NINE MILE POINT NUCLEAR STATION

UNIT No.1

EMERGENCY OPERATING PROCEDURE

VALIDATION PROGRAM PLAN

OEI DOCUMENT 8309-11

Revision 0

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Prepared for

Niagara Mohawk Power Corporation

By

Operations Engineering, Inc.
39510 Paseo Padre Parkway, Suite 390
Fremont, California 94538
(415) 794-0770
Telex 820062

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APPENDICES

1.0 PURPOSE

This document contains the necessary instructions, checklists, and data collection forms for the validation of the NMP1 Emergency Operating Procedures (EOPs). The process described herein is intended primarily for use during the initial development of the EOPs, but may be adapted as appropriate for use in evaluating subsequent procedure revisions.

2.0 DEFINITIONS

"Validation," as used in this report, is the process of confirming the usability and operational correctness of the procedures. "Usability" refers to the provision of the appropriate level of detail in the procedures and the understandability of the information presented. "Operational correctness" refers to the compatibility of the procedures with plant hardware, plant responses, operator capabilities, other procedures, and shift manning levels.

3.0 METHODOLOGY

3.1 EOP Evaluation Criteria

As stated above, the general validation concepts of procedure usability and operational correctness are here defined to encompass the following specific procedure characteristics:

General Concept	Procedure Characteristics
Usability	Level of detail
	Understandability
Operational Correctness	Compatibility with plant hardware
	Compatibility with plant response
	Compatibility with other procedures
	Compatibility with operator capabilities
	Compatibility with shift manning levels

The evaluation criteria against which each of these procedure characteristics will be evaluated are listed in Table 1.

TABLE 1

EOP EVALUATION CRITERIA

Procedure Characteristic	Evaluation Criteria
Level of Detail	Is the operator provided with the information necessary to enable him to evaluate plant conditions and effect the appropriate response?
	Is the operator able to rely upon the procedure for guidance on the appropriate response under unusual or degraded conditions?
	Is the level of detail provided consistent with the knowledge and capabilities of the intended users?
	Where appropriate, are response times, equipment limitations, instrumentation inaccuracies, and contingency actions addressed?
Understandability	Is the operator able to interpret the procedure steps correctly, with minimal hesitation?
Compatibility With Plant Hardware	Is the terminology used in the procedures consistent with that used on the control panels?
	Are the controls and indications specified in the procedure physically available to the operators?
	Does the existing plant design permit the performance of the prescribed actions as directed and in the specified sequence?
Compatibility With Plant Response	Are the specified actions effective in stabilizing plant conditions?

TABLE 1

EOP EVALUATION CRITERIA (Continued)

Procedure Characteristic	Evaluation Criteria
Compatibility With Other Procedures	Is the wording and terminology used in the EOPs consistent with that used in other procedures?
	Where cross-references are provided, are the specified procedure, step, and page numbers correct?
	Are the prescribed actions compatible with other procedures which may be executed concurrently?
Compatibility With Operator Capabilities	Are the task requirements imposed by the prescribed actions within the physical and mental capabilities of the control room operators?
Compatibility With Shift Manning	Are available personnel able to execute the prescribed actions efficiently and at the proper time?

3.2 Evaluation Techniques

The following evaluation techniques will be used in the EOP validation program:

(1) Observation of operators during real-time execution of event scenarios on the NMP1 simulator.

(2) Talkthroughs of any procedure steps which cannot be effectively addressed through simulations.

(3) Collection of operator opinions using prepared questionnaires.

(4) Feedback solicited from operators during EOP training sessions.

Copies of the checklists, questionnaires, scenario outlines, and data collection forms developed to guide and document the performance of the validation are provided in Appendices A through E of this document.

3.3 Development of Simulator Scenarios

Twenty-five event scenarios have been selected for use in the simulator phase of the validation. The following criteria were considered during the selection process:

- EOP Coverage

  A sufficient number of scenarios should be employed to permit an evaluation of all major sections of the EOPs.

- Operator Judgement Requirements

  Many steps within the EOPs require judgements on the part of the operator. Scenarios should therefore be included which will emphasize this aspect of procedure execution.

- Industry Events

  Events which have been of historical concern to the nuclear power industry (i.e., stuck open relief valve, loss of feedwater, ATWS, small break in the drywell) should be addressed.

- o Known or Suspected Problem Areas

  The scenarios should specifically exercise any steps which were subject to misinterpretation during earlier EOP evaluations.

- o Complexity

  The scenarios should be of varying complexity, permitting the evaluation of the EOPs over a wide spectrum of operator response levels.

The development of the scenarios was conducted in the following steps:

1. Major operator response paths implicitly defined by the EOPs were identified.

2. Variations and branch points within each major response path were defined.

3. Specific evolutions and contingency actions which might be required within each variation or branch path were listed.

4. The response path variations and branches, specific evolutions, and contingency actions thus defined were combined into detailed operator response patterns around which the event scenarios were developed.

5. One scenario was developed as follows for each response pattern formulated:

   a. At each decision point in the response pattern, plant symptoms were specified which would constrain the operator to the desired pattern.

   b. System degredations, instructor actions, or event complications which could result in the necessary plant symptoms were hypothesized.

   c. Operator response requirements were identified for each key procedure step and branch point within the response pattern.

   d. An initiating event was selected for the scenario.

e. A detailed scenario outline listing instructor actions, plant response, and operator actions was prepared using the form illustrated in Figure 1. Talkthrough sequences were developed for any segments of the response pattern which could not be simulated.

f. A scenario cover sheet (Figure 2) was prepared.

6. The scenarios were tested on the NMP1 simulator to verify that the desired response patterns were generated.

3.4 Scenario Descriptions

The twenty-five scenarios used during the validation may be divided into five groups corresponding to the primary procedure path evaluated by the exercises:

Group	Procedure Path
A	RPV water level and pressure control
B	Failure to scram
C	RPV flooding
D	Primary containment control
E	Secondary containment and radioacivity release control

Short descriptions of the individual scenarios are provided in Table 2. The detailed scenario outlines used during the execution of the simulator exercises are provided in Appendix B.

3.5 Test Participants

One normal shift of control room operators will be chosen to assist in the EOP validation. During the execution of the simulator scenarios, the operators will be instructed to act in their normal on-shift roles.

SCENARIO NUMBER _____ PAGE ____ OF ____

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES

Figure 1: Scenario Outline Form

NMP-1 EOP VALIDATION

SCENARIO A1

DESCRIPTION:

PROCEDURES EXERCISED:

INITIAL PLANT CONDITIONS:

Simulator Mode:	Mode Switch:
Reactor Power:	RPV Pressure:
Feedwater Lineup:	
Malfunctions:	
Equipment OOS:	

REMARKS:

Figure 2: Scenario Cover Sheet Form

TABLE 2

SCENARIO DESCRIPTIONS

No.	Description
A1	The reactor scrams on low RPV water level following a feedwater controller failure. RPV water level is restored and maintained with feedwater in the HPCI mode. The MSIVs close, requiring use of the emergency condensers for pressure control. Exercises EOP-2 (simple level and pressure control actions).
A2	A load reject causes a scram and turbine trip. The turbine bypass valves fail closed, requiring use of ERVs and the emergency condensers for pressure control. The shutdown cooling system fails, requiring use of alternate pressure control systems for RPV cooldown. Exercises EOP-2 (alternate pressure control).
A3	Only one core spray pump is available for RPV injection following a recirculation line rupture. Spray cooling is established. Exercises EOP-2 (spray cooling), EOP-4, and EOP-8 (Step 1).
A4	A complete loss of feedwater flow results in a scram and MSIV closure. The emergency condensers fail to operate and an ERV sticks open. Loss of both 115 KV lines and failure of both diesel generators results in loss of all AC and all injection sources. Loss of inventory through the stuck-open ERV requires execution of the steam cooling procedure. Exercises EOP-2, EOP-8, and EOP-9 (emergency condensers not available).
A5	All AC power is lost following a reactor scram. Inventory loss through a stuck-open ERV requires execution of the steam cooling procedure (one emergency condenser is operative). One injection source is restored when steam cooling is established. Exercises EOP-2, EOP-8 (Step 1), and EOP-9 (emergency condenser available).
A6	Only CRD and alternate injection systems are available for RPV injection following a LOCA. Exercises EOP-2 (use of alternate injection systems), EOP-4, and EOP-8 (Step 1).

