EMERGENCY OPERATING PROCEDURES GENERATION PACKAGE

PRAIRIE ISLAND NUCLEAR
GENERATING PLANT

NORTHERN STATES POWER COMPANY

EMERGENCY OPERATING PROCEDURES
GENERATION PACKAGE

1.0 INTRODUCTION

1.1 Purpose

The purpose of the Procedures Generation Package is to describe the emergency operating procedure upgrade program at Prairie Island.

2.0 PROGRAM DESCRIPTION

2.1 General

The Westinghouse Emergency Response Guidelines, Basic Revision, dated July 5, 1982, will be used for the initially drafted upgraded emergency procedures. As revisions are made to the Westinghouse Guidelines, revisions will be made to the upgraded emergency procedures, as appropriate.

2.2 References

- Westinghouse Emergency Response Guidelines
- USAR
- Technical Specifications
- Existing Emergency Procedures
- Plant Flow and Logic Diagrams

2.3 Writing Procedures

- The upgraded emergency procedures will as closely follow the Westinghouse Guidelines as possible, while still inputting plant specific information. The attached Writers' Guide will be followed.
- While writing the plant specific emergency procedures, plant specific background information will be generated for all steps. This will help assure complete and accurate inclusion of plant specific and generic steps.

2.4 Verification

The upgraded emergency procedures will be compared to the reference version of the Westinghouse Guidelines from which they are developed, in order to assess their completeness, technical adequacy and adherence to the intended structure of the guidelines.

2.5 Review

The upgraded emergency procedures will be reviewed by the operating shifts during normal requalification training sessions for technical and presentation accuracy. These comments will be factored into revision prior to procedure implementation. Additional Plant Operations Committee review will, in accordance with plant administrative directives, be performed before implementation.

2.6 Validation

The validation process for the emergency procedures will be performed as part of the Control Room Design Review process.

2.7 Training

Since the procedure upgrade project has been underway for some months, considerable training on the revised procedures has been conducted and is currently in progress. The basic areas addressed include:

1. Format familiarization
2. Scope of Procedure coverage
3. Content of Upgraded Procedures
4. Background Information for Upgraded Procedures

During the selection process of an appropriate format type, the operators were exposed to the selected format in detail. Advantages of the chosen format were illustrated as well as how to use the new format.

Beneficial training was received by the operators during review of the draft upgraded emergency procedures. The operating crews were made part of the review cycle for two reasons; one, to get operator review and input early in the upgrade program; two, provide operator training on the content and the coverage provided by the new procedure set.

The operator review provides a good check on the presentation and content of action steps. Specifically, the operators comments provides further information on whether or not the particular action step is understood by the operator and that the operator can perform the action as stated. To perform this review the operators had to review the transient involved and the available background information. This type of review is excellent training. It also provides the operator with good training on the content of the procedures.

Beginning in May, 1983, the draft upgraded procedures will be used by the requal shifts at a simulator. This will provide the first good validation for the operator, that the procedures will work on accident conditions. Comments received from the simulator training will be further input into the final draft of the procedures before implementation.

Additional classroom training will be given as final draft procedures are generated to provide further training on the procedures prior to implementation.

Early involvement of the operating crews in the development of upgraded procedures through review of draft procedures, simulator experience on the new procedures and classroom training during normal requalification is providing excellent results in enhancing operator knowledge of the transients and procedures, and ultimately providing the best possible procedures for implementation.

WRITERS GUIDE FOR

EMERGENCY OPERATING PROCEDURES

1.0 INTRODUCTION

1.1 Purpose

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

1.2 Scope

This writers guide applies to the writing of all EOPs.

2.0 EOP DESIGNATION AND NUMBERING

EOPs are procedures that govern the plant operation during emergency conditions and specify operator actions to be taken to return the plant to a stable condition.

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

2.1 Cover Sheet

Every EOP shall have a cover sheet (see Figure 1). The primary purposes of this cover sheet are (1) to identify the procedure and (2) to identify the authorized revision. To identify the procedure, a descriptive title is to be used that also designates the scope.

2.2 Procedure Designation and Numbering

2.2.1 Main EOPs shall be designated by the letter E followed by a sequential number 0, 1 . . ., e.g. E-0.

2.2.2 Procedures subordinate to the main procedures shall be designated by the letters ES (event specific) followed by the main procedure number and a sequential subset number .1, .2, . . ., e.g. ES-0.1.

