ATTACHMENT TO AEP:NRC:0773Q

PROCEDURES GENERATION PACKAGE

PART II

WRITERS GUIDE

FOR

DONALD C. COOK NUCLEAR PLANT

EMERGENCY OPERATING PROCEDURES

REVISION 1

MAY 1, 1986

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FIGURE

1. PURPOSE AND SCOPE

The purpose of this document is to provide administrative and technical guidance on the preparation of Emergency Operating Procedures (EOPs) for the Donald C. Cook Nuclear Plant. This guide applies to Optimal Recovery Procedures, Function Restoration Procedures, and Critical Safety Function Status Trees.

2. EOP DESIGNATION AND NUMBERING

Emergency operating procedures (EOPs) specify operator actions to be taken during plant emergency situations which will return the plant to a safe stable condition. Each procedure shall be uniquely identified to facilitate preparation, review, use, and subsequent revision.

2.1 Procedure Title

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

2.2 Procedure Designation

Every separate procedure shall have its own alpha-numeric designation to supplement the descriptive title. Each procedure will begin with either the prefix 01-OHP 4023 (for Unit 1), or 02-OHP 4023 (Unit 2). The prefix will be followed by an alpha-numeric designator. Letter designators are to be assigned according to the definitions provided in Table 1.

Optimal Recovery Procedures shall be designated by the letters E, ES or ECA plus a number designator. Number designators are assigned sequentially. Each E procedure number designator shall consist of a single integer. Each ES procedure shall consist of the number designator of the reference E procedure, plus a decimal integer, again assigned sequentially.

ECA procedures shall each have a number designator consisting of an integer plus a decimal integer. Related procedures shall be assigned sequential decimal integers.

TABLE 1

DEFINITIONS OF LETTER DESIGNATORS FOR EOPs

E	-	a procedure for diagnosis and recovery from design basis events
ES	-	a procedure which supplements the recovery actions of an E procedure
ECA	-	a procedure which supplements both the E and ES procedures by providing recovery actions for low probability or unique event sequences which are not easily covered in the E or ES procedures or which may complicate or reduce the effectiveness of these procedures
F	-	a procedure for diagnosis of challenges to a Critical Safety Function - represented in tree format
FR	-	a procedure for restoration of a Critical Safety Function (CSF) to a satisfied condition
S	-	designator for SUBCRITICALITY CSF
C	-	designator for CORE COOLING CSF
H	-	designator for HEAT SINK CSF
P	-	designator for INTEGRITY CSF
Z	-	designator for CONTAINMENT CSF
I	-	designator for INVENTORY CSF

Letter and number designators shall be separated by a hyphen.

Examples:
E-0
ES-0.1
ES-1.2
ES-1.3
ECA-0.0
ECA-1.1
ECA-2.1

Critical Safety Function Status Trees shall be designated by the letter F plus a number designator. Number designators shall consist of the number zero plus a decimal integer which shall be assigned sequentially.

Letter and number designators shall be separated by a hyphen.

Examples:
F-0.1
F-0.2

Function Restoration Procedures shall be designated by the letters FR plus an additional letter which corresponds to the respective Critical Safety Function. All the separate procedures related to a particular Critical Safety Function are assigned decimal integers in increasing order.

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

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

2.3 Revision Numbering

The procedure cover sheet and procedure pages shall be updated to reflect the next sequential revision number. Revision numbering as described here applies to both procedures and status trees. The current revision number will appear in the lower right hand corner of the procedure pages below the page number (see Figure 5). The approval date and effective date appear on the procedure cover sheet.

EOP revisions should be subject to the PGP process when major changes occur in the plant design, technical specifications, technical guidelines, writers guide or other plant procedure.

2.4 Page Numbering and Identification

Each procedure page shall carry the procedure designator and number (Section 2.2) in the upper right hand corner; the procedure title (Section 2.1) in the upper left hand corner; and the page number and revision number in the lower right hand corner. Page numbering shall be sequential and each page will be specified as "___ of ___". The last page of instructions will have the word "END" following the last instruction step.

3. FORMAT

This section describes the format that is to be applied consistently to all Emergency Operating Procedures.

3.1 Procedure Organization

All procedures in the EOP set are to employ a common structure consisting of five elements as shown in Table 2. Any individual procedure might contain only the two required elements, or additional elements as necessary to present the intent of the procedure.

The sequence of procedure elements is always in the order shown in Table 2. Page numbering is sequential through all the elements comprising any procedure, except the Foldout Page and Supplement.

Each individual procedure will be bound in its own four part folder such that; the inside front cover will contain the cover sheet and pages containing instructional steps, the front of the folder inside leaf contains Foldout Page (if applicable) and the back of the inside leaf contains a Supplement (if applicable), the inside back cover contains any Attachments to the procedure. The procedure folder is identified with the procedure number and title.

The EOP set is housed in a cart which is used exclusively for these procedures. Each procedure folder is kept in a hanging folder which is tabbed with the procedure number. Tabs are also used on the hanging folders to designate type of procedure e.g., Optimal Recovery Procedures, Function Restoration Procedures; and the location of significant procedures such as Reactor Trip or Safety Injection, Reactor Trip Response, Steam Generator Tube Rupture and Loss of Reactor or Secondary Coolant. All tabs are color coded to represent its specific function as describe above.

3.2 Page Formats

All pages of the Emergency Operating Procedures will use the same page structure except the Foldout Page which is discussed below. This page structure employs a pre-printed border to assure all margins are correctly maintained, and pre-printed designator boxes to insure completeness and consistency (see Figure 1).

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

TABLE 2

PROCEDURE ELEMENTS

COVER SHEET	(all procedures) - summarizes procedure intent and either entry symptoms or transitions
INSTRUCTION STEPS	(all procedures) - presents the stepwise operator instructions
FIGURES	(as required) - presents usually graphical data to supplement action steps
FOLDOUT PAGE	(as required) - presents information which is applicable throughout the procedure(s) that it follows
ATTACHMENTS	(as required) - presents non-graphical information to supplement action steps
SUPPLEMENT	(As required) - presents graphical and stepwise operator instructions to determine Reactor Coolant System Subcooling when adverse containment conditions are present