TABLE 2

SCENARIO DESCRIPTIONS (Continued)

No.	Description
A7	An ERV sticks open following a complete loss of feedwater. Emergency RPV depressurization is required. Exercises EOP-2 (Step 2.4.4) and EOP-8 (use of alternate depressurization in Step 1).
A8	Various combinations of RPV water level trends and RPV pressure are evaluated following a steam line break (talkthrough). Exercises EOP-2, Step 2.4.4.
A9	An ERV sticks open following a turbine trip. The Heat Capacity Temperature Limit is approached, requiring rapid RPV depressurization. Exercises EOP-2 and EOP-4.
B1	Four control rods fail to insert following a reactor scram. Exercises EOP-2, EOP-3, and SOP-34.
B2	An ERV inadvertently opens. When a manual scram is attempted, the control rods fail to insert. Boron is injected and RPV water level is lowered. Exercises EOP-3, EOP-4, and SOP-34.
B3	The reactor fails to scram following a turbine trip. An ERV opens and sticks open causing torus temperature to increase. Boron is injected and RPV water level is lowered. A subsequent loss of both 115 KV lines results in a complete loss of feedwater, requiring RPV depressurization and use of core spray for RPV water level control. Exercises EOP-3, EOP-4, and EOP-8 (Step 2).
B4	The reactor fails to scram following an MSIV closure. Emergency RPV depressurization is required when torus temperature exceeds the heat capacity temperature limit. Exercises EOP-3, EOP-4, and EOP-8 (Step 2).
B5	The reactor fails to scram following a turbine trip. One ERV sticks open. Boron injection is required when torus temperature reaches 110°F. Both liquid poison pumps trip, requiring use of alternate boron injection systems. Exercises EOP-3 and EOP-4.

TABLE 2

SCENARIO DESCRIPTIONS (Continued)

No.	Description
B6	RPV water level is lowered and boron injected following a failure to scram. Reactor power increases when RPV water level is restored to the normal band. Exercises EOP-3.
C1	RPV water level cannot be determined following a steam leak inside the primary containment. RPV flooding is required. Exercises EOP-2, EOP-4, and EOP-7 (Step 3).
C2	The control rods do not insert following a scram caused by steam leakage in the drywell. RPV water level cannot be determined and RPV flooding is required. Exercises EOP-3, EOP-4, and EOP-7 (Step 2).
D1	Drywell cooling capability is lost. Exercises EOP-4 (Step 3).
D2	A low torus water level requires emergency RPV depressurization (talkthrough). Exercises EOP-4 (Step 5) and EOP-8 (Step 1).
D3	A small steam leak occurs in the drywell. Exercises EOP-2 and EOP-4 (Steps 3 and 4).
D4	A steam leak occurs in the drywell. Containment spray and RPV depressurization are required due to high drywell temperatures (talkthrough). Exercises EOP-4 (Step 3).
D5	A steam leak occurs in the drywell. Containment spray, RPV depressurization, and RPV flooding are required. EOP-6 is entered (talkthrough). Exercises EOP-4 (Step 4), EOP-6, and EOP-7.
D6	Torus water level increases following a LOCA (talkthrough). Exercises EOP-4 (Step 5).
E1	The scram discharge volume ruptures following a reactor scram. Exercises EOP-5 and EOP-8.

TABLE 2

SCENARIO DESCRIPTIONS (Continued)

No.	Description
E2	Primary containment leakage occurs following a steam line rupture in the drywell. Exercises EOP-5 and EOP-8.

3.6 Training of Test Participants

All operators assisting in the EOP validation will complete an introductory EOP training course prior to participating in the simulator exercises. As a minimum, this course will include instruction in the following topics:

1. Historical background of symptomatic EOPs.
2. Structure and use of the NMP1 EOPs.
3. Technical basis of EOP instructions and action levels.
4. EOP development and implementation.

3.7 Conduct of Simulator Exercises

The simulator exercises will be performed in the sequence specified in the validation test plan (Appendix A). Each scenario will be executed as follows:

1. Initial plant conditions will be set as specified on the Scenario Cover Sheet and in the Scenario Outline (Appendix B).
2. The operators will be briefed concerning the initial plant conditions and directed to act in their normal on-shift roles.
3. The transient will be run in accordance with the instructions contained in the Scenario Outline. When a talkthrough sequence is required, the operators will be asked to demonstrate and describe in detail the actions they would perform in response to the assumed conditions.
4. The operators' responses will be compared to the operator actions specified on the Scenario Outline. Any of the following variations from the expected response pattern will be designated "performance deviations" and documented in the "Notes" column of the Scenario Outline:
    - o Performance of an inappropriate step or action
    - o Formulation of an incorrect decision
    - o Misinterpretation of a procedure step

- Failure to perform an expected action
- Violation of a procedural limit
- Omission of a procedure step
- Failure to observe a specifed caution.

5. When the scenario is terminated, the evaluator will complete a Scenario Checklist (Appendix C). Each participant will be asked to complete an Operator Questionnaire, Part 1 (Appendix D).

6. The completed questionnaires will be reviewed with the operators.

When all scenarios have been completed, each participant will be asked to complete Part 2 of the Operator Questionnaire.

3.8 Training Input

Any procedure discrepancies identified by operators during formal EOP training sessions conducted subsequent to the simulator phase of the validation will be documented and subjected to the resolution process described below. Operators in the first two training classes will also be asked to complete Part 2 of an Operator Questionnaire.

3.9 Resolution of Procedure Discrepancies

In the Resolution Phase of the validation, each identified procedure discrepancy will be analyzed to determine whether any corrective action is required. If corrective action is deemed necessary, an appropriate solution will be developed. This process will be completed in the following steps:

1. Each procedure discrepancy identified during the simulator exercises or EOP training courses will be assigned an identification number and documented on a Discrepancy Resolution Report (Appendix E).

2. Each discrepancy will be reviewed to determine whether corrective action is appropriate. If corrective action is necessary, a recommended solution will be developed and documented on the Discrepancy Resolution Report. If no corrective action is required, appropriate justification will be provided.

3. Corrective actions affecting procedure content will be incorporated into Revision 0 of the EOPs.

4. Training program modifications will be implemented as appropriate to clarify the intent of any procedure steps misunderstood during the simulator runs.

3.10 Evaluation of the Safety Parameter Display System

The evaluation techniques relied upon in the EOP validation will also be used to evaluate the NMP1 Safety Parameter Display System (SPDS) in terms of the following general design concepts and specific system characteristics:

General Concept	System Characteristic
Operational Usefulness	Efficacy of design Relevance of information
Usability	Display feature understandability Display readability Ease of operation Display visibility System availability
System Compatibility	Compatibility with EOPs Compatibility with control room design Compatibility with operator capabilities

The evaluation criteria against which each of these system characteristics will be evaluated are listed in Table 3.

4.0 DOCUMENTATION

The following materials will be provided as documentation of the EOP validation:

1. A completed EOP Validation Checklist, including the Validation Test Plan and a Participant Record, documenting the completion of each major task in the validation process (Appendix A).

2. A cover sheet and detailed outline of each scenario performed during the Assessment Phase (Appendix B).

3. A completed Scenario Checklist documenting the performance of each scenario and listing any observed performance deviations (Appendix C).