2.2.3 Emergency contingency actions shall be designated by the letters ECA followed by a sequential number 1, 2 . . ., e.g. ECA-1.

2.2.4 Function restoration guidelines shall be designated by the letters FR and the letter of the particular Critical Safety Function to which the guideline applies (S for subcriticality, P for RCS integrity, C for core cooling, I for RCS inventory, H for core heat sink, or Z for containment integrity) followed by a sequential number 1, 2 . . ., e.g. FR-H.1.

2.3 Revision Designation and Numbering

Two numbers following the abbreviation "Rev" will be used to designate the revision level of the EOPs, e.g. Rev. 01.

To identify the latest revisions to the test of an EOP, a vertical change bar in the left margin alongside the text change shall be used to indicate a change in the left column, and a bar in the right column. Previous revision change bars shall be deleted.

2.4 Page Identification and Numbering

Each page of the procedure will be identified by (1) the procedure designator and number, (2) the unit number and procedure title, and (3) the revision number and date. This information will be at the top of each page as shown in Figure 2. The page number shall be specified "____ of ____" and centered at the bottom of each page as shown in Figure 2.

3.0 FORMAT

The following format is to be applied consistently for all EOPs.

3.1 Page Format

A dual-column format will be used. The left-hand column is designated for operator actions, and the right-hand column is designated for contingency actions to be taken when the expected response is not obtained. A sample page format is presented in Figure 2.

3.2 Procedure Organization

The procedure will be sectionalized only by having the immediate operator action step numbers circled.

3.3 Instruction Step Numbering

Instruction steps will be numbered and indented as follows:

1 High Level Action Step
  a. Detailed substep
    (1) Detailed substep

For response not obtained (right hand column) the high level step number will not be used but the substep numbering will be.

4.0 WRITING INSTRUCTIONAL STEPS

4.1 Instruction Step Length and Content

Instruction steps will be concise and precise. Conciseness denotes brerity; preciseness means exactly defined. Thus, instructions should be short and exact. General rules to be used in meeting these objectives are as follows:

- Instruction steps should deal with only one idea.
- Short, simple sentences should be used.
- Complex evolutions should be prescribed in a series of steps, with each step made as simple as practicable.
- Objects of operator actions should be specifically stated. This includes indentification of exactly what is to be done and to what.
- For instructional steps that involve an action verb relating to three or more objects, the objects will be listed with space provided for operator checkoff.
- Limits should be expressed quantitatively whenever possible, e.g. 62 (60 to 64)%.
- Steps that are numbered or lettered should be performed in sequence, unless otherwise stated. Steps marked with a bullet (•) can be performed in any order.
- Instruction content should be written to communicate to the user.
- Expected results of routine tasks need not be stated.

4.1.1 Instruction Column

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

- Expected indications should be presented in this column.
- Operator actions in this column should be appropriate for the expected indications.

4.1.2 Contingency Actions Column

Contingency actions will be presented in the right-hand column of the dual-column format. Contingency actions are operator actions that should be taken in the event a stated condition, event, or task does not represent or achieve the expected result.

Contingency actions will be specified for each circumstance in which the expected results or actions might not be achieved. The contingency actions should identify, as appropriate, alternatives for achieving the desired result.

4.2 Use of Logic Terms

The logic terms AND, OR, NOT, IF NOT, WHEN, and THEN are often necessary to describe precisely a set of conditions or sequence of actions. When logic statements are used, logic terms will be highlighted so that all the conditions are clear to the operator. This highlighting will be done by capitalizing and underlining all letters of the logic terms.

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

The dual-column format used equates to the logic, IF NOT the action in the left-hand column, THEN follow the action specified in the right-hand column.

Use other logic terms as follows:

- When attention should be called to combinations of conditions, the word AND shall be placed between the description of each condition. The word AND shall not be used to join more than three conditions. If four or more conditions need to be joined, a list format shall be used.
- The word OR shall be used when calling attention to alternative combinations of conditions. The use of the word OR shall always be in the inclusive sense. To specify the exclusive "OR", the following may be used: "either A OR B but not both."

