space provided for operator checkoff.

5.3.3 Vocabulary

The simplest, most familiar, and most specific words that accurately convey the intended meaning shall be used. All words should be understood by the newly qualified operator. Except where a word(s) has acquired a definition as a result of technical usage and is commonly understood within the industry, the definition of the word(s) shall conform to the more common usages as found in a standard American Dictionary.

5.3.4 Spelling

Spelling shall be consistent with modern usage as presented in a standard American English Dictionary.

5.3.5 Hyphenation

Hyphens are used between elements of a compound word or structure. Use of a hyphen to break a word at the end of a sentence shall be avoided. If any doubt exists as to the proper usage of a hyphen, the word or sentence shall be restructured to avoid hyphenation. The following are situations where hyphens shall be used:

- Hyphens should be used between some prefix and root word conbinations when this combination is similar to a different word. Examples are: re-cover and pre-position.

- When writing compound numbers from 21 (twenty-one) through 99 (ninety-nine).

- In compounds with self; examples: self-contained, self-lubricated.

- When misleading or awkward words would result by joining the words; example: bell-like.

- In writing fractions; example: one-half.

- Serves as an equivalent of the phrase "up to and including" when used between numbers and dates.

- When a letter is linked with a noun; example: o-ring.

- To seperate chemical elements and their atomic weight; examples: Uranium-235; U-235.

5.3.6 Punctuation

The rules of punctuation for standard American English shall be used. In general operator instructions shall be written such that a minimal amount of punctuation is required. If extensive punctuation is required for clarity, the sentence will be restructured. Short, concise clauses or sentences which are somewhat choppy but easily understood are preferable to lengthy confusing verbage. Some specific rules for the more commonly used punctuation marks are as follows:

- An apostrophe is used to denote the possessive case of nouns and pronouns. It may also be used to form plurals of letters, figures and words referred to as letters, figures and words.

- A colon is used to introduce a series.

- A comma is used to seperate words, phrases or clauses in a series.

·Parentheses are used to set off or separate, supplementary, parenthetic or explanatory material when the inclusion of such material does not essentially alter the meaning of the sentence.

·A period is used at the end of a complete sentence. It denotes the decimal place in numbers. It also is used to follow some abbreviations such as etc.

·A semicolon is used to link clauses not joined by a conjunction.

5.3.7 Abbreviations, Symbols, and Acronyms

The use of letter abbreviations, symbols and acronyms shall be limited to a well defined and understood standardized set. In general this set will be in accordance with FNP-0-AP-25 (equipment identification). Although FNP-0-AP-25 presents a standard set of plant abbreviations, only those abbreviations which are commonly recognized by the operators without referring to FNP-0-AP-25 shall be used. A list of permissible mathematical symbols and units are presented in Table 2. The presentation of abbreviations, symbols and acronyms should be consistent. For example, if an abbreviation is defined in lower case letters, then the abbreviation should always be presented in lower case letters, even in titles and headings. Periods shall be avoided in abbreviations unless the ommission would result in confusion.

5.3.8 Logic

Logic terms such as AND, OR, NOT, IF, IF NOT, WHEN and THEN may be used to describe a specific set of conditions upon which certain operator actions are based. When words are used as logic terms they shall be conspicuously identified by presenting them in capital letters and underlined. The following are rules for use in logic statements.

·The use of AND and OR within the same action shall be avoided.

·AND shall be used to indicate combinations of conditions which must all be true prior to performing the associated action.

·No more than three conditions can be joined by AND. IF more than three conditions are necessary, THEN the conditions should be presented in the form of a list.

·OR shall be used to indicate combinations of conditions any or all of which must be true prior to performing the associated action. If the all true combination is not an allowable pre-condition,it must be specifically identified. For example: "either A OR B, but NOT both.

·When action steps are contingent upon certain conditions a logic statement of the form "IF","THEN" or "WHEN", "THEN" shall be used. The words "IF" or "WHEN" shall precede the conditional portion

of the statement. A comma should be used to signify the end of the conditional portion and the action portion shall begin with the word "THEN." "IF" is used for an unexpected but possible outcome. "WHEN" should be used for an expected outcome.

- "IF NOT" shall be limited to those cases in which the operator must respond to the second and less desirable of two possible outcomes. "IF" shall be used for the first and more desirable outcome.