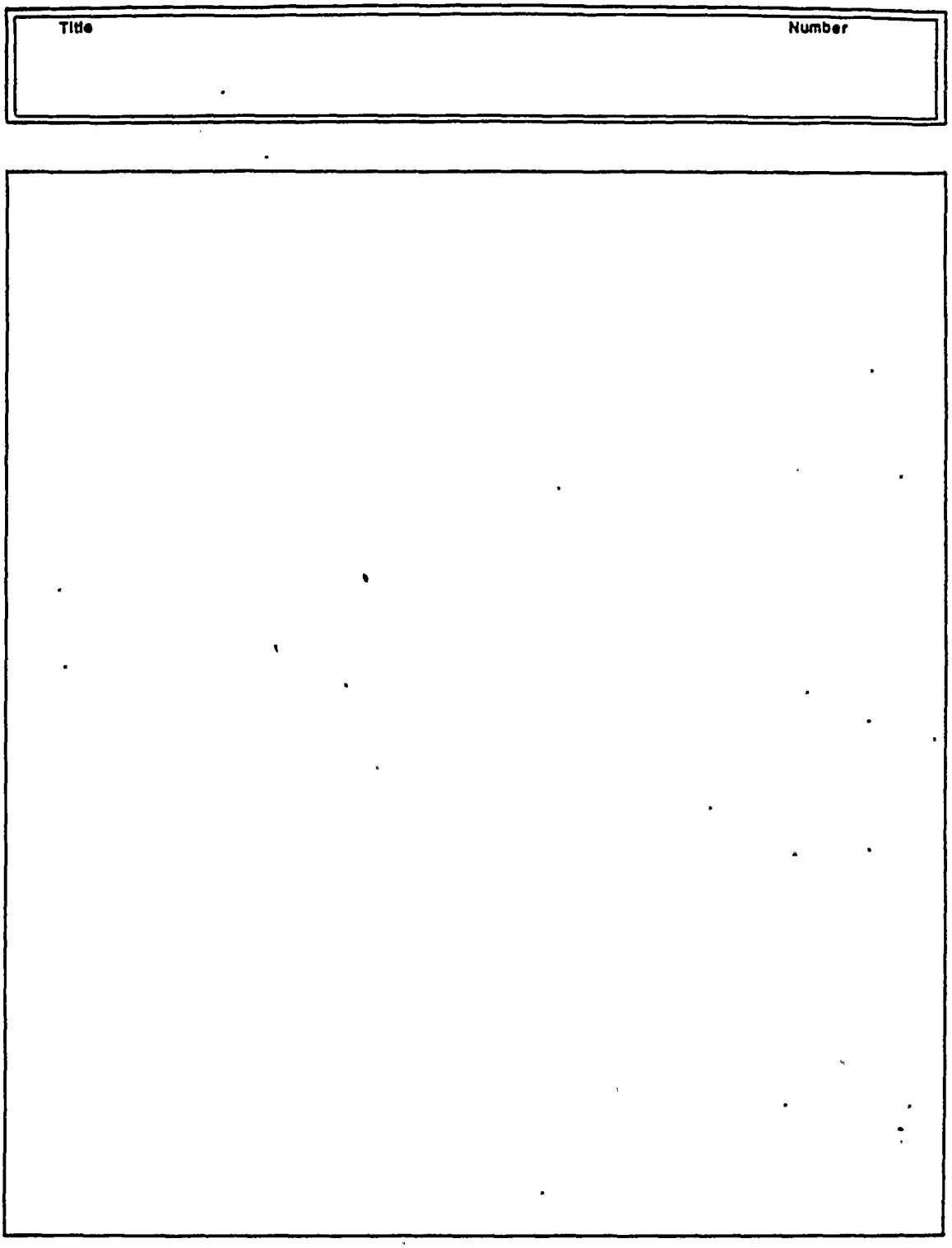

FIGURE 1. PRE-PRINTED PAGE FORMAT

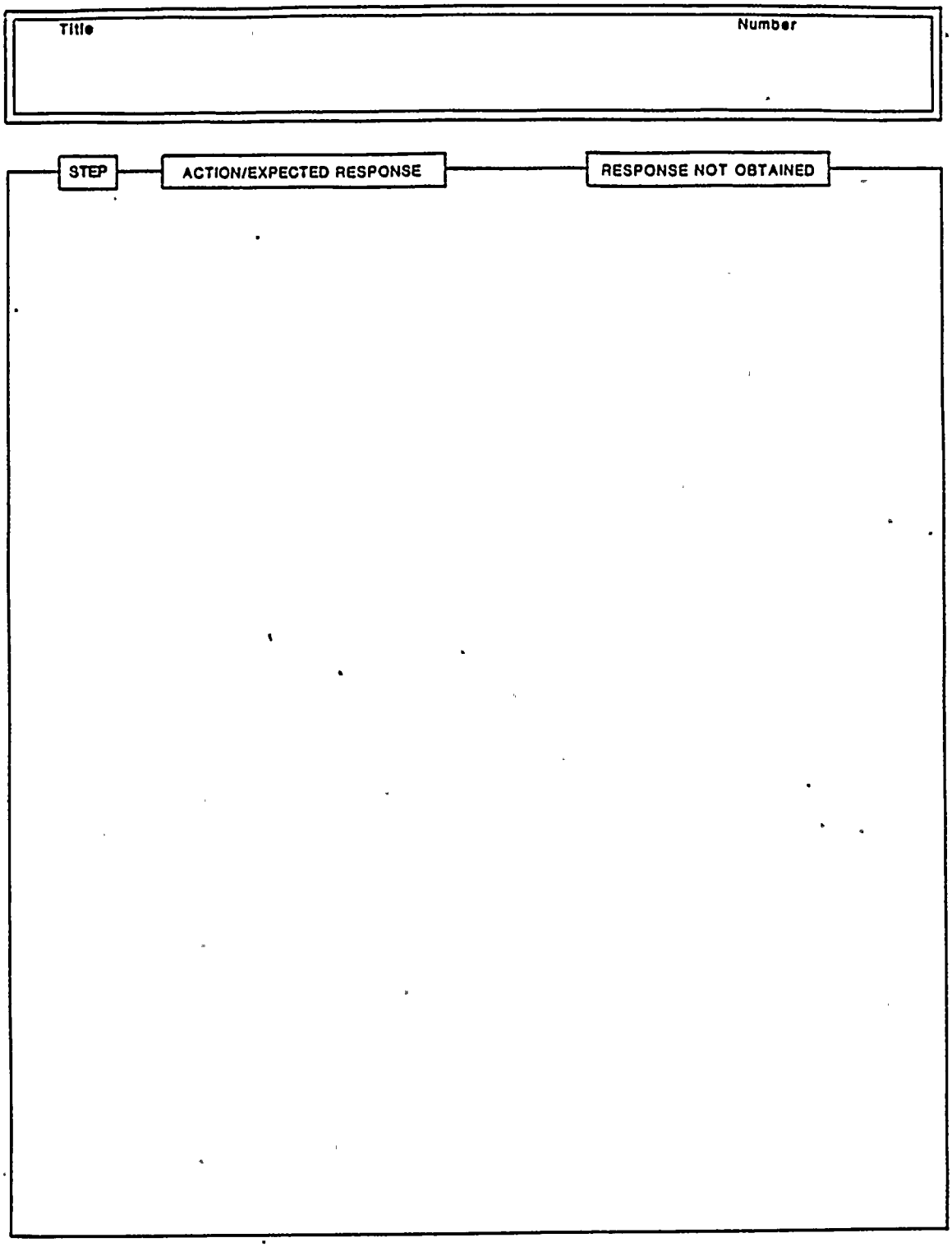

FIGURE 2. PRE-PRINTED PAGE (2-COLUMN) FORMAT

The foldout page does not use the pre-printed page format with column headings and a separate designator box for title and procedure number. Instead, it will employ a single-line border encompassing all information except page and revision numbering.