- When action steps are contingent upon certain conditions or combination of conditions, the step shall begin with the words IF or WHEN followed by a description of the condition or conditions, a comma, the word THEN, followed by the action to be taken. WHEN is used for an expected condition. IF is used for an unexpected but possible condition.
- Use of IF NOT should be limited to those cases in which the operator must respond to the second of two possible conditions. IF should be used to specify the first condition.
- THEN shall not be used at the end of an action step to instruct the operator to perform the next step because it runs actions together.

4.3 **Use of Cautionary Information and Notes**

Cautionary information can be considered in two fundamental categories: those that apply to the entire procedure and those that apply to a portion or a specific step of the procedure. Those that apply to the entire procedure are called "PRECAUTIONS" and are covered in operator training. Those that apply to a portion of a procedure are called "CAUTIONS" and are placed immediately before the procedural steps to which they apply.

Cautions shall extend across the entrie page and shall be highlighted as shown in Figure 2. This placement of cautions helps ensure that the procedure user observes the caution before performing the step. A caution cannot be used instead of an instructional step. It should be used to dencte a potential hazard to equipment or personnel associated with or consequent to the subsequent instructional step.

If additional information other than cautions is necessary to support an action instruction, a NOTE should be used. A NOTE should present information only, not instructions, and should extend across the entire page and should be placed immediately before the portion of the procedure to which it applies (see Figure 2).

4.4 **Calculations**

Mathematical calculations should be avoided in EOPS. If a valve has to be determined in order to perform a procedural step, a chart or graph should be used whenever possible.

4.5 Use of Underlining

Underlining will be used for emphasis of logic terms only.

4.6 Referencing and Branching To Other Procedures Or Steps

Referencing implies that an additional procedure or additional steps will be used as a supplement to the procedure being used. Referencing other steps within the procedure being used, either future steps or completed steps, should be minimized. When only a few steps are involved in the referencing, the steps should be stated in the procedure wherever they are needed.

To minimize potential operator confusion, branching will be used when the operator is to leave one procedure or step and use another procedure or step. Use the key words "go to". Therefore, the operator will know to leave the present steps and not return until directed.

Use capitalization to emphasize the title of the referenced or branched procedure; e.g., Go to E-1, LOSS OF REACTOR COOLANT, STEP 20.

4.7 Component Identification

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

- Equipment, controls, and displays will be identified in operator language (common usage) terms. These terms may not always match engraved names on panels but will be complete.
- When the engraved names and numbers on panel placecards and alarm windows are specifically the item of concern in the procedure, the engraving should be quoted verbatim and emphasized by using initial capitalization and quotation marks.
- The names of plant system titles are emphasized by initial capitalization. When the word "system" is deleted from the title because of brerity and is understood because of the context, the title is also emphasized by initial capitalization.
- If the component is seldom used or it is felt that the component would be difficult to find, location information should be given in parentheses following the identification.

4.8   Level of Detail

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

Infrequently performed or complex evolutions shall be
delineated with a high level of detail. Routine tasks
should not require amplifying instructions.

4.9   Printed Operator Aids

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

4.9.1   Units of Measure

Units of measure should be given for numerical
values that represent observed, measurement data,
or calculated results. A virgule (slant line)
should be used instead of per, e.g. ft/sec.

4.9.2   Titles and Headings

Initial capitalization should be used for refer-
ences to tables and figures, titles of tables and
figures within text material, and column headings
within a table.

Examples: Refer to Figure 1 for . . .
             . . . as shown in Table 2, Equipment
             Power Supplies, the . . .

4.9.3   Figure and Table Numbering

Sequential arabic numbers should be assigned to
figures and tables in separate series. The se-
quence should correspond with the order of their
reference in the text. The symbol "#" and
abbrviation "No." are unnecessray and should not
be used.

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

Page identification should consist of (1) proce-
dure number, (2) figure or table number, (3) page
number, and (4) revision number.

5.0 MECAHNICS OF STYLE

5.1 Spelling

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

5.2 Hypenation

Hyphens are used between elements of a compound word when
usage calls for it. When doubt exists, the compound word
should be restructured to avoid hyphenation.

5.3 Punctuation

Punctuation should be used only as necessary to aid read-
ing and prevent misunderstanding. Word order should be
selected to require a minimum of punctuation. When exten-
sive punctuation is necessary for clarity, the sentence
should be rewritten and possibly made into several sen-
tences. Punctuation should be in accordance with the
following rules:

5.3.1 Brackets

Do not use brackets

5.3.2 Colon

Use a colon to indicate that a list of items is to
follow or suboridnate steps are to follow a high
level action step.