- THEN shall not be used at the end of an action step.

5.4 Numbers and Alphanumerics

5.4.1 Numerical Values

Numerical values shall utilize standard recognizable symbols and shall be consistent. Arabic numberals shall be used. For numbers less than unity, the decimal point shall be preceded by a zero (e.g. 0.1). The number of significent digits used will correspond to the number of significant digits available on the associated display and the reading precision of the operator. Although higher degrees of interpolation are possible, as a general rule requiring interpolation of a meter scale more accurately than one-half of the value between graduations shall be avoided.

5.4.2 Units

Units of measure shall be familiar to the operator. Units shall correspond to displayed information directly without necessitating conversion. A virgule (slant line) will be used instead of "per"; examples: ft/sec, Btu/hr.

5.4.3 Component Identification

Equipment nomenclature, alarm designations and references to control room displays, whenever possible shall correspond precisely to the engraving provided on the associated control, annunciator window or display. For components such as breakers with a name and commonly used alphanumeric designation, both descriptions shall be provided.

5.4.4 Setpoints

When an operator action specifies an alarm or automatic function, the applicable setpoint should be provided for verification by the operator.

5.4.5 Tolerance/Limits

When designating control points, a tolerance/limit band shall be given. The tolerance band will be specified in the same units as the control point and shall utilize a "from-to"

specification. Using a "±" tolerance band shall be avoided as this requires additional action by the operator to determine the limits. If an action is required upon reaching a specific value, then no tolerance band would be required. Under these circumstances the direction from which the action value would be reached should be known and specified in the instruction. For example, TRIP Reactor Coolant Pump 2A at 1300 psig falling pressure.

5.4.6 Calculations

Calculations shall be avoided as they direct the operators attention from the plant.

5.5 Printed Operator Aids

5.5.1 Figures

Graphs and drawings required for performance of a procedure will be given a figure number. Assigned figure numbers shall be sequential and arranged to coincide with their order of reference in the text. Graphs shall be legible and utilize scales with units corresponding to the operators' displays. Simple line graphs are preferrable to more sophisticated graphs such as bar charts. Significant areas of the graph such as acceptable and danger regions shall be clearly marked.

5.5.2 Tables

When lists of data are necessary a table shall be used. Tables shall be numbered similar to figures. Units for numerical values utilized in tables shall be consistent with operator displays. Presentation of data in tables shall avoid the necessity of interpolation. If interpolation is required presentation of the data in graph form should be considered.

5.5.3 Attachments

Additional information required by the operator other than figures and tables will be appended as attachments. Attachment numbering will be sequential and arranged according to the order referenced in the text. Presentation and writing of attachments shall conform to the same rules as required for the main portion of the procedure.

5.5.4 Tabs

Locating tabs will be provided to enable quick and easy access to the various procedures.

5.5.5 Placekeeping

In order to enhance procedure placekeeping for the operator, check off spaces will be provided for every substep. These

checkoffs may be utilized as desired by the operator and shall not be considered as a signoff requirement.

5.6 Procedure Flow and Interface

5.6.1 Referencing

Referencing implies that an additional procedure or procedure steps are to be used as a supplement to the procedure presently being used. Since referencing may create a potential for the concurrent use of two or more procedures, use of referencing shall be minimized. If required however the words "refer to" shall be used. Also, the referenced document must exist, and have entry conditions compatible with the plant status at the time of referencing. Care must be exercised to ensure referencing actions do NOT route the operator around important instructions or caution statements.

5.6.2 Branching

When it is necessary to perform another procedure branching shall be used. Excessive use of branching destroys continuity and shall be avoided. If only a few procedure steps are involved in the branching, they will be included in the originating procedure. When branching is required to a new procedure the transfer will be total. That is, the new procedure will take control and the previous procedure shall no longer be required. Branching shall be directive in nature utilizing the words "go to." As in referencing, the branch procedure must exist and have compatible entry conditions. Branching shall NOT route the operator around important or necessary instructions or cautions.

5.7 Methods for Emphasis

5.7.1 Underlining

Underlining will be used to emphasize logic terms. It is also a useful tool for showing general emphasis as it has minimal effect upon procedure readability. Underlining shall only be used for the following procedure parts: the word CAUTION statements, major procedure steps and logic terms.