It is intended to summarize only the information which an operator should have continuously available, so page content will vary by procedure. Each Foldout Page shall be titled at the top all-capitalized type: "FOLDOUT FOR PROCEDURE 0(X)-OHP 4023.(XX-X.X)", making sure that the prefix is unit-specific (X), and the correct procedure number is applied.

3.3 Instructional Step Numbering

Procedures steps will be numbered as follows:

1. High-level step

    a. Substep (if necessary)

        1) Detailed instructions (if necessary)

            a) (if necessary)

Substeps are lettered sequentially according to expected order of performance. If the order of substep performance is not important, the substeps are designated by bullets (o). If the logical OR is used, both choices must be designated by bullets. This same numbering scheme is to be used in both the right-hand and left-hand columns of the procedures.

3.3.1 Immediate Action Steps

For those procedures which are the entry procedures into the EOP set, certain initial steps may be designated "immediate actions". This designation implies that those steps may be performed by the operator, based on his or her memory, without reference to the written procedure. These steps should be limited to verifications, if possible. Immediate action steps are identified by a *NOTE* (see Section 4.2.4) prior to the first high-level action step.

Example:

NOTE: Steps 1 through 10 are IMMEDIATE ACTION steps.

3.3.2 Continuous Steps

Many of the operator actions provided in a procedure imply continuous performance throughout the remainder of the procedure. This intent is conveyed by the use of appropriate action verbs such as monitor, maintain, or control.

3.3.3 Alternative Steps

Many of the operator actions provided in a procedure give an alternative means of satisfying the requirements of the step. The EOP format conveys this philosophy by the use of the Action-Expected Response (AER) column and the Response Not Obtained (RNO) column (see Section 3.2). It can also be conveyed by the use of the logical term "OR" (see Section 4.2.3) and is intended to provide an alternate solution for the case when a designated piece of equipment is unavailable. Example: Use PZR PORV OR Aux. Spray).

3.3.4 Concurrent Steps

Concurrent steps are not normally used in the EOP steps. All steps are assumed to be performed in the sequence given unless otherwise stated. An exception to this case is if the assigned task of a step is lengthy, (Example: Establish letdown) the next step can be performed concurrent with the completion of the step in progress unless the operator is explicitly directed not to do so. (Section 4.2).

4. WRITING THE PROCEDURE

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

4.1 Cover Page

Each cover sheet will contain two explanatory sections in addition to procedure and title designators. The first section will be titled PURPOSE and will briefly describe what the procedure is intended to do. The second section is a summary of those conditions which require entry into the procedure. This section will be titled SYMPTOMS OR ENTRY CONDITIONS. For those procedures that are entry procedures into the EOP set, a symptom summary is sufficient (see Figure 3). For other procedures, which can only be entered by transition from previous procedures, a summary of the entry conditions (and procedure/step) should be provided (see Figure 4 for the preferred format). Figures 3 and 4 should be used as examples for wording on all cover sheets.

4.2 Operator Actions

Steps directing operator action should be written in short and precise language. The statement should present exactly the task which the operator is to perform. The equipment to be operated should be specifically identified, and only those plant parameters should be specified which are presented by instrumentation available in the control room. It is not necessary to state expected results of routine tasks.

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

Title	Number
REACTOR TRIP OR SAFETY INJECTION	01-OHP 4023. E-0

A. PURPOSE

This procedure provides actions to verify proper response of the automatic protection systems following manual or automatic actuation of a reactor trip or safety injection, to assess plant conditions, and to identify the appropriate recovery procedure.

B. SYMPTOMS OR ENTRY CONDITIONS

1) The following are conditions that require a reactor trip, if one has not occurred:

a) "Reactor Breaker Undervoltage Trip A Initiated" and "Reactor Breaker Undervoltage Trip B Initiated" which is cause by any of the following:

Reactor Trip	Coincidence	Setpoint	Logic Drw
Source Range, high flux	1/2	10^5 CPS ↑	98504
Intermediate, Range high flux	1/2	____amps	98504
Power Range, high flux, high setpoint	2/4	109%	98505
Power Range, high flux, negative rate	2/4	5% ↓ in 2 sec.	98505
Power Range, high flux, positive rate	2/4	5% ↑ in 2 sec.	98505
Power Range, high flux, lo setpoint	2/4	25%	98505
Overtemperature ΔT	2/4	Calculated	98501
Overpower ΔT	2/4	Calculated	98501
Primary Coolant low flow or RCP breaker open	Above 50%: 2/3 on 1/4 loops 10-50%: 2/3 on 2/4 loops Above 50%: 1/4 10-50%: 2/4	90% N/A	98502 98502
RCP bus undervoltage	2/4 above 10%	90 Volts	98502
RCP bus underfrequency	2/4 above 10%	57.5 Hz	98502
Pressurizer high pressure	2/4	2378 psig	98503

This list continued on the next page.

FIGURE 3. COVER PAGE EXAMPLE FOR E-0

Title	Number
RESPONSE TO LOW PRESSURIZER LEVEL	01-OHP 4023. FR-I.2

A. PURPOSE

This procedure provides actions to respond to a low pressurizer level.

B. SYMPTOMS OR ENTRY CONDITIONS

This procedure is entered from F-0.6, INVENTORY Critical Safety Function Status Tree on a YELLOW condition.

FIGURE 4. COVER PAGE EXAMPLE FOR FR-I.2

Actions required in a particular step do not have to be completed prior to continuing to the next step in sequence, unless this condition is stated clearly in that step or substep. If assigned tasks are short, then the expected action will probably be completed prior to continuing. However, if an assigned task is very lengthy, additional steps may be performed in sequence prior to completion of the present step.

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

4.2.1 Instruction Steps, Left-Hand Column

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

- High-level action steps should begin with an appropriate verb, or verb with modifier.
- The first letter of all words in a high-level step should be capitalized.
- Expected responses to operator actions are shown following in ALL CAPITAL LETTERS.
- If a step requires multiple substeps, then each substep may also have its own expected response.

Example:

Verify AFW Pumps Running:
a. MD pumps - RUNNING
b. TDAFP - RUNNING IF NECESSARY

- If only a single task is required by the step, the high-level step contains its own response.

Example: Check RCP Status - AT LEAST ONE RUNNING

Title	Number
REACTOR TRIP OR SAFETY INJECTION	01-OHP 4023. E-0

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION: THE LOAD ON ANY DG SHOULD NOT EXCEED 3500 KW.