4. Completed Operator Questionnaires (Appendix D).

5. A completed Discrepancy Resolution Report for each identified procedure discrepancy or operator concern (Appendix E).

TABLE 3

SPDS EVALUATION CRITERIA

System Characteristic	Evaluation Criteria
System Efficacy	Can EOP entry conditions be easily detected?
	Can EOP action levels be easily detected?
	Does the SPDS assist the operator in determining plant status?
Relevance of Information	Do the displays supply information considered valuable by the operators?
	Is only necessary information provided on the displays?
	Is the information provided useful in assessing the status of the plant relative to the action levels specified in the EOPs?
Display Feature Understandability	Are the displays logically organized?
	Can the displays be easily comprehended and interpreted?
	Are the displays effectively formatted?
Display Readability	Can words and numbers on the displays be easily read?
Ease of Operation	Are the displays conveniently located?
	Can the displays be readily accessed by the operators?
	Are the SPDS hardware and software easy to use?
Display Visibility	Are the displays easy to see from various positions throughout the control room?

TABLE 3

SPDS EVALUATION CRITERIA (Continued)

System Characteristic	Evaluation Criteria
System Availability	Is the display update time satisfactory?
	Does the system continue to operate throughout the transients?
Compatibility With EOPs	Is the terminology used on the displays consistent with that used in the EOPs?
	Do the action levels identified on the displays correspond to those identified in the EOPs?
Compatibility With Control Room Design	Do parameter values displayed on the SPDS correspond to those indicated on control panel instruments?
	Is the terminology used on the displays consistent with that used on control panel labels?
Compatibility With Operator Capabilities	Is the operator able to use the displays effectively while responding to abnormal plant conditions in accordance with the EOPs?

APPENDIX A

VALIDATION CHECKLIST, TEST PLAN, AND PARTICIPANT RECORD

GENERAL INSTRUCTIONS AND VALIDATION CHECKLIST

		Initials	Date
1.	Fill out the Participant Record (attached).	_____	_____
2.	Conduct the pre-validation training.	_____	_____
3.	Perform each scenario listed on the Validation Test Plan (Table 1) in accordance with the instructions provided.	_____	_____
4.	Have each operator complete Part 2 of a Validation Questionnaire.	_____	_____
5.	Tabulate the data from all questionnaires and checklists.	_____	_____
6.	Number each performance deviation and procedure discrepancy identified on the Scenario Outlines, Operator Questionnaires, and Scenario Checklists, using a "V" prefix (e.g. V-1, V-2, V-3, etc). Multiple occurences of a particular deviation or discrepancy may be assigned the same number.	_____	_____
7.	Fill out a Discrepancy Evaluation Report for each numbered performancy deviation and procedure discrepancy in accordance with the instructions provided.	_____	_____

TABLE 1

VALIDATION TEST PLAN

	FIRST HALF	SECOND HALF
DAY 1:	_____ D3	_____ B1
	_____ A3	_____ C1
	_____ A6	_____ A4
	_____ E1	_____ D4
	_____ D2	_____ E2
DAY 2:	_____ A1	_____ D1
	_____ A5	_____ B3
	_____ B4	_____ A7
	_____ A2	_____ D6
	_____ D5	_____ A8
DAY 3:	_____ B2	
	_____ B6	
	_____ C2	
	_____ B5	
	_____ A9	

NMP-1 EOP VALIDATION PROCEDURES

PARTICIPANT RECORD

DATE: _____ EOP REVISION: _____

OPERATORS: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

INSTRUCTORS: _____

_____

_____

EVALUATORS: _____

_____

_____

_____

INSTRUCTIONS FOR CONDUCTING THE VALIDATION SCENARIOS

Perform the following steps for each scenario listed on the Validation Test Plan (Table 1):

1. Set the initial conditions according the the instructions in the Scenario Outline.

2. Brief the operators concerning initial plant conditions.

3. Run the transient in accordance with the Scenario Outline. If a talkthrough is required, perform the following:

   a. Set or describe the plant conditions specified in the Scenario Outline.

   b. Have the operators demonstrate and describe in detail the actions they would perform in response to the assumed conditions. Supply any additional information specified in the scenario outline.

4. Verify that each operator action specified on the Scenario Outline is performed at the appropriate time. If the action is performed correctly, place a check in the "Notes" column of the Scenario Outline. If any performance deviations are observed, document the nature of the deviation in the "Notes" column. (Examples of performance deviations are listed in Table 2.) Use a Comment Continuation Sheet if additional space is required.

5. When the scenario has been terminated, have each operator complete a Validation Questionnaire.

6. Complete a Scenario Checklist.

7. Review the completed questionnaires with the operators. Note and initial on the forms any necessary explanatory comments.

TABLE 2

EXAMPLES OF OPERATOR PERFORMANCE DEVIVATIONS

COMMISSION DEVIATIONS

- o Operator performs an inappropriate step or action
- o Operator makes an incorrect decison
- o Operator misinterprets a procedure step

OMISSION DEVIATIONS

- o Operator does not perform an expected action
- o Operator violates a procedural limit
- o Operator omits a procedure step
- o Operator fails to observe a caution

COMMENT CONTINUATION SHEET

Scenario # _____

Comments (Continued) _____

APPENDIX B

SCENARIO OUTLINES

NMP-1 EOP VALIDATION

SCENARIO A1

DESCRIPTION: Low RPV water level scram due to FW controller failure. RPV water level is restored and maintained with FW in the HPCI mode. MSIVs close requiring use of ECs for pressure control.

PROCEDURES EXERCISED: EOP-2 (simple level and pressure control)

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14 **Mode Switch:** Run

Reactor Power: 100% **RPV Pressure:** Normal

Feedwater Lineup: Normal

Malfunctions: None

Equipment OOS: None

REMARKS:

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14			
T_o +3 min.	Malfunction #FW15 (FW master controller fails low	RPV water level decreases		
RPV water level <53 in.		Reactor scram FW shifts to HPCI mode	Enter EOP-2 Verify auto actions (2-2.1) Restore/maintain RPV water level 53-95 in. with Condensate/FW in HPCI mode (2-2.2) Control RPV pressure <1080 psig with BPVs (2-3.2) Depressurize <100°F/hr (2-3.3)	
RPV water level @ 5 in.		MSIVs close	Control RPV pressure with ECs	
When SDC interlocks clear			Initiate SDC (2-3.4) Exit EOPs	

NMP-1 EOP VALIDATION

SCENARIO A2

DESCRIPTION: Load reject causes scram and turbine trip. BPVs fail closed, requiring use of electromatics and ECs for pressure control. SDC fails, requiring use of alternate pressure control system.

PROCEDURES EXERCISED: EOP-2 (alternate pressure control)

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14 Mode Switch: Run

Reactor Power: 100% RPV Pressure: Normal

Feedwater Lineup: Normal

Malfunctions: TC12

Equipment OOS: None

REMARKS:

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14 Malfunction #TC12 (all BPVs fail closed)			
T_o + 3min.	Malfunction #EG14 (load reject)	Generator trip Turbine trip Reactor scram RPV pressure increases FW shifts to HPCI mode Electromatics open	Enter EOP-2 Verify auto actions (2-2.1) Restore/maintain RPV water level 53-95 in. (2-2.2) Control RPV pressure <1080 psig with ECs and electromatics (2-3.3) Depressurize <100°F/hr (2-3.3) Initiate SDC (2-3.4)	
When SDC established	Malfunction #SC01 A,B,C (trip all SDC pumps)		Cooldown with alternate pressure control systems Exit EOPs	

NMP-1 EOP VALIDATION

SCENARIO A3

DESCRIPTION: Recirc line rupture with only one CS pump available for injection.

PROCEDURES EXERCISED: EOP-2 (spray cooling)
EOP-4
EOP-8

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14 **Mode Switch:** Run

Reactor Power: 100% **RPV Pressure:** Normal

Feedwater Lineup: Normal

Malfunctions: DG01A, CS01D

Equipment OOS: None

REMARKS: Degraded ECCS availability results from loss of both 115 KV lines, failure of one DG and trip of one CS pump supplied by the operating DG.