5.7.2 Capitalization

Rules of capitalization for Standard American English shall be followed. In addition the following items shall be capitalized for emphasis and clarity: verbatim equipment nameplates, engraved or placarded switch positions, verbatim annunciator light wordings, the words "NOTE" and "CAUTION"

in Note and Caution statements, conditional logic terms, and verbatim procedure titles and headings. Excessive uses of capitalization shall be minimized to prevent a diminishing effect.

5.7.3. Framing

Partial framing of note and caution statements with a straight line above and below the Note statement and asterisked lines above and below caution statements will be used. This will help draw attention to the statements and help segregate the statements from the main text.

5.8 Typing

5.8.1 Paper

Page size with the exception of foldout pages shall be standard 8 1/2 x 11 inches. To prevent confusion between units, Unit 1 procedures will use yellow paper and Unit 2 procedures will use green paper.

5.8.2 Type

Procedures will be typed utilizing a standard modern style type with no greater than 12 characters per inch. Temporary changes may be initially made as necessary until the affected pages are typed.

5.8.3 Page Arrangement

Pages margins, borders and spacing shall be in accordance with Figure 6.

5.8.4 Page Rotation

If rotation of a page is required for tables etc., the following rules should be followed:

- The top of the rotated page should be the normal left hand edge.
- The page margins do not rotate.
- Page identification and numbering will not be rotated.

6.0 Critical Safety Function Status Trees

6.1 Logic Sequence

Critical safety function status trees (F-Series) will utilize a branching logic tree format (see Figure 7). Flow of the logic will be from left to right across the page. Arrangement shall be in their general order of priority regarding plant safety.

6.2 Color

Critical Safety Function Status Trees will contain a four color scheme to aid in indicating degrees of severity. Colors used will be red, orange, yellow and green respectively from more severe to less severe.

6.3 Logic

A progression logic sequence will be used that is limited to only two possible outcomes at each decision point. Additionally the two possible outcomes specified at each decision point will include all outcomes of the specified trial. This will ensure the operator can always proceed from the initial decision point to the final outcome.

6.4 Logic Path and Outcome Coding

To reinforce the color coding both line and final outcome coding will be used. Red paths will be solid heavy lines, orange paths will be heavy dashed lines, yellow paths will be dotted lines, and green paths will be two thin lines. Red outcomes will end with a full heavy ring, orange paths will end with a ring of 240 degrees, yellow paths will end with a ring of 120 degrees and green paths will end with a thin lined circle (see Figure 8).

6.5 Branching

In all instances where the safety function monitored by the Critical Safety Function Status Tree is not satisfied (i.e. the final outcome is not a green circle), specific branching instructions shall be provided. This will direct the operator to the applicable function restoration procedure in order to restore the safety function to an acceptable status.