___ 36. Check If DGs Should Be Stopped:

a. Verify AC emergency busses - ENERGIZED BY OFFSITE POWER:

- T11A
- T11B

-AND-

- T11C
- T11D

a. Try to restore offsite power to AC emergency busses. IF offsite power can NOT be restored, THEN load equipment on AC emergency busses:

- Plant lighting transformers:
  - 1N (11D10)
  - 1S (11A4)
- Other equipment as necessary for plant recovery.

b. Stop any unloaded DG and place in standby

___ 37. Return To Step 19

- END -

FIGURE 5. EXAMPLE INSTRUCTION STEPS

Left-hand column tasks should be specified in the order as to which they are to be performed. The user would normally move down the left-hand column of each step as the expected response is obtained. However, if a task is lengthy, the user may continue to the next step to perform actions while the present step is being completed (see Section 4.2).

- When the expected response is not obtained, the user is expected to move to the right-hand column for contingency instructions.
- All procedures should end with a transition to another procedure, a transition to a normal operating procedure or with direction to consult the Plant Evaluation Team for guidance.
- When adverse containment conditions are required for setpoint values, they will be added following the value for normal conditions (see Section 6.5). If they are part of the expected response, they will be shown in ALL CAPITAL LETTERS.

4.2.2 Instruction Steps, Right-Hand Column

The right-hand column is used to present contingency actions which are to be taken in the event that a stated condition, event, or task in the left-hand column does not represent or achieve the expected result. Contingency actions will be specified directly across from steps and any substeps for which useful alternatives are available. The following rules apply to the right-hand column:

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

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

- Unlike the left-hand column, contingency instructions are to be written in sentence format, including adverse containment conditions where applicable.

- If the right-hand column contains multiple contingency actions for a single high-level action in the left-hand column, the phrase "Perform the following:" should be used as the introductory high-level statement.

- If the right-hand column contains multiple contingency actions which do not correspond to multiple substeps in the left-hand column, then different designators should be used in the two columns.

Example:

Establish Letdown:	Establish excess letdown:
a.	1)
b.	2)
c.	3)

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

- As a general rule, all <u>contingent</u> transitions to other procedures will take place out of the right-hand column. Deliberate transitions may be made from the left-hand column.

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

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

4.2.3 Use of Logic Terms

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

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

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

IF is used for an unexpected, but possible condition.

WHEN is used for an expected condition.

AND calls attention to combinations of conditions and shall be placed between each condition. If more than two conditions are to be combined, a list format is preferred.

OR implies alternative combinations or conditions. OR means either one, or the other, or both (inclusive).

The combinations of AND and OR in the same step should be avoided if at all possible to prevent misinterpretation.

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

4.2.4 Notes and Cautions

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

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

CAUTION denotes some potential hazard to personnel or equipment associated with the following instructional step. *NOTE* is used to present advisory or administrative information necessary to support the following action instruction. A *CAUTION* or *NOTE* may also be used to provide a contingent transition based on changes in plant conditions.

CAUTIONs will be presented all in capitalized, italic letters, except the appearance of subscripts (T_{avg}) and plural acronyms (SGs, RCPs). *NOTEs* will be presented as normal upper/lower case copy, except where certain abbreviations, acronyms or terms requiring special attention are required (°F, ECCS, MUST, BYPASS INTERLOCK, Steps).

As a general rule, neither a *CAUTION* nor a *NOTE* will contain an instruction/operator action; however, reference may be made to expected action in progress.

CAUTIONs precede *NOTEs* when they occur together unless the *NOTE* contains information which clarifies the *CAUTION*.

4.2.5 Transitions to Other Procedures or Steps

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

Example: Go to ES-0.1, REACTOR TRIP RESPONSE, Step 1.

Transitions to a different step later in the same procedure are specified in a similar manner.

Example: Go to Step 20.

Transitions between procedures shall not contain a "return here" feature (e.g., perform steps X through Y in some other procedure and then return).

Transitions to an earlier step in the same procedure are specified by using the words "Return to".

Example: Return to Step 2.

Transition to a step which is preceded by a *CAUTION* or *NOTE* may include special wording (in ALL CAPITAL LETTERS) to emphasize that the *CAUTION* or *NOTE* is to be observed.

Example: IF conditions are NOT satisfied, THEN go to Step 22.
OBSERVE CAUTION PRIOR TO STEP 22.

To assist the operator in determing his or her place (with respect to steps already completed) in a procedure, each high level step will have a line in the left margin next to the step number on which a checkmark can be placed once the step is completed. When a transition is required, a book mark will be provided as an intergral part of the procedure folder. By using the two devices, the operator can return (when appropriate) to the page and step which indicate completed action prior to the transition.

In addition to the above, certain conditions require the use of plant procedures other than the EOPs to complete the assigned actions. These procedures can be incorporated two ways:

- Transitions out of the EOPs are used when the appropriate steps of the EOPs are completed and further recovery actions (beyond EOP scope) are required. Transitions are specified by using the words "Go to" followed by either the procedure designator and title or by using the words "appropriate plant procedure". For the later case, the shift supervisor has the responsibility of determining the most appropriate procedure for further recovery based on present plant conditions.

- References to other plant procedures are used to provide additional information that my be needed to properly conduct the assigned task. Using this approach, the operator has the liberty to refer to the stated procedure if he requires additional assistance. References are specified by using the words "Refer to," implement, or "per" followed by the procedure designator and title. The use of referring to other procedures should be limited to steps which require extensive information to complete the step. (Examples: Refer to 01-OHP 4022.005.002, EMERGENCY BORATION. Place RHR System in service per 01-OHP 4021.017.002, PLACING IN SERVICE AND OPERATION OF RESIDUAL HEAT REMOVAL LOOP.) If the steps to complete the tasks are short, they should be added directly to the procedure to reduce the possibilities of operator error in referring to many different procedures. Referenced procedures are performed in parallel with the existing EOP.

4.2.6 Component Identification And Location

Equipment, controls and displays will be identified in "operator language" terms. Standard abbreviations which may be used throughout the procedures are listed alphabetically in Table 3. Where similar components are used in both primary and secondary systems, it is always necessary to clarify the location, even if the wording appears redundant.

The location of infrequently used equipment and controls may be called out to assist the operator in the completion of local action steps. However, the use of location identification should be minimized to prevent excessive wording in the RNO column.