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14 Malfunction #DG01 A (DG 102 fails to start) Malfunction #CS01 D (CS pump 122 trip)			
T_o + 3 min.	Malfunction #RR29 (recirc line rupture) Malfunction #ED01 C (loss of both 115 KV lines)	DW pressure and temperature increase RPV water level and pressure decrease Reactor scram and containment isolation at 3.5 psig DW pressure DG 103 starts CS and Topping Pump 112 start	Enter EOP-2, EOP-4 Verify auto actions (2-2.1) Attempt to restore/maintain RPV water level 53-95 in. (2-2.2)	
RPV water level <53 in.			Attempt to restore RPV water level > -86.4 in. (2-2.3)	
RPV water level at 5 in.		MSIVs close		
RPV water level < -86.4 in.			Confirm EC initiation (2-2.4.1) Attempt to line up CS, Cond/FW (2-2.4.2) Line up alternate systems (2-2.4.3)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
RPV water level < -86.4 in. (Cont.)			Depressurize RPV: (Table) Confirm EC initiation (8-1.1) Open 3 electromatics (8-1.2)	
One CS injecting 1.7×10^6 lbm/hr gpm and RPV pressure <110 psig			Terminate all RPV injection except CRD and CS	
2 min. after CS established	Clear malfunction #DG01	DG 102 starts CS pumps 111, 121 start RPV water level increases	Observe override on page 6 of EOP-2 Restore/maintain RPV water level 53-95 in. (2-2.2)	
			Initiate SDC (2-3.4) Exit EOPs	

NMP-1 EOP VALIDATION

SCENARIO A4

DESCRIPTION: Complete loss of FW results in scram and MSIV, closure. ECs fail to operate and one electromatic sticks open. Loss of both 115 KV lines and failure of both DGs results in loss of all AC and all injection sources. Loss of inventory through stuck-open electromatic requires steam cooling (RPV pressure remains high).

PROCEDURES EXERCISED: EOP-2 (steam cooling without ECs)
EOP-8
EOP-9

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14 Mode Switch: Run

Reactor Power: 100% RPV Pressure: Normal

Feedwater Lineup: Normal

Malfunctions: EC04C, DG01C, FP01

Equipment OOS: None

REMARKS: Injection sources are restored when steam cooling has been executed and the RPV is depressurized.

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14 Malfunction #EC04 C (both EC return values fail to open) Malfunction #DG01 C (both DGs fail to start) Malfunction FP01 (diesel fire pump failure)			
T_o + 3 min.	Malfunction #ED01 C (loss of both 115 KV lines)			
T_o + 5 min.	Malfunction #FW25 (complete loss of FW)	Feedwater pumps trip RPV water level decreases Reactor scram Turbine trip, BPVs fail shut Loss of all AC, all injection sources	Enter EOP-2 Verify auto actions (2-2.1) Attempt to restore/maintain RPV water level 53-95 in. (2-2.2) Maintain RPV pressure <1080 psig with electromatics (2-3.2)	
RPV water level at 5 in.		MSIVs close RPV pressure increases Electromatic opens and sticks open	Attempt to maintain RPV water level > -86.4 in. (2-2.3)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
When SOP-9 executed	Simulate pulling electromatic fuses. Inform operator that the valve remains open.			
RPV water level < -86.4 in.			Attempt to initiate EC (2-2.4) Attempt to lineup systems, alternate systems (2-2.4) Enter EOP-9 (2-table)	
Before RPV pressure drops to 700 psig	Inform operator that RPV level is -174 in.		Open one electromatic (9-2)	
RPV pressure < 700 psig			Depressurize: (9-2) Open 3 electromatics (8-1.2) Return to EOP-2 (9-2) Evaluate RPV level and pressure (2-2.4.4)	
When RPV is depressurized	Clear Malfunction #DG01 for DG 102	DG 102 starts CS 111, 121 start RPV water level increases	Restore/maintain RPV water level 53 - 95 in. (2-table) Initiate SDC Exit EOPs	

NMP-1 EOP VALIDATION

SCENARIO A5

DESCRIPTION: Complete loss of feedwater with loss of all AC. Steam cooling is required (with EC).

PROCEDURES EXERCISED: EOP-2 (steam cooling with ECs)
EOP-8
EOP-9

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14 **Mode Switch:** Run

Reactor Power: 100% **RPV Pressure:** Normal

Feedwater Lineup: Normal

Malfunctions: DG01B, EC04C, FP01

Equipment OOS: None

REMARKS:

(1) Loss of all AC results from fault in PB102, turbine trip, loss of both 115 KV lines, and failure of DG103 to start.

(2) Low level/high pressure conditions produced with TMI malfunction.

(3) When steam cooling is established, one injection source is provided.

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14 Malfunction #DG01 B (DG 103 fails to start) Malfunction #EC04 C (both EC return valves fail to open) Malfunction #CS01 B,D (CS pumps 112, 122 fail to start) Malfunction #FP01 (diesel fire pump failure)			
T_o + 3 min.	Malfunction #ED07 (PB102 fault)	Loss of power to PB 102 DG 102 lockout	Respond in accordance with SOPs/OPs Recover from lost loads as required	
When conditions have stabilized	Malfunction #FW25 (complete loss of FW) Malfunction #ED01 C (loss of both 115 KV lines)	Feedwater pumps trip RPV water level decreases Reactor scram Turbine trip, BPVs fail shut Loss of all AC, all injection sources	Enter EOP-2 Verify auto actions (2-2.1) Attempt to restore/maintain RPV water level 53 - 95 in. (2-2.2) Maintain RPV pressure less than 1080 psig with electromatics (2-3.2)	
RPV water level at 5 in.		MSIVs close RPV pressure increases; electromatic opens and sticks open	Attempt to restore/maintain RPV water level above -86.4 in. (2-2.3)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
When SOP-9 is executed	Simulate pulling electromatic fuses. Inform operator that the valve remains open.			
RPV water level < -86.4 in.			Attempt to initiate EC (2-2.4) Attempt to lineup systems, alternate systems (2-2.4) Enter EOP-9 (2-table)	
When EOP-9 entered	Clear Malfunction #EC04 on one EC, inform operator valve has been opened		Use EC for core cooling	
When steam cooling mode is established	Clear malfunction #DG01	DG103 starts CRD #12 starts	Depressurize: (9-3) Open 3 electromatics (8-1.2) Continue in EOP-2 (9-3) Evaluate RPV level and pressure (2-2.4.4)	
When RPV is depressurized + 5 min.	Clear malfunction #CS01 B (for CS pump 112)	CS 112 starts RPV water level increases	Restore/maintain RPV water level 53 - 95 in. (2-2.2) Initiate SDC (2-3.4) Exit EOPs	

NMP-1 EOP VALIDATION

SCENARIO A6

DESCRIPTION: LOCA with only CRD and alternate injection systems available

PROCEDURES EXERCISED: EOP-2 (use of alternate injection systems; low pressure, decreasing level)
EOP-4
EOP-8

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14 **Mode Switch:** Run

Reactor Power: 100% **RPV Pressure:** Normal

Feedwater Lineup: Normal

Malfunctions: DG01B

Equipment OOS: None

REMARKS: Loss of injection systems caused by loss of both 115 KV lines, failure of DG 103 and failure of CS 111, 121.

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14 Malfunction #DG01 B (DG 103 fail to start) Malfunction #CS01 A,C (CS pumps 111, 121 trip)			
T_o + 3 min.	Malfunction #MS04 100% (steam line rupture inside primary containment) Malfunction #ED01 C (loss of both 115 KV lines)	DW pressure and temperature increase RPV water level and pressure decrease Reactor scram and containment isolation Turbine trip MSIVs close DG 102 starts	Enter EOP-2, EOP-4 Verify auto actions (2-2.1)	
RPV water level < 53 in.			Attempt to maintain RPV water level above -86.4 in. (2-2.3)	
RPV water level < -86.4 in.			Confirm EC initiation (2-2.4.1) Lineup alternate systems (2-3.4.3) Start pumps in alternate systems (2-table)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
RPV water level < -86.4 in. (Cont.)			Depressurize: (2-table) Open 3 electromatics (8-1.2)	
RPV water level increasing			Restore/maintain RPV water level 53 - 95 in. (2-2.4.3)	

NMP-1 EOP VALIDATION

SCENARIO A7

DESCRIPTION: Complete loss of feedwater (CS available) with stuck open electromatic. Requires emergency RPV depressurization.