FNP-1-EEP-0	Reactor Trip or Safety Injection	Revision 0

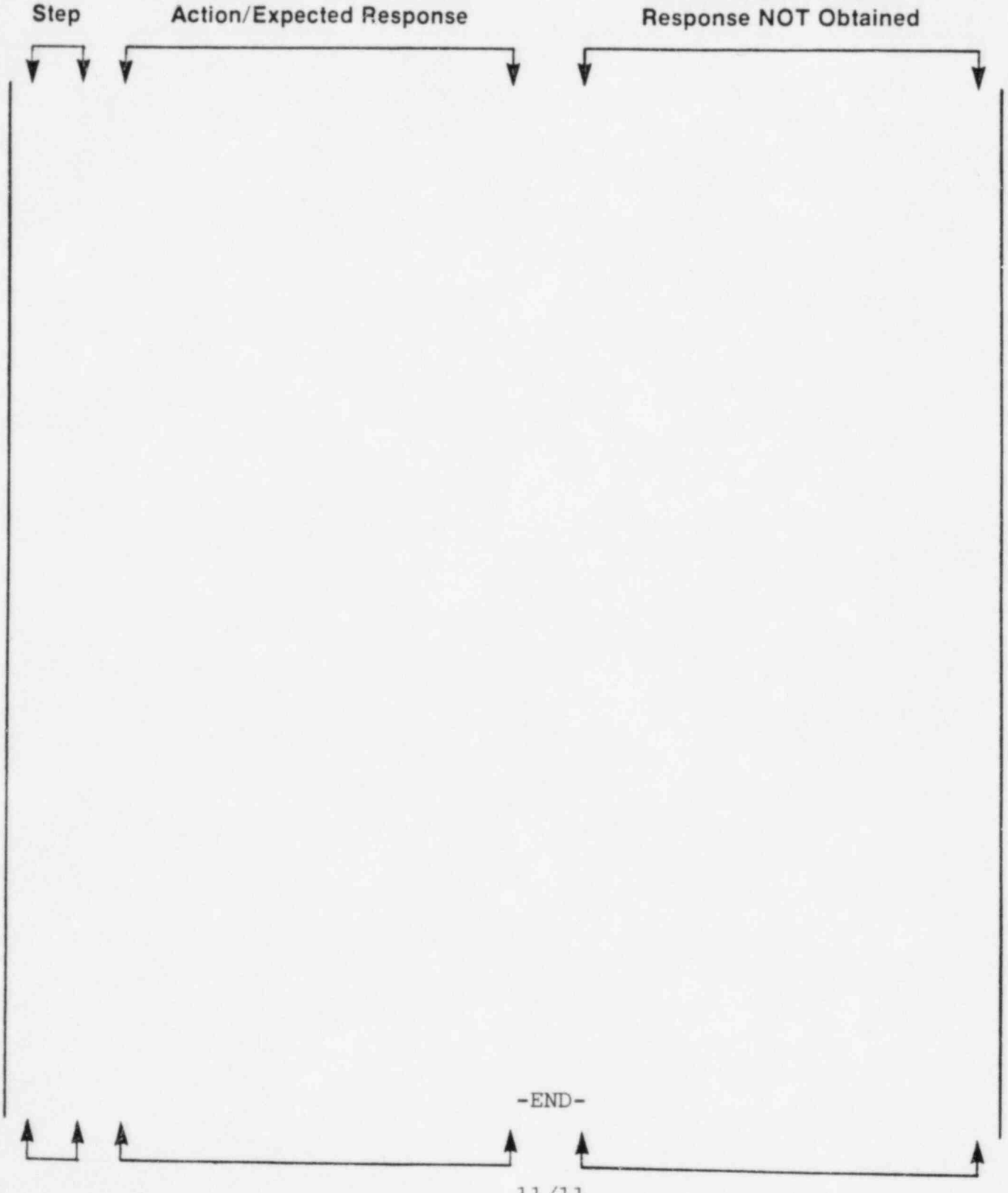


FIGURE 2

FNP-1-EEP-0
Date
Revision____

FARLEY NUCLEAR PLANT

EMERGENCY EVENT PROCEDURE

FNP-1-EEP-0

S
A
F
E
T
Y

REACTOR TRIP
OR
SAFETY INJECTION

R
E
L
A
T
E
D

Approved:

_____
Operations Superintendent

Date Issued:_____

Diskette #_____

REV. 0

Figure 3
LIST OF EFFECTIVE PAGES FNP-0-AP-74

PAGE NO.	REVISION NO.											
	0	1	2	3	4	5	6	7	8	9	10	11

Rev. 0

FIGURE 4

FNP-1-EEP-0	Reactor Trip or Safety Injection	Revision 0

Step **Action/Expected Response** **Response NOT Obtained**

A. Purpose

I. The purpose of this procedure is to verify proper response of the automatic protection systems following actuation of a Reactor Trip or Safety Injection; and to assess plant conditions and identify the appropriate recovery procedure.

B. Symptoms

I. Following are symptoms of a reactor trip:

a. Any reactor trip annunciator.
b. Rapid drop in neutron level indicated by nuclear instrumentation.
c. All shut down and control rods are fully inserted. Rod bottom lights are ON.
d. Rapid drop in unit load to zero power.

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

a. Any SI annunciator lit.
b. SI pumps in service.