TABLE 3

ABBREVIATIONS USED IN PROCEDURES

AC - Alternating Current (electrical power)

ACB - Air Circuit Breaker

AFW - Auxiliary Feedwater

Alt - Alternate

AUTO - Automatic

Aux - Auxiliary

ATWS - Anticipated Transient Without Scram

BAST - Boric Acid Storage Tank

BIT - Boron Injection Tank

BMS - Boron Makeup System

CAS - Containment Annunciator Sub

CB - Circuit Breaker

CCP - Centrifugal Charging Pump

CCW - Component Cooling Water System

CEQ - Hydrogen Skimmer Fans (Cntmt. Press. Equalization Fans)

CONT - Containment

CRDM - Control Rod Drive Mechanisms

CST - Condensate Storage Tank

CTS - Containment Spray System

CVCS - Chemical and Volume Control System

DC - Direct Current (electrical power and signals)

D/G - Diesel Generator

DWG - Drawing

TABLE 3 (Con't)

ABBREVIATIONS USED IN PROCEDURES

E - East

ECCS - Emergency Core Cooling System

EHC - Electro Hydraulic Control

ESF - Engineered Safety Feature(s)

ESW - Essential Service Water

°F - Fahrenheit (in degrees)

FPT - Feed Pump Turbine

FRV - Feed Regulator Valve

gls - gallons

gpm - Gallons per minute

HX - Heat Exchanger

HVAC - Heating, Ventilation & Air Conditioning

lb/hr - pounds per hour

LOCA - Loss of Coolant Accident

MCC - Motor Control Center

MD - Motor Driven

MDAFP - Motor Driven Auxiliary Feedwater Pump

MFP - Main Feedwater Pump

FW - Feedwater

MG - Motor Generator

N - North

NESW - Non-Essential Service Water

NEUT - Neutral

TABLE 3 (Con't)

ABBREVIATIONS USED IN PROCEDURES

NIS - Nuclear Instrumentation System

No. - Number

NR - Narrow Range

PACHM - Post Accident Containment Hydrogen Monitoring System

PDC - Positive Displacement Charging (in reference to pumps)

PP - Pump(s)

ppm - Parts per million

PORV - Power Operated Relief Valve

PRT - Pressurizer Relief Tank

psia - Pounds per square inch atmospheric

psig - Pounds per square inch gauge

psid - Pounds per square inch differential

PRZ - Pressurizer

°R - Rankine (in degrees)

RC - Reactor Coolant

RCP - Reactor Coolant Pump

RCS - Reactor Coolant System

Reg - Regulating

RHR - Residual Heat Removal (System)

RHX - Residual Heat Removal Heat Exchanger

RMS - Radiation Monitoring System

RTD - Resistance Temperature Detector

RVLIS - Reactor Vessel Level Indication System

TABLE 3 (Con't)

ABBREVIATIONS USED IN PROCEDURES

RWST - Refueling Water Storage Tank

S - South

SCFM - Standard Cubic Feet per Minute

Sec. - Second(s)

SG - Steam Generator

SGTR - Steam Generator Tube Rupture

SI - Safety Injection

STP - Standard Temperature and Pressure

SUR - Startup Rate

T/C - Thermocouple

TDAFP - Turbine Driven Auxiliary Feedwater Pump

Tk - Tank

VCT - Volume Control Tank

W - West

WR - Wide Range

4.2.7 Level of Detail

To allow an operator to efficiently execute the action steps in a procedure, all unnecessary detail must be removed. Any information which an operator is required to know (based on his training and experience) should not be included. Many actuation devices (switches) in the control room are similar, even though the remotely performed functions are not, so certain action verbs listed here are recommended:

- Use "start/stop" for power-driven rotating equipment.
- Use "open/close/throttle" for valves.
- Use "control" to describe a manually maintained process variable (flow, level, temperature, pressure).
- Use "trip/close" for electrical breakers.
- Use "place in standby" to refer to equipment when actuation is to be controlled by available (e.g., not reset or blocked) automatic logic circuitry.

4.2.8 Figures

If needed to clarify operator action instructions, figures shall be added to a procedure. Any figure used will be constructed to fit within the pre-printed page format (see Figure 1). Certain rules of construction will apply:

- All wording on the figure shall be at least as legible (type size and spacing) as the instruction steps in the procedures.
- Each figure will occupy a complete page and will be uniquely identified by a figure number and title. The figure number will consist of the procedure designator, without punctuation, followed by a hyphen and an integer. Multiple figures will be assigned sequential integers.

Examples: Figure ECA11-1, MINIMUM SI FLOW RATE VERSUS TIME AFTER TRIP

Figure FRI3-1, HYDROGEN FLOW RATE VERSUS RCS PRESSURE

- Figure titles will explain the intent or content of the figure.

- The figure number and title will be placed at the bottom of the page, centered just above the pre-printed border.

- If the figure is a graph, all the numbers and wording will be horizontal. By convention, the independent variable is plotted on the horizontal (X) axis. Grid line density should be consistent with the resolution expected from the graph. Any labeling required on the graph will have a white (not graph) background. Figure 6 is an example showing the presentation of a graph.

- All figures for a procedure are numbered sequentially and are located immediately after the instruction step pages. Figure pages are numbered as pages of that procedure. Any figures required for an ATTACHMENT are numbered in sequence with the procedure figures.

- References to a figure from an action step should use only the figure number and not the title.

4.2.9 Tables

Tables may be used within the text of a procedure to clearly present a large number of separate options. A table will immediately follow the step or substep which makes use of it. Therefore, it does not require a unique number and title. Any table will be completely enclosed by a distinct outline; if necessary, it may extend into the adjacent column because of this delineation.

All information presented in a table shall be at least as legible (type size and spacing) as the instruction steps in the procedure.

All columns and rows of information in a table will be defined by solid lines.

All column and row headings shall be presented in ALL CAPITAL LETTERS.

Absence of a table element will be indicated by a dash.

Figure 7 presents an example of a table.