PROCEDURES EXERCISED:

EOP-2	(high pressure, level decreasing; depressurization required)
EOP-8	(use of alternate depressurization systems)

INITIAL PLANT CONDITIONS:

Simulator Mode:	IC 14	**Mode Switch:**	Run
Reactor Power:	100%	**RPV Pressure:**	Normal
Feedwater Lineup:	Normal		
Malfunctions:	EC04C		
Equipment OOS:	None		

REMARKS: When emergency RPV depressurization is attempted, only one electromatic can be opened.

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14 Malfunction #EC04 (both EC return valves fail to open)			
T_o + 3 min.	Malfunction #FW25 (TMI incident)	FW pumps trip RPV water level decreases Reactor scram Turbine trip, BPVs fail shut	Enter EOP-2 Verify auto actions (2-2.1) Attempt to restore/ maintain RPV water level 53-95 in. (2-2.2) Maintain RPV pressure <1080 psig with electromatics (2-3.2)	
RPV water level at 5 in.		ECCS initiation MSIVs close RPV pressure increases Electromatic opens and sticks open	Attempt to maintain RPV water level > -86.4 in. (2-2.3)	
When SOP-9 is executed	Simulate pulling electromatic fuses. Inform operator that the valve remains open.			
RPV water level at -10 in.			Ovveride ADS	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
RPV water level < -86.4 in.			Attempt to initiate EC (2-2.4.1) Verify CS running (2-2.4.2) Depressurize: (2-table) Open 3 electromatic (8-1.2)	
When operator opens electromatics	Close all but one electromatic, inform operator that the rest are inoperable		Bypass low level MSIV isolation (8-1.3.1) Depressurize using alternate systems (8-1.3.2)	
RPV pressure < 365 psig		CS injects RPV water level increases	Restore/maintain RPV water level 53-95 in. (2-2.2) Initiate SDC (2-3.4) Exit EOPs	

NMP-1 EOP VALIDATION

SCENARIO A8

DESCRIPTION: Steam line break with various combinations of RPV water level trend and RPV pressure. (Talkthrough)

PROCEDURES EXERCISED: EOP-2 Table (Region I, Regions II & III with RPV pressure increasing and HPCI not available)

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14 **Mode Switch:** Run

Reactor Power: 100% **RPV Pressure:** Normal

Feedwater Lineup: Normal

Malfunctions: None

Equipment OOS: None

REMARKS: Addresses steps in EOP-2 table not covered by other scenarios.

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14			
T_o + 3 min.	Malfunction #MS04 (steam line rupture)	DW pressure increases RPV water level decreases	Enter EOP-2, EOP-4	
T_o + 4 min.	Freeze simulator. Inform operators that remaining steps will be conducted as a talkthrough.			
Condition A	Inform operator that RPV water level is -90 in. and increasing, RPV pressure is 750 psig and decreasing. HPCI is not operating.		Enter Table in EOP-2 (2-2.4) Return to Step 2 of EOP-2 (Table) Restore/maintain RPV water level 53-95 in. (2-2.2)	
Condition B	Inform operator that RPV water level is -90 in. and increasing. RPV pressure is 350 psig and increasing. CS is injecting, HPCI is not operating.		Depressurize the RPV in accordance with N1-EOP-8 (Table)	
Condition C	Inform operator that RPV water level is -80 in. and decreasing, RPV pressure is 350 psig and increasing. CS is running, HPCI is not operating.		Depressurize the RPV in accordance with N1-EOP-8 (Table)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
Condition D	Inform operator that RPV water level is -50 in. and increasing slowly, RPV pressure is 300 psig.		Reset the ADS timer (2-2.3)	

NMP-1 EOP VALIDATION

SCENARIO A9

DESCRIPTION: Turbine trip with stuck-open electromatic. HCTL is approached, requiring rapid depressurization.

PROCEDURES EXERCISED: EOP-2 (rapid depressurization with BPVs)
EOP-4

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14	**Mode Switch:** Run
Reactor Power: 100%	**RPV Pressure:** Normal

Feedwater Lineup: Normal

Malfunctions: AD06; CT01A,B,C,D; CT02A,B,C,D

Equipment OOS: None

REMARKS:

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14 Malfunction #AD06 (stuck open electromatic) Malfunction #CT01 A,B,C,D (trip of all containment spray pumps Malfunction #CT02 A,B,C,D (trip of all containment spray raw water pumps)			
T_o + 3 min.	Malfunction #TC01 (turbine trip)	Reactor scram RPV pressure increases Electromatic opens and sticks open Torus temperature increases FW shifts to HPCI mode	Enter EOP-2 Restore/maintain RPV water level 53-95 in. (2-2.2) Maintain RPV pressure <1080 psig (2-3.2)	
Torus temp. = 80°F			Enter EOP-4 Attempt to close electromatic in accordance with SOP-9 (4-2.1) Operate torus cooling (4-2.2)	
When SOP-9 is executed	Simulate pulling electromatic fuses. Inform operator that the valve remains open.			

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
2 min. after torus temp. reaches 80°F.	Freeze simulator. Inform operators that remaining steps will be conducted as a talkthrough.			
	Inform operator that torus temp. is 160°F and increasing.		Evaluate HCTL (4-2.4)	
When asked	Inform operator that RPV pressure is 750 psig, torus water level is 8.5 ft.		Rapidly depressurize the RPV using the BPVs (2-3.1 override)	
	Terminate scenario			

NMP-1 EOP VALIDATION

SCENARIO B1

DESCRIPTION: Four control rods fail to insert following a reactor scram caused by a generator trip.

PROCEDURES EXERCISED:
EOP-2
EOP-3 (Rx shutdown; transition to EOP-2)
SOP-34

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14 **Mode Switch:** Run

Reactor Power: 100% **RPV Pressure:** Normal

Feedwater Lineup: Normal

Malfunctions: RD04, RD12, RD20, RD28

Equipment OOS: None

REMARKS: The stuck control rods subsequently insert, requiring entry of EOP-2.

NMP-1 EOP SCENARIO CHECKLIST

SCENARIO # _____ DATE _____

SPDS STATUS:

ON _____ OFF _____

PERFORMANCE CHECKLIST:

_____ Initial conditions set

_____ Operating crew briefed

_____ Scenario executed

_____ Scenario outline completed

_____ Operator questionnaires completed and reviewed

_____ Validation checklist completed

_____ Discrepancy evaluation forms prepared

DISCREPANCY NUMBERS:

REMARKS:

SIGNATURE _____

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14 Malfunctions #RD04, #RD12, #RD20, #RD28 (four rods fail to insert)			
T_o + 3 min.	Malfunction #EG01 (generator trip)	Turbine/generator trip Reactor scram BPVs open 4 rods do not insert FW shifts to HPCI mode	Enter EOP-3 Perform manual scram (3-1) Place mode switch in shutdown (3-5.1) Execute SOP-34 (3-5.3) Maintain RPV pressure <1080 psig (3-4.2) Verify auto actions (3-3.1) Maintain RPV water level 53-95 in. with FW (3-3.3) Depressurize <100°F/hr (3-4.3)	
When manual rod insertion attempted in SOP-34	Clear malfunction #RD04, #RD12, #RD20, #RD28	Rods insert	Enter EOP-2 (override) Initiate SDC (2-3.4) Exit EOPs	

NMP-1 EOP VALIDATION

SCENARIO B2

DESCRIPTION: Electromatic inadvertently opens. Control rods do not insert when manual scram is attempted. Boron is injected and RPV water level lowered.