FNP-1-EEP-0	Reactor Trip or Safety Injection	Revision 0

Step	Action/Expected Response	Response NOT Obtained
36.	Check if RHR pumps should be stopped.	
_ 36.1	RCS wide range pressures greater than 130 psig AND NOT falling. _ RCS WIDE RANGE LOOP A (PI 403A) _ RCS WIDE RANGE LOOP B (PI 402A)	36.1 IF either RCS wide range pressure less than 130 psig OR falling, THEN proceed to step 28.
_ 36.2	Reset SI. _ SAFETY INJECTION TRAIN A reset _ SAFETY INJECTION TRAIN B reset	
	********** CAUTION IF RCS pressure drops below 130 psig, THEN RHR pumps must be manually restarted to supply water to the RCS. **********	
_ 36.3	TRIP RHR pumps _ RHR PMP 1A tripped _ RHR PMP 1B tripped	
37.	Rediagnose plant conditions:	
_ 37.1	Proceed to step 18.	
	-END-	

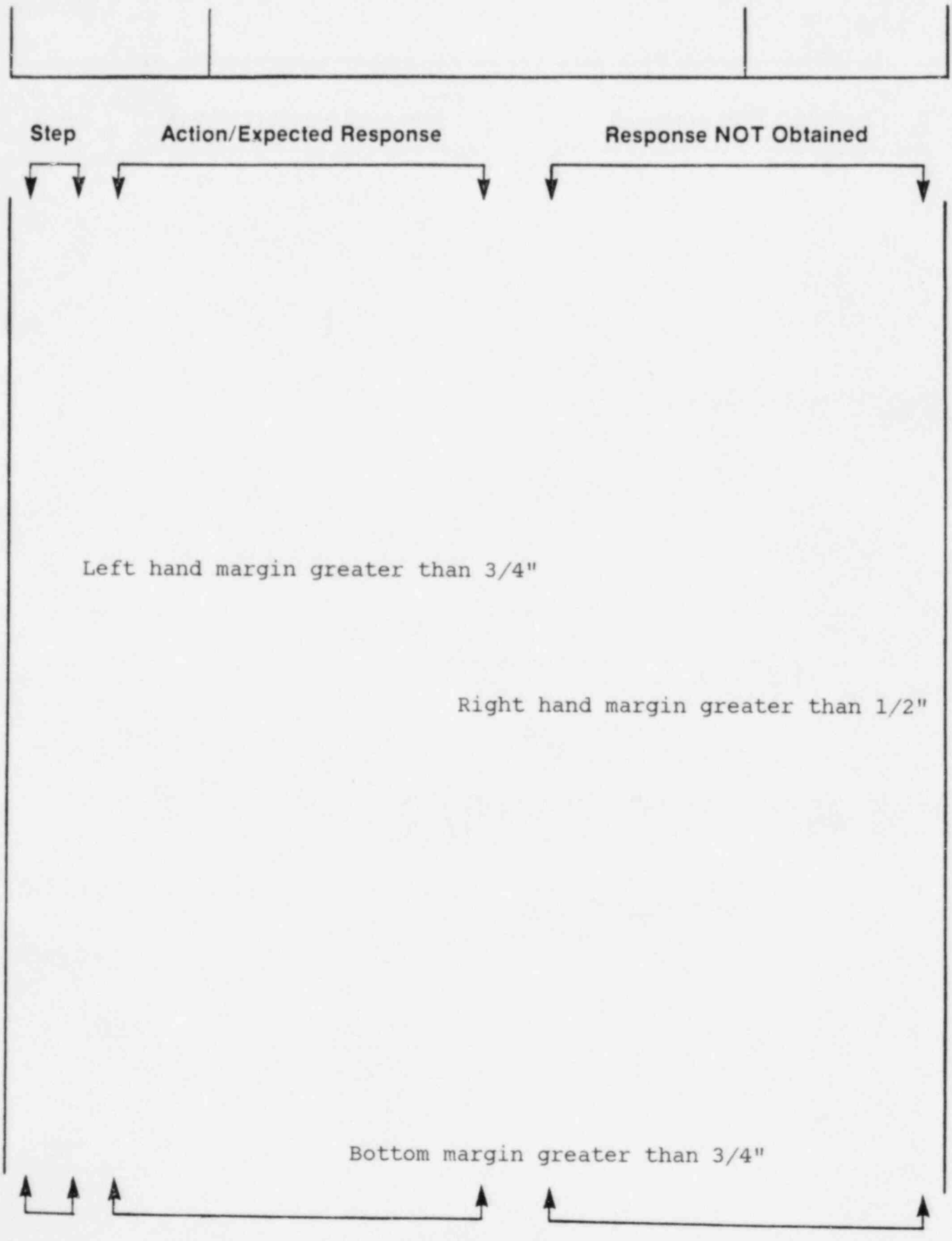
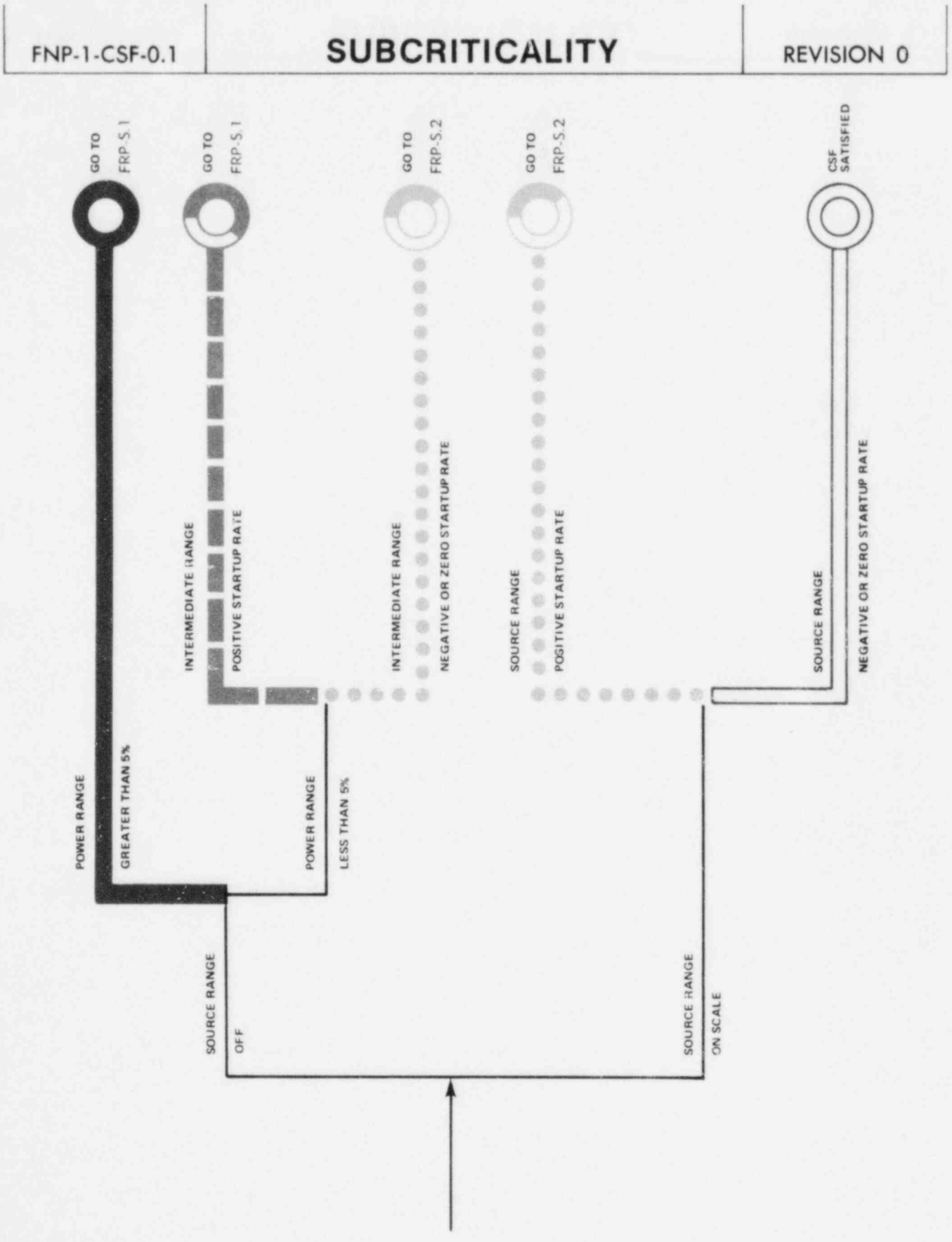