Title	Number
LOSS OF EMERGENCY COOLANT RECIRCULATION	01-OHP 4023 ECA-1.1

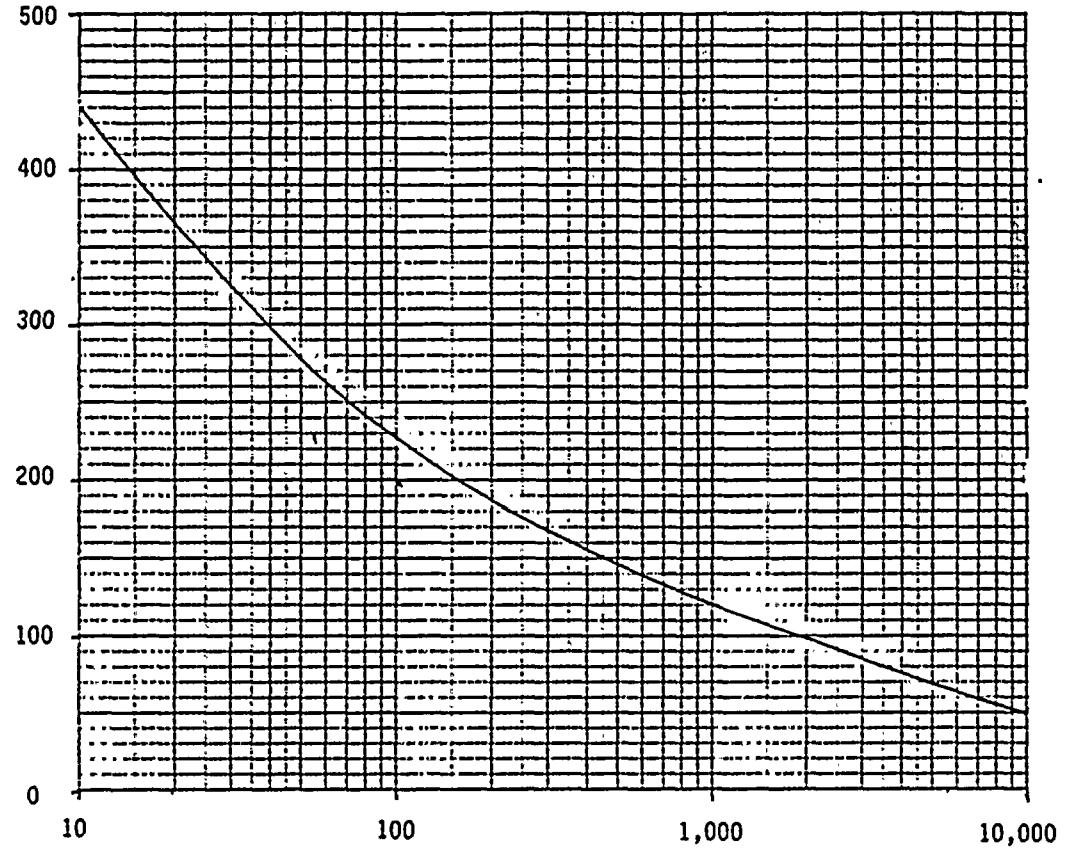

FIGURE ECA11-1, MINIMUM ECCS FLOW RATE
VERSUS TIME AFTER TRIP

FIGURE 6. EXAMPLE GRAPH

4.2.10 Attachments

Supplementary information or detailed instructions which would unnecessarily complicate the flow of a procedure may be placed in an attachment to that procedure.

Attachments are identified by the title "ATTACHMENT" followed by a single letter designator. This title is centered at the top of a standard format page. The pre-printed title blocks will be the same as for the procedure. Attachments will use a single-column, full-page-width format.

Physically, Attachments will be located after any Figures belonging to the procedure. Attachment pages are numbered in sequence with normal procedure pages. Figure 8 is an example ATTACHMENT page.

4.2.11 Supplement

RCS subcooling determination (for adverse containment conditions) which would unnecessarily complicate the flow of a procedure is placed in an attachment to that procedure.

These attachments are identical in content and are identified by the title "SUPPLEMENT". This title is centered at the top of a standard format page. The pre-printed title blocks will be the same as for the procedure. The supplement will use a single-column, full-page-width format.

4.3 Foldout Page

Important actions which can be performed at any step in the applicable procedure will be contained on a single foldout page, located at the end of a procedure. Its page number will reflect its uniqueness and be identified as: "Page 1 of 1". The foldout page will use a single-column, full-page-width format and will be titled "FOLD-OUT FOR PROCEDURE 0(X)-OHP 4023.(XX-X.X)", making sure that the prefix is unit-specific (X), and the correct procedure number is applied (see Figure 9).

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

STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED

CAUTION: RCS AND RUPTURED SG(s) PRESSURES MUST BE MAINTAINED LESS THAN THE RUPTURED SG(s) STEAM RELIEF VALVE SETPOINT.

___ 29. Control RCS Pressure And Makeup Flow To Minimize RCS-To-Secondary Leakage:

a. Perform appropriate action(s) from table:

RUPTURED SG(s) LEVEL / PRZ LEVEL	INCREASING	DECREASING	OFFSCALE HIGH
LESS THAN 17% (46% FOR ADVERSE CONTAINMENT)	• Increase RCS Makeup Flow • Depressurize RCS Using Step 29b	Increase RCS Makeup Flow ___	• Increase RCS Makeup Flow • Maintain RCS And Ruptured SG(s) Pressures Equal
BETWEEN 17% (46% FOR ADVERSE CONTAINMENT) AND 50%	Depressurize RCS Using Step 29b	Turn On PRZ Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal
BETWEEN 50% AND 76% (54% FOR ADVERSE CONTAINMENT)	• Depressurize RCS Using Step 29b • Decrease RCS Makeup Flow	Turn On PRZ Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal
GREATER THAN 76% (54% FOR ADVERSE CONTAINMENT)	Decrease RCS Makeup Flow	Turn On PRZ Heaters	Maintain RCS And Ruptured SG(s) Pressures Equal

b. Use normal PRZ spray per Step 29a

b. IF letdown is in service, THEN use auxiliary spray. IF NOT, THEN use one PRZ PORV.

FIGURE 7. EXAMPLE TABLE

Title	Number
STEAM GENERATOR TUBE RUPTURE	01-OHP 4023. E-3

ATTACHMENT A

The following conditions support or indicate natural circulation flow:

- RCS subcooling based on core exit T/Cs - GREATER THAN 30°F
- SG pressures - STABLE OR DECREASING
- RCS hot leg temperatures - STABLE OR DECREASING
- Core exit T/Cs - STABLE OR DECREASING
- RCS cold leg temperatures - AT SATURATION TEMPERATURE FOR SG PRESSURE

FIGURE 8. EXAMPLE ATTACHMENT

FOLDOUT FOR PROCEDURE 01-OHP 4023.E-3

1. SI REINITIATION CRITERIA

Manually operate ECCS pumps as necessary and go to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1, if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 30°F
- PRZ level - CANNOT BE MAINTAINED GREATER THAN 4% (46% FOR ADVERSE CONTAINMENT.

2. RED PATH SUMMARY

a. SUBCRITICALITY - Nuclear power greater than 5%

b. CORE COOLING - Core exit T/Cs greater than 1200°F

-OR-

Core exit T/Cs greater than 700°F
AND RVLIS narrow range less than
39% with no RCPs running

c. HEAT SINK - Narrow range level in all SGs less than 44% AND total AFW flow less than 200 x 10^3 lb/hr

d. INTEGRITY - Cold leg temperature decrease greater than 100°F in last 60 minutes AND RCS cold leg temperature less than 242°F

e. CONTAINMENT - Containment pressure greater than 12 PSIG

3. SECONDARY INTEGRITY CRITERIA

Go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, unless needed for RCS cooldown.

4. COLD LEG RECIRCULATION SWITCHOVER CRITERION

Go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1, if RWST level decreases to less than 32%.

5. AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW supply if CST level decreases to less than 13%.

6. EMERGENCY PLAN IMPLEMENTATION

Initiate Emergency Plan and Emergency Plan Procedures as appropriate.

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FIGURE 9. EXAMPLE FOLDOUT PAGE FORMAT

5. STATUS TREE FORMAT

Critical Safety Function Status Trees will be presented in the "branch" version (see Figure 10). The trees will be oriented horizontally on a page.

Color-coding and/or line-pattern-coding shall be used from each last branch point to its terminus (see Figure 11).

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

Each Status Tree shall have at the top of the page, a designator block identical to that used in the standard procedure format, and containing the same information.

Statements shall be worded so that the favorable response is the downward branch. Termini shall be ordered so that REDs are uniformly at the top and GREENs at the bottom. Termini order should be RED - ORANGE - YELLOW - GREEN if possible.