PROCEDURES EXERCISED:
EOP-3 (lowering water level, simple)
EOP-4 (step 2)
SOP-34

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14 **Mode Switch:** Run

Reactor Power: 100% **RPV Pressure:** Normal

Feedwater Lineup: Normal

Malfunctions: AD06; RP05; CT01A,B,C,D; CT02A,B,C,D

Equipment OOS:

REMARKS: Control rods remain withdrawn during the execution of SOP-34.

Snapshot taken for use in Scenario B6.

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14 Malfunction #AD06 (stuck electromatic) Malfunction #RP05 (complete failure to scram) Malfunction #CT01 A,B,C,D (trip of all containment spray pumps) Malfunction #CT02 A,B,C,D (trip of all raw water pumps)			
T_o + 3 min.	Malfunction #AD05 (inadvertent electro-matic opening)	Electromatic opens Torus temp increases		
Torus temp = 80^oF			Enter EOP-4 Attempt to close stuck open electromatic per SOP-9 (4-2.1) Operate torus cooling (4-2.2)	
When SOP-9 is executed	Simulate pulling electro-matci fuses. Inform operator that the valve remains open.			
Torus temp = 110^oF			Scram reactor (4-2.3)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
When manual scram performed		Rods do not insert	Enter EOP-3 Place mode switch in shutdown (3-5.1) Trip recirc pumps (3-5.2) Execute SOP-34 (3-5.3) Prevent auto ADS (3-5.4.1) Initiate Liquid Poison (3-5.4.3) Verify RWCU isolation (3-5.4.3) Verify auto action (3-3.1) Bypass low level MSIV isolation (3-3.2.1) Lower RPV water level (3-3.2.)	
When SOP-34 is executed	Simulate all actions. Inform operator that the control rods remain withdrawn.			
Reactor power <3% or RPV water level ≈ -86.4 in.			Maintain RPV water level at level to which it was lowered (3-3.3)	
163 lbs. of poison injected	Take snapshot		Restore/maintain RPV water level 53-95 in. (3-3.6)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
291.5 lbs. of boron injected			Terminate boron injection (3-5.4.5) Depressurize @ <100°F/hr (3-4.3) Initiate SDC (3-4.4) Exit EOPs	

NMP-1 EOP VALIDATION

SCENARIO B3

DESCRIPTION: Failure to scram following turbine trip. An electromatic opens and sticks open causing torus temperature to increase. Boron is injected and RPV water level is lowered. A subsequent loss of both 115 KV lines causes a complete loss of feedwater, requiring RPV depressurization and use of CS for level control.

PROCEDURES EXERCISED: EOP-3 (level is lowered, but can't be maintained; depressurization required)
EOP-4
EOP-8

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14 **Mode Switch:** Run

Reactor Power: 100% **RPV Pressure:** Normal

Feedwater Lineup: Normal

Malfunctions: RP05; CT01A,B,C,D; CT02A,B,C,D

Equipment OOS: None

REMARKS: Control rods do not insert during execution of SOP-34.

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14 Malfunction #RP05 (complete failure to scram) Malfunction #AD06 (stuck open electromatic) Malfunction #CT01 A,B,C,D (trip of all containment spray pumps) Malfunction #CT02 A,B,C,D (trip of all raw water pumps) Malfunction #RD04, #RD12, #RD20, #RD28 (four control rods fail to insert)			
T_o + 3 min.	Malfunction #TU06 100% (turbine trip on thrust bearing wear)	Turbine trips BPVs open Reactor does not scram RPV pressure increases Electromatic opens and sticks open Torus temperature increases FW shifts to HPCI mode	Enter EOP-3 Manual scram (3-1) Place mode switch in shutdown (3-5.1) Trip recirc (3-5.2) Execute SOP-34 (3-5.3) Maintain RPV water level 53-95 in. (3-3.3) Maintain RPV pressure <1080 psig (3-4.2)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
Torus temp = 80°F			Enter EOP-4 Attempt to close stuck-open electromatic per SOP-9 (4-2.1) Initiate torus cooling (4-2.2)	
Torus temp = 110°F			Prevent auto ADS (3-5.4.1) Initiate Liquid Poison (3-5.4.2) Verify RWCU isolation (3-5.4.3) Bypass low water level MSIV isolation (3-3.2.1) Lower RPV water level (3-3.2.2)	
When reactor power <3% or RPV water level = -86.4 in.			Maintain RPV water level at level to which it was lowered (3-3.3)	
When RPV water level stabilized	Malfunction #ED01 (loss both 115 KV lines)	Condensate and FW pumps trip RPV water level decreases All but four control rods insert	Attempt to maintain RPV water level > -86.4 in. (3-3.4)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
RPV water level < -86.4 in.			Depressurize: (3-3.5.1) Terminate injection (8-2.1) Initiate EC (8-2.2) Open 3 electromatics (8-2.3)	
RPV pressure < 325 psig			Inject with CS to maintain RPV water level > -86.4 in. (3-3.5.3)	
163 lbs. boron injected			Restore/maintain RPV water level 53-95 in. (3-3.6)	
291.5 lb. boron injected			Terminate boron injection (3-5.4.5) Initiate SDC (3-4.4) Exit EOPs	

NMP-1 EOP VALIDATION

SCENARIO B4

DESCRIPTION: MSIV closure with failure to scram. Emergency RPV depressurization is required when torus temperature exceeds the HCTL.

PROCEDURES EXERCISED: EOP-2 (lowering RPV water level; depressurization required from HCTL)
EOP-4
EOP-8

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14 **Mode Switch:** Run

Reactor Power: 100% **RPV Pressure:** Normal

Feedwater Lineup: Normal

Malfunctions: RP05; CT01A,B,C,D; CT02A,B,C,D

Equipment OOS: None

REMARKS: Scram occurs after the RPV is depressurized, requiring entry of EOP-2.

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14 Malfunction #RP05 (complete failure to scram) Malfunction #CT01 A,B,C,D (trip of all containment spray pumps) Malfunction #CT02 A,B,C,D (trip of all raw water pumps)			
To + 3 min.	Malfunction #RP06 (MSIV closure)	MSIVs close Reactor does not scram RPV pressure increases Electromatics open Torus temperature increases FW shifts to HPCI mode	Enter EOP-3 Manual scram (3-1) Place mode switch in shutdown (3-5.1) Trip recirc pumps (3-5.2) Execute SOP-34 (3-5.3) Verify auto actions (3-3.1) Maintain RPV pressure <1080 psig (3-4.2)	
Torus temp = $80^{o}F$			Enter EOP-4 Operate torus cooling (2-2.2)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
Torus temp = 110°F			Prevent ADS (3-5.4.1) Initiate Liquid Poison (3-5.4.2) Verify RWCU isolation (3-5.4.3) Lower RPV water level to -86.4 in. (3-3.2.3.3)	
Torus temp = HCTL	Inform operator torus water level is 9 ft.		Depressurize: (4-2.5) Terminate injection (8-2.1) Initiate EC (8-2.2) Open 3 electromatics (8-2.3)	
RPV pressure <325 psig			Commence injection with FW (3-3.5.2) Maintain RPV water level > -86.4 in. (3-3.5.2)	
When RPV is depressurized and level is stablized	Clear malfunction #RP05	Control rods insert	Terminate boron injection (3-5.4.5) Enter EOP-2 (override) Restore/maintain RPV water level 53-95 in. (2-2.2) Initiate SDC (2-3.4)	

NMP-1 EOP VALIDATION

SCENARIO B5

DESCRIPTION: Failure to scram following a turbine trip. One electromatic sticks open. Boron injection is required when torus temperature reaches 110°F. Both Liquid Poison pumps trip, requiring alternate boron injection.