Step
Action/Expected Response
Response NOT Obtained
Left hand margin greater than 3/4"
Right hand margin greater than 1/2"
Bottom margin greater than 3/4"

FIGURE 7


FNP-1-CSF-0.1
SUBCRITICALITY
REVISION 0
GO TO FRP-S.1
GO TO FRP-S.1
GO TO FRP-S.2
GO TO FRP-S.2
CSF SATISFIED
INTERMEDIATE RANGE
POSITIVE STARTUP RATE
INTERMEDIATE RANGE
NEGATIVE OR ZERO STARTUP RATE
SOURCE RANGE
POSITIVE STARTUP RATE
SOURCE RANGE
NEGATIVE OR ZERO STARTUP RATE
POWER RANGE
GREATER THAN 5%
POWER RANGE
LESS THAN 5%
SOURCE RANGE
OFF
SOURCE RANGE
ON SCALE

THE SCHEME OF LINE PATTERN CODING USED TO IDENTIFY PRIORITIES

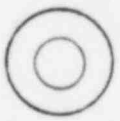
BRANCH LINE	STATUS IDENTIFIER	
═══		THE CRITICAL SAFETY FUNCTION IS SATISFIED - NO OPERATOR ACTION IS CALLED FOR
CORRESPONDS TO GREEN		
● ● ● ● ●		THE CRITICAL SAFETY FUNCTION IS NOT FULLY SATISFIED - OPERATOR ACTION MAY EVENTUALLY BE NEEDED
CORRESPONDS TO YELLOW		
▬ ▬		THE CRITICAL SAFETY FUNCTION IS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

TABLE 1

ACTION VERBS

VERB	DEFINITION/USE
Align	To arrange or position a set of elements to perform a specified function. When "align" is used the instruction should specify the system or devices to be manipulated and the desired function(s) to be achieved. For example, "Align the service water system to provide cooling water to the generator hydrogen cooler."
Allow	To permit a stated condition to be achieved. For example, allow discharge pressure to stabilize.
Attempt	To make an effort to perform a task. This verb should only be used when there is a significant possibility the specified task may not be achieved.
Block	To prevent or inhibit the normal functioning of a device or control system. For example, "Block safety injection."
Check	To investigate the position or status of a specified function or variable. Check should be used to indicate a strictly investigative process. No equipment or control devices should be manipulated when performing a "Check" function.
Check Closed	The process of investigating the position of a valve, breaker or other device when the expected position of the device is closed. The actual position of the device should remain unchanged regardless of its "As Found" position. If the "As Found" condition is not closed, further investigation to resolve the discrepancy should be performed.
Check Open	The process of investigating the position of a valve, breaker or other device when the expected position of the device is open. The actual position of the device should remain unchanged regardless of its "As Found" position. If the "As Found" condition is not open, further investigation to resolve the discrepancy should be performed.
Close	To change the physical position of a device to either prevent the flow of mass thru the device (such as valves, doors, etc.) or in the case of breakers to permit the flow of electrical current.
Commence	To begin the initial act. Generally to start a lengthy or complex evolution.

TABLE 1 (cont)

VERB	DEFINITION/USE
Compare	To examine two or more parameters in an effort to discern similarities or differences. The parameters should be similar to permit direct examination. In general comparisons should be limited to an examination of magnitude differences between two similar variables.
Complete	To perform a specified action or task to a final end.
Continue	To maintain a course of action or to resume a course of action which was interrupted.
Control	To exercise direct physical influence over a parameter, function or device. Using physical manipulation of plant devices, to cause a desired event(s) to occur.
Decrease	Do not use.
Determine	To ascertain the status or to resolve a question thru an investigative process. Generally used to initiate an investigation upon which to base a decision.
Equalize	The process of making two or more variables the same. The variable(s) to be adjusted should be similar enough to enable direct comparison.
Establish	To bring about. To take necessary actions to cause a specified set of conditions to exist.
Evaluate	To determine the significance or worth of something usually by careful appraisal or study. Generally to formulate a decision regarding a course of action by careful study of applicable conditions. For example, "Evaluate the need for continued containment spray system operation."
Identify	To distinguish an item or parameter with unique characteristics from a group of items or parameters. For example, "Identify the faulted steam generator."
Implement	To carry out. To initiate and maintain a prescribed course of action(s).
Increase	Do not use.
Initiate	To commence or begin. Generally used to cause the start or beginning of an effort which can not be completed in a short time. For example, "Initiate SI."
Inspect	To examine closely in a critical manner. Generally used to require a search for a potential problem or error.
Investigate	To observe or study by close examination in a systematic manner. Generally used to cause a search for problems or information.