Title	Number
SUBCRITICALITY	01-OHP 4023.F-0.1

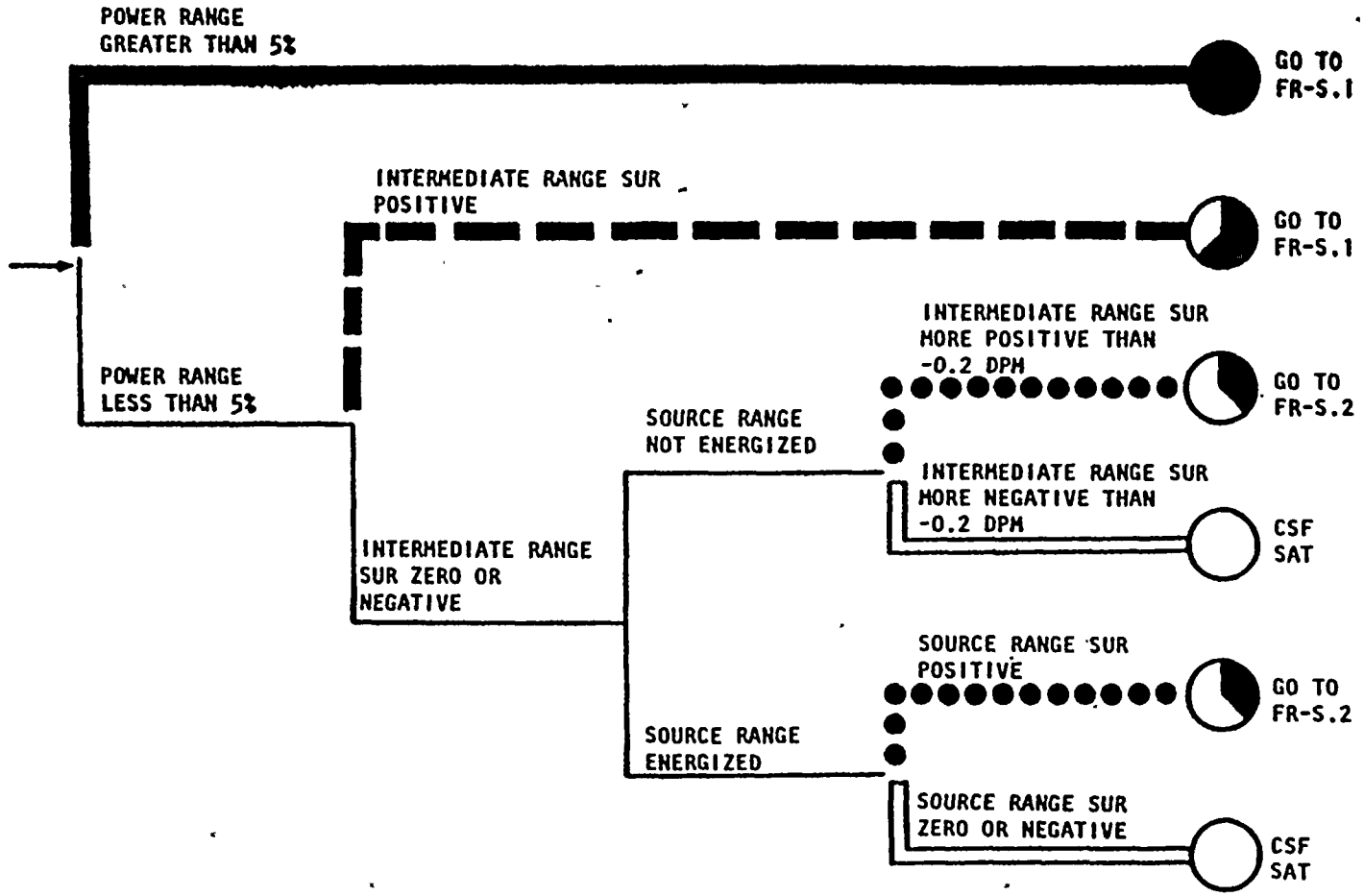

FIGURE 10. EXAMPLE STATUS TREE

STATUS TREE PRIORITY INDENTIFICATION

Color	Line Code	Symbol Code	Status/Response
Red	▬▬▬	●	The critical safety function is under extreme challenge; immediate operator action is required.
Orange	■ ■ ■ ■	◕	The critical safety function is under severe challenge; prompt operator action is required.
Yellow	● ● ● ● ● ●	◔	The critical safety function conditon is off - normal. Operator action may be taken.
Green	▭▭▭	○	The critical safety function is satisfied. No operator action is needed.

FIGURE 11. STATUS TREE PRIORITY IDENTIFICATION

6. MECHANICS OF STYLE

6.1 Spelling

All spelling should be consistent with modern usage as specified in the Webster's Third New International Dictionary and Webster's New Collegiate Dictionary.

6.2 Punctuation

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

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

  Example: Stop the following equipment:

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

  Example: IF level exceeds 50%, THEN . . .

- Use parenthesis to indicate footnotes.

- Use a period to indicate the end of complete sentences in right-hand column action statements and in NOTEs and CAUTIONs and for indicating the decimal place in numbers. No periods are to be used in left-hand column action steps.

- Use a dash to separate a required action and its expected response and also to indicate a null table element.

  Example: Verify ECCS Pumps - RUNNING

6.3 Capitalization

Full capitalization shall be used in the procedures for emphasis in the following cases:

- Logic terms will be capitalized and underlined.
- Expected responses (left-hand column of instructions) are capitalized. Adverse containment conditions that are part of the expected response are also capitalized.
- Titles of procedures will be completely capitalized whenever referenced within any procedure.
- Operator action steps may be capitalized for emphasis (Example: DO NOT STOP SI PUMPS). However extensive use of capitalization should be avoided.
- Section headings on cover sheet are capitalized, and on foldout page are capitalized and underlined.
- Titles of figures (including axis notation), foldout pages, attachments, all elements, row and column headings appearing in tables are capitalized.
- Switch positions; where a specific position is required, may be capitalized.
- Conditional words, when one or more option exists or must be satisfied, are capitalized and usually underlined.
- The descriptor CAUTION (including all information that follows it) and the descriptor NOTE will be capitalized.
- Transition to any step which is preceded by a CAUTION or NOTE will be capitalized, to emphasize that the information they contain is to be carefully observed.

6.4 Vocabulary

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

Verbs with specific meaning should be used. The verb should exactly define the task expected to be performed by the operator. A list of frequently used verbs is included as Appendix A (located at the end of this document).

Some words have unique meanings as listed below:

manual (manually) - an action performed by the operator in the control room. (The word is used in contrast to an automatic action, which takes place without operator intervention.)

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

Example: "Locally close valve" means directly turning a handwheel to close a valve.

Certain other words are to be avoided simply because they are not adequately defined when used without modification. These include: approximately, rapidly and slowly. The same words become acceptable when some clarification is provided; clarification normally is part of a lower-level substep.

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

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

6.5 Numerical Values

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

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

Acceptance values should be stated in such a way that any addition and subtraction operations are avoided, if possible. This is done by stating acceptance values as limits.