5.3.3 Comma

Use of many commas is a sign the instruction is
too complex and needs to be rewritten. Therefore,
evaluate the number of commas to ensure the in-
struction is not too complex.

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

5.3.4 Parentheses

Parentheses should be used to indicate alternative items.

5.3.5 Period

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

5.4 Vocabulary

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

- Use simple words. Simple words are usually short words of few syllables. Simple words are generally common words.
- Use common usage if it makes the procedure easier to understand.
- Use words that are concrete rather than vague, specific rather than general, familiar rather than formal, precise rather than blanket.
- Define key words that may be understood in more than one sense (see Table 1).
- Verbs with specific meaning should be used and used consistently.

TABLE 1

Word	Application
Available	This word means that a system, subsystem, train, component, or device is operable and can be used as desired; however, it need not be operating.
Locally	This word means to take an action outside the control room.
Manually	This word means to perform an action in the control room.
Operable/ operability	These words mean that a system, subsystem, train, component, or device is capable of performing its specified function(s) in the intended manner. Implicity in this definition is the assumption that all support systems for the system, subsystem, train, component, or device are operable.
Operating	This word means that a system, subsystem, train, component, or device is in operation and performing its specified function(s), and conditions do not prevent it from maintaining that service.

5.5 Numerical Values

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

- Arabic numerals should be used.
- For numbers less than unity, the decimal point should be preceded by a zero, e.g. 0.1.
- The number of significant digits should be equal to the number of significant digits available from the display and the reading precision of the operator.
- Acceptance values should be specified in such a way that addition and subtraction by the user is avoided. This can generally be done by stating acceptance values as limits, e.g. 50 (45 to 55)%.
- Engineering units should always be specified for numerical values of process variables and should be the same as those used on the control room dispaly.

5.6 Abbreviations and Acronyms

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

Capitalization of abbreviations should be uniform. The period should be omitted in abbreviations except in cases where the omission would result in confusion.

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

Abbreviations and acronyms should not be overused.