TABLE 1 (cont)

VERB	DEFINITION/USE
Isolate	To seperate one item from another. Generally used to require the securing of flow to and from a component. For example, "Isolate the boron injection tank."
Maintain	To cause a condition or function to continue in an unchanged state. Should only be used to specify that a given set of conditions which have previously been established should be continued.
Open	To change the position of a mechanical device to either permit the flow of mass thru the device (such as valves, doors, etc.) or in the case of breakers to prevent the flow of electrical current.
Operate	To perform the necessary action(s) to cause a component or device to function. Generally used to direct the starting and running of equipment.
Place	To direct to a specific location. Generally used to direct the movement of a control device to a specific position. When used there should be direct correspondence between the directed position and the actual position as indicated on the associated control.
Prepare	To make ready for some purpose, use or activity. To plan in advance for an activity. Generally used to require all advanced planning and initial conditions be completed prior to performing a related activity.
Prevent	To keep from happenning. Generally used to direct any necessary actions to preclude an action or condition from occurring.
Raise	To cause a parameter to become larger in magnitude. For example, "Raise RCS pressure."
Record	To set down in writing. Generally used to require the writing of informatoin so as to create a permanent reference.
Reduce	To cause a parameter to become smaller in magnitude. For example, "Reduce RCS pressure."
Reset	To restore to an initial or previous state. Generally used to direct the placement of a component or control device to a pretripped or to a ready/standby condition.
Restore	To return to a former original condition. Generally used to require the reinstatement of a system or broad function to a pretripped or a ready/standby condition.
Set	To adjust a device especially a measuring or control device to a desired position. Generally used to direct the positioning of a variable control device. For example, "Set diesel speed to 720 rpm."

TABLE 1 (cont)

VERB	DEFINITION/USE
Shutdown	To stop or cease to operate. Generally used to direct the placing of a system or complex piece of equipment in a normal nonoperating condition.
Start	To begin an activity or undertaking. Generally used to direct the placing of a piece of equipment from a shutdown to a running condition when such action is achieved by the placing of a control device in a corresponding "start" or "on" position.
Stop	To cease an activity or to cause an activity to cease. Generally used to direct the placing of a piece of equipment from a running to a shutdown condition when such action is achieved by the placing of a control device in a corresponding "Stop" or "Off" position.
Terminate	To bring to an end or to cease an activity. Generally used to direct the cessation of a system or complex function.
Throttle	To control the flow of a fluid, usually by manipulation of a valve. Generally used to direct the operation of a valve or valves in an intermediate position to control fluid flow.
Trip	To manually actuate a semi-automatic feature. Generally used to direct the manual actuation of a control which will cause the associated device to cease operation in a short time frame.
Vent	To permit a fluid under pressure to escape.
Verify	To ensure an expected condition or action has occurred and if necessary to take actions to make the condition or action occur.

TABLE 2

SYMBOLS/UNITS

SYMBOL/UNIT	DESCRIPTION
	NOTE
	Mathematical symbols are intended for use in calculations. Their use in instructional steps should be restricted.
X > Y	X greater than Y
X ≥ Y	X greater than OR equal to Y
X < Y	X less than Y
X ≤ Y	X less than OR equal to Y
X = Y	X equals Y
X ≠ Y	X does NOT equal Y
X + Y	X plus Y
X - Y	X minus Y
X ÷ Y	X divided by Y
X/Y	X divided by Y
X x Y	X multiplied by Y
( )	Indicates to perform operations within parenthesis prior to other operations
$X \times 10^{Y}$	10 raised to the Y power multiplied by X.
A	Amperes
Btu	British Thermal Unit
Ci	Curies
ft, ft^2, ft^3	Feet, square feet and cubic feet
gal	Gallons
hp	Horse power
h	Hours

TABLE 2 (cont)

SYMBOL/UNIT	DESCRIPTION
HZ	Hertz (cycles/second)
in, in^2, in^3	Inches, square inches and cubic inches
inHg	Inches of mercury
inHga	Inches of mercury absolute
inH_2O	Inches of water
inH_2Oa	Inches of water absolute
kW	Kilowatts
lb	Pounds
min	Minutes
MW	Mega-watts
psi	Pounds/in^2 (pressure)
psia	Pounds/in^2 absolute
psig	Pounds/in^2 gage
rd	Rad
rem	REM
rpm	Revolutions/minute
V	Volts
W	watts
°C	Degrees Celsius
°F	Degrees Farenheit
°K	Degrees Kelvin
°R	Degrees Rankine
%	Percent