Examples: 2500 psig maximum
350°F minimum
between 450°F and 500°F
greater than 42%

Tolerances can be expressed by stating the normal value followed by the acceptable range in parenthesis.

Example: 550°F (540°F to 560°F) - Correct
550°F ± 10°F - Incorrect

Engineering units should always be specified when presenting numerical values for process parameters. They should be the same as those used on the control room displays. Numerical values that also require adverse containment conditions should be written with the adverse conditions in parenthesis following the normal value.

Example: GREATER THAN 6% (44% FOR ADVERSE CONTAINMENT);
greater than 17% (50% for adverse containment)

Fractional numbers should be written in decimal notation. Also, any numberical value that is less than 1 or greater than -1 should be presented with a 0 preceding the decimal point.

Example: 0.25 - Correct
.25 - Incorrect

6.6 Abbreviations and Acronyms

Abbreviations and acronyms should be limited to those commonly used by operators. Table 3 lists the common ones to be used for the procedures. Abbreviations and acronyms should be used whenever possible to simplify the procedures.

Abbreviations and acronyms are capitalized in accordance with Table 3.

7. CONTROL ROOM STAFFING AND RESPONSIBILITIES

The EOPs should be structured to comply with the minimum staffing requirements and qualifications defined in Technical Specifications for the applicable modes of operation.

The ERG step sequence tables should be used as an aide in determining the step sequence of the D. C. Cook EOPs with regards to the control room layout. This will minimize the movement of personnel around the control room while carrying out procedural steps.

It is the SRO's responsibility to implement the EOPs and provide direction for the operators to carry out the required actions. This will eliminate the possibility of step duplication.

8. PRINTED FORMAT

8.1 General Printing Instructions

For all emergency operating procedures, the following general instructions apply:

- Paper size should be 8 1/2 by 11 inches for all pages.
- White bond paper should be used.
- Type size and style are to be consistent across all emergency procedures. (Information should be added (AEP scope) regarding type font and size. Also work processing specifics should be included.)
- All text material should be maintained on current word-processing equipment.

8.2 Page Layout

The following instructions apply to the placement of text on the procedure pages:

- All text will maintain one - inch margins at both sides of the page.
- The bottom page margin will always be one inch.
- One blank lines will separate operator action steps.
- A single blank line will separate substeps within any action step.
- Adjacent lines of text will be separated by normal spacing for the type fonts.

- Every effort should be made to avoid splitting action steps across pages.

- If an action step (including its preceding NOTES and/or CAUTIONS) does not fit onto a single page, then the words "This step is continued on the next page" should be placed at the bottom of the page.

- Page rotation is to be avoided for emergency operating procedures.

9. REPRODUCTION

Procedure reproduction may be done on a standard copier. Reproduced copies shall be checked to ensure that they are legible and useable. Particular attention should be paid to graphical figures, where excessive grid-line dropout could create confusion for the reader and lead to inaccurate interpretation. Page checks should be performed to ensure there are no missing pages.

APPENDIX A

ACTION VERBS

actuate	to put into action or motion; commonly used to refer to automated, multi-faceted operations. Examples: Actuate SI, Actuate Phase A
align	to arrange components into a desired configuration. Examples: Align the system for normal charging, Align valves as appropriate
block	to inhibit an automatic actuation. Example: Block SI actuation
check	to note a condition and compare with some procedure requirement. Example: Check PRZ level - GREATER THAN 20%
close	to change the physical position of a mechanical device. Closing a valve prevents fluid flow. Closing a breaker allows electrical current flow.
complete	to accomplish specified procedure requirements.

ACTION VERBS

continue	to go on with a particular process. Example: Continue with this procedure
control	to manually operate equipment as necessary to satisfy procedure requirements on process parameters: pressure, temperature, level, flow, etc. Example: Control PRZ level
determine	to calculate or evaluate using formulae or graphs. Example: Determine maximum venting time
energize	to supply electrical energy to (something); commonly used to describe an electrical bus or other dedicated electrical path. Example: Energize AC emergency busses
establish	to make arrangements for a stated condition. Example: Establish normal PRZ pressure and level control

ACTION VERBS

evaluate	to examine and decide; commonly used in reference to plant conditions and operations. Example: Evaluate plant conditions
equalize	to make the value of a given parameter equal to the value of another parameter. Example: Equalize charging and letdown flow
implement	to begin another guideline or procedure and follow it to completion (may be concurrent with procedure in progress).
initiate	to begin a process. Example: Initiate flow to all SGs
load	to connect an electrical component or unit to a source of electrical energy; may involve a "start" in certain cases. Example: Load the SI pump on the AC emergency bus
maintain	to control a given plant parameter to some procedure requirement continuously. Example: Maintain SG level in the narrow range
minimize	to make as small as possible. Example: Minimize secondary system contamination

ACTION VERBS

monitor	similar to "check", except implies a continuous activity.
notify	contact (verbally via page or telephone) personnel in other departments or locations to request them to perform a certain task.
open	to change the physical position of a mechanical device to the unobstructed position. Opening a valve permits fluid flow. Opening an electrical breaker prevents current flow.
operate	to turn on or turn off as necessary to achieve the stated objective. Example: Operate PRZ heaters to increase pressure
place	to move a control to a stated position. Example: Place controls in MANUAL
place in standby	to return a piece of equipment to an inactive status but ready for start on demand; commonly used to refer to a mid-position on a switch labeled AUTO or NEUT. Example: Stop the SI pumps and place in standby

ACTION VERBS

reset	to remove an active output signal from a retentive logic device even with the input signal still present; commonly used in reference to protection/ safeguards logics in which the actuating signal is "locked-in". The reset allows equipment energized by the initial signal to be deenergized. Examples: Reset SI, Reset Phase A
record	to document specified characteristics. Example: Record RCS average temperature
sample	to take a representative portion for the purpose of examination; commonly used to refer to chemical or radiological examination. Examples: Sample for RCS boron concentration, Sample for secondary side radioactivity
set	to position a variable control to a given setpoint or value.
shut down	to deenergize equipment and place in standby. Example: Shut down unnecessary equipment

ACTION VERBS

start	to originate motion of an electrical or mechanical device, either directly or by remote control. Example: Start one RCP
stop	to terminate motion of an electrical or mechanical device. Example: Stop both D/Gs
throttle	to operate a valve in an intermediate position to obtain a certain flow rate. Example: Throttle charging flow control valve to establish desired flow
trip	to manually actuate a semiautomatic feature. Commonly, "trip" is used to refer to component deactuation. Examples: Trip the reactor, Trip the turbine, Trip a breaker
try	to make a continued effort when success may not be immediately attainable. Example: Try to restore offsite power

ACTION VERBS

turn on	to supply electrical energy to a non-mechanical component. Example: Turn on PRZ heaters
verify	to observe that an expected characteristic or condition exists. Typically the expectation comes from some previous automatic or operator action. The appropriate contingency, either stated or implied, is to establish the expected condition. Examples: Verify Reactor Trip, Verify ECCS Pumps - RUNNING