UNIT 1

REACTOR TRIP OR SAFETY INJECTION

OPERATIONS COMMITTEE REVIEW: _____

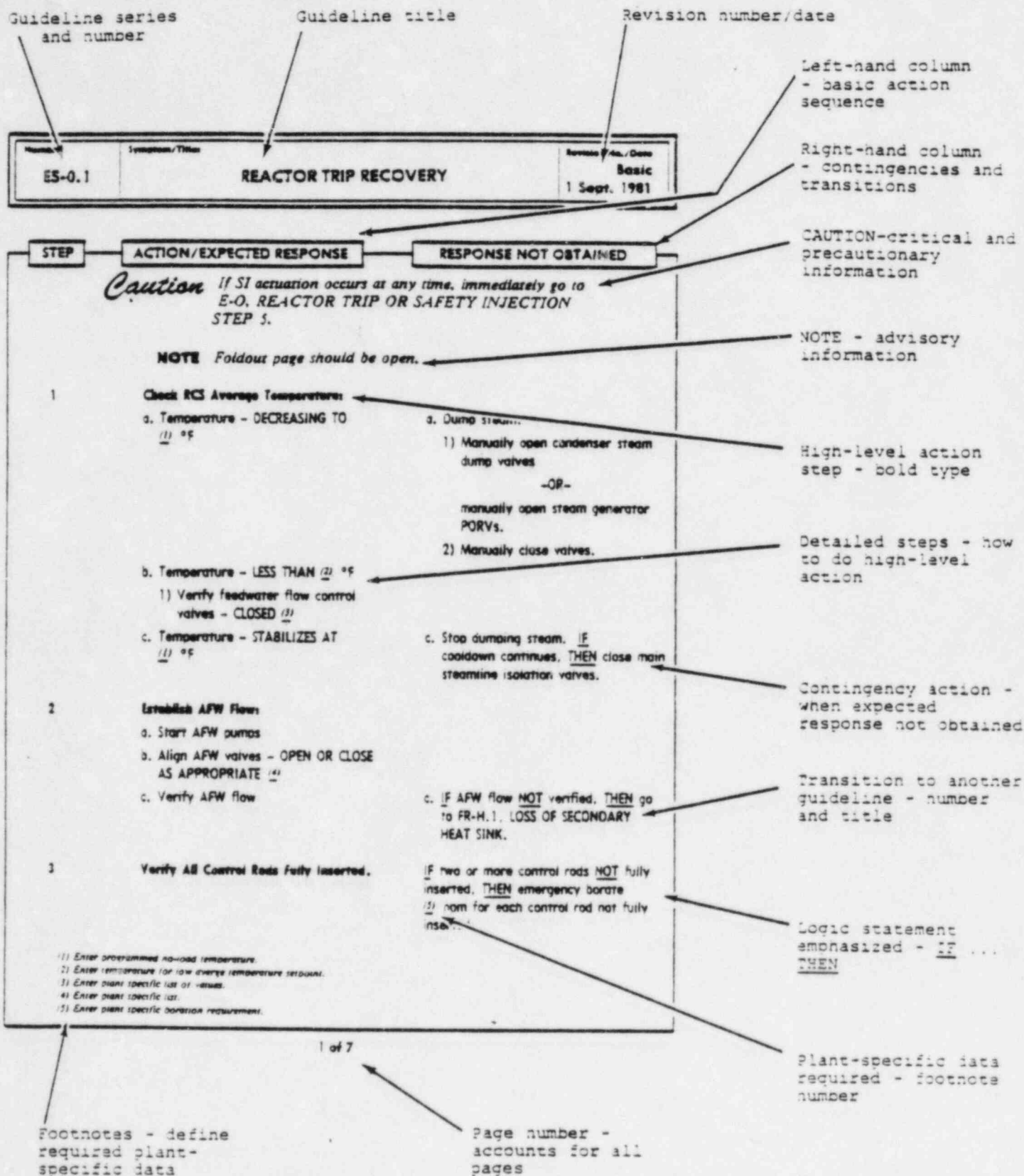REVIEWED BY: _____ DATE _____

APPROVED BY: _____ DATE _____

Page 1 of 11

FIGURE 1   COVER SHEET EXAMPLE

Guideline series
and number

Guideline title

Revision number/date

Left-hand column
- basic action
sequence

Right-hand column
- contingencies and
transitions

Number	Symptom/Titles	Revision No./Date
ES-0.1	REACTOR TRIP RECOVERY	Basic 1 Sept. 1981

CAUTION-critical and
precautionary
information

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Caution If SI actuation occurs at any time, immediately go to
E-0, REACTOR TRIP OR SAFETY INJECTION
STEP 5.

NOTE - advisory
information

NOTE *Foldout page should be open.*

1   **Check RCS Average Temperature:**

     a. Temperature – DECREASING TO *(1)* °F

       a. Dump steam:

       1) Manually open condenser steam dump valves

       –OR–

       manually open steam generator PORVs.

       2) Manually close valves.

High-level action
step - bold type

     b. Temperature – LESS THAN *(2)* °F

       1) Verify feedwater flow control valves – CLOSED *(3)*

Detailed steps - how
to do high-level
action

     c. Temperature – STABILIZES AT *(1)* °F

       c. Stop dumping steam. IF cooldown continues, THEN close main steamline isolation valves.

Contingency action -
when expected
response not obtained

2   **Establish AFW Flow:**

     a. Start AFW pumps

     b. Align AFW valves – OPEN OR CLOSE AS APPROPRIATE *(4)*

     c. Verify AFW flow

       c. IF AFW flow NOT verified, THEN go to FR-H.1, LOSS OF SECONDARY HEAT SINK.

Transition to another
guideline - number
and title

3   **Verify All Control Rods Fully Inserted.**

       IF two or more control rods NOT fully inserted, THEN emergency borate *(5)* ppm for each control rod not fully inserted.

Logic statement
emphasized - IF ...
THEN

(1) Enter programmed no-load temperature.
(2) Enter temperature for low energy temperature setpoint.
(3) Enter plant specific list of values.
(4) Enter plant specific list.
(5) Enter plant specific boration requirements.

1 of 7

Plant-specific data
required - footnote
number

Footnotes - define
required plant-
specific data

Page number -
accounts for all
pages

Figure 2   Format Example

Battelle

Report

New England
Marine Research Laboratory

IE23
1/1