PROCEDURES EXERCISED: EOP-3 (alternate boron injection)
EOP-4

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14 **Mode Switch:** Run

Reactor Power: 100 **RPV Pressure:** Normal

Feedwater Lineup: Normal

Malfunctions: RP05; AD06; CT01A,B,C,D; CT02A,B,C,D

Equipment OOS: None

REMARKS:

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14 Malfunction #RP05 (complete failure to scram) Malfunction #AD06 (stuck electromatic) Malfunction #CT01 A,B,C,D (trip of all containment spray pumps) Malfunction #CT02 A,B,C,D (trip of all raw water pumps)			
T_o + 3 min.	Malfunction #TC01 (turbine trip)	Turbine trips Reactor does not scram RPV pressure increases Electromatic opens and sticks open Torus temperature increases FW shifts to HPCI mode	Enter EOP-3 Manual scram (3-1) Place mode switch in shutdown (3-5.1) Trip recirc pumps (3-5.2) Execute SOP-34 (3-5.3) Verify auto actions (3-3.1) Maintain RPV water level 53-95 in. (3-3.3) Maintain RPV pressure <1080 psig (3-4.2)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
Torus temp = 80°F			Enter EOP-4 Attempt to close stuck open electromatic per SOP-9 (4-2.1) Operate torus cooling (4-2.2)	
Torus temp = 110°F			Prevent ADS (3-5.4.1) Initiate Liquid Poison (3-5.4.2) Verify RWCU isolation (3-5.4.3) Bypass low level MSIV isolation (3-5.4.4, 3.2.1) Lower RPV water level (3-3.2.2)	
When Liquid Poison initiated	Malfunction #LP01 (trip of both Liquid Poison pumps)		Inject boron with a hydro pump per SOP-35 (3-5.4.2)	
163 lbs. of boron injected			Restore/maintain RPV water level 53-95 in. (3-3.6)	
291.5 lbs. boron injected			Depressurize <100°F/hr (3-4.3) Initiate SDC (3-4.4)	

NMP-1 EOP VALIDATION

SCENARIO B6

DESCRIPTION: Duplicate of Scenario B2. Reactor power increases when RPV water level is restored.

PROCEDURES EXERCISED: EOP-3 (3.6 override)

INITIAL PLANT CONDITIONS:

Simulator Mode: **Mode Switch:**

Reactor Power: **RPV Pressure:**

Feedwater Lineup:

Malfunctions:

Equipment OOS:

REMARKS: Initialize at snapshot of B2.

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize at snapshot of B2 Inform operator 163 lbs. of boron have been injected		Restore/maintain RPV water level 53-95 in. (3-3.6)	
When RPV water level is increasing	Inform operator that reactor power is increasing		Lower RPV water level (3-3.6 override, 3-3.2)	
	Terminate scenario			

NMP-1 EOP VALIDATION

SCENARIO C1

DESCRIPTION: RPV water level cannot be determined following a steam leak inside the primary containment. RPV flooding is required.

PROCEDURES EXERCISED:
EOP-2
EOP-4
EOP-7 (level can't be determined)

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14 **Mode Switch:** Run

Reactor Power: 100% **RPV Pressure:** Normal

Feedwater Lineup: Normal

Malfunctions: CT01A,B,C,D; CT02A,B,C,D

Equipment OOS: None

REMARKS:

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14 Malfunction #CT01 A,B,C,D (trip of all containment spray pumps) Malfunction #CT02 A,B,C,D (trip of all raw water pumps)			
T_o + 3 min.	Malfunction #EC01 (steam leakage inside primary containment)	DW temperature and pressure increase Reactor scram, containment isolation at 3.5 psig ECCS, DG auto start FW shifts to HPCI mode	Enter EOP-2, EOP-4 Verify auto actions (2-2.1) Maintain RPV pressure <1080 psig Maintain RPV water level 53-95 in.	
DW temp. >RPV sat. temp.			Enter EOP-7 (override) Depressurize: (7-3.1) Initiate EC (7-3.1.1) Open 3 electromatics (7-3.1.2)	
When operator opens electromatics	Close all but two electromatics. Inform operator the rest are inoperable.		Close steam valves (7-3.2)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
			Inject with listed systems until specified conditions are established (7-3.3, 3.4)	
When RPV is flooded	Inform operator that level instruments are operable		Terminate injection and reduce RPV water level (7-3.5) Monitor time (7-3.6)	
Level indication on scale			Restore/maintain RPV water level 53 - 95 in. (2-2.2) Initiate SDC (2-3.4) Exit EOPs	

NMP-1 EOP VALIDATION

SCENARIO C2

DESCRIPTION: Control rods do not insert following a scram caused by steam leakage in the drywell. RPV water level cannot be determined, requiring RPV flooding.

PROCEDURES EXERCISED:
EOP-3
EOP-4
EOP-7 (control rods withdrawn)

INITIAL PLANT CONDITIONS:

Simulator Mode: IC-14 **Mode Switch:** Run

Reactor Power: 100% **RPV Pressure:** Normal

Feedwater Lineup: Normal

Malfunctions: RP05

Equipment OOS: None

REMARKS:

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14 Malfunction #RP05 (complete failure to scram)			
T_o + 3 min.	Malfunction #EC01 (steam leakage to DW) - low	DW pressure and temperature increase		
DW pressure = 3.5 psig		Scram signal Control rods do not insert Auto isolations ECCS, DG start FW shifts to HPCI mode	Enter EOP-4 Enter EOP-3 Manual scram (3-1) Place mode switch in shutdown (3-5.1) Trip recirc pumps (3-5.2) Execute SOP-34 (3-5.3) Maintain RPV pressure <1080 psig (3-4.2) Verify auto actions (3-3.1)	
Scram + 5 min.	Fail all RPV LIs		Enter EOP-7 (override) Depressurize: (7-2.1) Terminate injection (7-2.1.1) Initiate EC (7-2.1.2) Open 3 electromatics (7-2.1.3)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
RPV pressure <325 psig			Close steam valves (7-2.3) Inject with FW until one electromatic is open and RPV pressure > 325 psig (7-2.4, 2.5)	
When flooding conditions are established	Clear malfunction #RP05		Exit EOP-3 (override) Flood per EOP-7 steps 3.3 and 3.4 (7-2.6)	
	Terminate scenario Inform operator that remaining steps will be performed as a talk-through			
	Talkthrough the following steps of EOP-7: 2.2 With no electromatic open 2.4 If the conditions cannot be established 2.6 If RPV water level can be determined Override on page 2			

NMP-1 EOP VALIDATION

SCENARIO D1

DESCRIPTION: Loss of drywell coolers.

PROCEDURES EXERCISED: EOP-4 (Step 3)

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14	**Mode Switch:** Run
Reactor Power: 100%	**RPV Pressure:** Normal
Feedwater Lineup: Normal	
Malfunctions: None	
Equipment OOS: None	

REMARKS:

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14			
T_o + 3 min.	Malfunction #CW09 (loss of DW cooling)	DW temperature and pressure increase	Respond in accordance with OPs/SOPs	
DW temp = 150°F			Enter EOP-4 Monitor/control torus temperature, DW temperature, PC pressure, torus water level Vent DW as required (3-4.1)	
Before DW temp = 300°F			Trip recirc pumps (4-3.2.1) Trip DW coolers (4-3.2.2) Initiate containment spray (4-3.2.3)	

NMP-1 EOP VALIDATION

SCENARIO D2

DESCRIPTION: Low torus water level requires RPV depressurization. (Talkthrough)

PROCEDURES EXERCISED: EOP-4 (Step 5; low level)
EOP-8

INITIAL PLANT CONDITIONS:

Simulator Mode: IC.14	**Mode Switch:** Run
Reactor Power: 100%	**RPV Pressure:** Normal
Feedwater Lineup: Normal	
Malfunctions: None	
Equipment OOS: None	

REMARKS:

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14			
T_o + 3 min.	Inform operator torus low level alarm has actuated and torus water level is decreasing. Supply periodic reports of decreasing level.		Enter EOP-4 Initiate torus makeup (4-5.1)	
T_o + 10 min.	Inform operator that torus water level is 7 ft.		Scram the reactor (4-5.2.1.1) Depressurize: Initiate EC (8-1.1) Open 3 electromatics (8-1.2)	
When electromatics are opened	Inform operator that torus water level is 6 ft.		Close all electromatics (4-5.2.2) Depressurize with alternate systems (8-1.3)	

NMP-1 EOP VALIDATION

SCENARIO D3

DESCRIPTION: Small steam leak in the drywell

PROCEDURES EXERCISED: EOP-2
EOP-4 (steps 3, 4)

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14	**Mode Switch:** Run
Reactor Power: 100%	**RPV Pressure:** Normal
Feedwater Lineup: Normal	
Malfunctions: None	
Equipment OOS: None	

REMARKS:

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14			
T_o + 3 min.	Malfunction #EC01 (steam leakage inside PC) - ramp 0 - 100% over 10 min.	DW temp increases DW pressure increases	Respond in accordance with OPs	
DW temp = 150°F			Enter EOP-4 Operate DW coolers (4-3.1) Operate EVS (4-4.1)	
DW pressure = 3.5 psig		Reactor scram Auto isolations ECCS and DGs start Turbine trip FW shifts to HPCI mode	Re-enter EOP-4; continue to control DW temp and pressure Enter EOP-2 Verify auto actions (2-2.1) Restore/maintain RPV water level 53-95 in. (2-2.2) Maintain RPV pressure <1080 psig (2-3.2)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
DW temp = 212°F			Isolate EVS (4-4.1)	
	Instruct operator to place the plant in cold shutdown.		Depressurize @ <100°F/hr (2-3.3)	
Before RPV pressure = 365 psig			Prevent injection from CS (GI #4)	
Shutdown cooling interlocks clear			Initiate SDC (2-3.4) Exit EOPs	
DW pressure >15 psig			Trip recirc pumps (4-4.2) Trip DW cooling fans (4-4.2) Initiate containment spray (4-4.2)	

NMP-1 EOP VALIDATION

SCENARIO D4

DESCRIPTION: Steam leak in drywell. Containment spray and RPV depressurization required due to high DW temperature. (Talkthrough)

PROCEDURES EXERCISED: EOP-4 (Step 3)

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14 **Mode Switch:** Run

Reactor Power: 100% **RPV Pressure:** Normal

Feedwater Lineup: Normal

Malfunctions: None

Equipment OOS: None

REMARKS:

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14			
T_o + 3 min.	Malfunction EC01 100% (steam leak in drywell)	DW temp. and pressure increase		
DW pressure = 3.5 psig or DW temp. = 150°F		Reactor scram (at 3.5 psig) ECCS initiation (at 3.5 psig)	Enter EOP-4 Operate DW coolers (4-3.1) Operate EVS (4-4.1) Enter EOP-2 (at 3.5 psig)	
Scram + 3 min.	Freeze simulator. Inform operators that remaining steps will be conducted as a talkthrough.			
	Inform operator that DW temp. = 215°F		Terminate any EVS vent (4-4.1)	
	Inform operator that DW temp. is 250°F		Evaluate use of containment sprays (4-3.2)	
When asked	Inform operator that torus air temp. is 90°F, DW pressure is 5 psig, torus pressure is 5 psig.		Trip recirc pumps (4-3.2.1) Trip DW coolers (4-3.2.2) Initiate containment spray (4-3.2.3)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
After containment, spray is initiated	Inform operator that DW temp. is 305°F		Depressurize the RPV in accordance with EOP-8 (4-3.3)	
	Terminate scenario			

NMP-1 EOP VALIDATION

SCENARIO D5

DESCRIPTION: Steam leak in DW. Containment spray, RPV depressurization, and RPV flooding are required. EOP-6 is entered. (Talkthrough)

PROCEDURES EXERCISED:
EOP-4 (step 4)
EOP-6
EOP-7 (step 4)

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14 **Mode Switch:** Run

Reactor Power: 100% **RPV Pressure:** Normal

Feedwater Lineup: Normal

Malfunctions: CT01; CT01A,B,C,D; CT02A,B,C,D

Equipment OOS: None

REMARKS:

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14 Malfunctions #CT01 A,B,C,D (trip of all containment spray pumps) Malfunction #CT02 A,B,C,D trip of all raw water pumps)			
T_o + 3 min.	Malfunction #EC01 (steam leak in DW) 0-100% over 3 min.	DW temp. and pressure increase	Vent through EVS	
DW pressure = 3.5 psig		Reactor scram ECCS initiation	Enter EOP-2, EOP-4	
Scram + 1 min.	Freeze simulator. Inform operators that remaining steps will be performed as a talkthrough.			
	Inform operator that torus pressure is 15 psig.		Evaluate use of containment spray (4-4.2)	
When asked	Inform operator that torus air temperature is [later], DW temp. is 240°F, and DW pressure is 15 psig.		Do not spray containment (4-4.2)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
	Inform operator that torus pressure is 30 psig. When asked, inform operator that torus water level is 10 ft.		Depressurize the RPV in accordance with N1-EOP-8 (4-4.3)	
	Inform operator that torus pressure is 35 psig.		Flood the RPV in accordance with N1-EOP-7 (4-4.4)	
	Talkthrough N1-EOP-7 in detail.			
	Inform operator that torus pressure is 38 psig. When asked, inform operator that torus water level is 10 ft.		Vent the torus (4-4.5)	
	Inform operator that the torus vent valve will not open.		Vent the DW (4-4.5)	
	Inform operator that the off-site release rate is [later].		Enter and execute EOP-6	
	Terminate scenario			

NMP-1 EOP VALIDATION

SCENARIO D6

DESCRIPTION: LOCA with high torus water level (Talkthrough)

PROCEDURES EXERCISED: EOP-4 (Step 5; high level)

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14	**Mode Switch:** Run
Reactor Power: 100%	**RPV Pressure:** Normal
Feedwater Lineup: Normal	
Malfunctions: None	
Equipment OOS: None	

REMARKS:

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14			
T_o + 3 min.	Malfunction #RR29 (recirc loop rupture)	RPV water level decreases DW temp. and pressure increase Reactor scram ECCS initiation	Enter EOP-2, EOP-4.	
	Freeze simulator. Inform operator that remaining steps will be conducted as a talkthrough.			
	Inform operator that DW water level is -5 in.		Terminate HPCI (4-5.3.2)	
When HPCI terminated	Inform operator that all CS pumps are tripped		Restart HPCI (4-5.3.2)	
	Inform operator that DW water level is 0 in.		Terminate HPCI (4-5.3.2)	

NMP-1 EOP VALIDATION

SCENARIO E1

DESCRIPTION: SDV rupture following reactor scram on low vacuum.

PROCEDURES EXERCISED: EOP-5
EOP-8

INITIAL PLANT CONDITIONS:

Simulator Mode: IC 14	**Mode Switch:** Run
Reactor Power: 100%	**RPV Pressure:** Normal
Feedwater Lineup: Normal	
Malfunctions: None	
Equipment OOS: None	

REMARKS:

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14			
T_o + 3 min.	Malfunction #MC01 (condenser air in-leakage	Condenser vacuum decreases	Respond in accordance with SOPs/OPs	
Condenser vacuum = 23 in.		Reactor scram Turbine trip		
When reactor scram occurs	Malfunction #RD41 (SDV rupture) Malfunction #RX01 100% (fuel cladding failure) Malfunction #RM03W (CRD) module ARM upscale)	SDV level decreases RB vent rad alarm ARM high alarm	Enter EOP-5	
Condenser vacuum = 7 in.		MSIV closure		
Scram + 10 min.	Take snapshot Malfunction #RM03BB (Containment spray HX ARM upscale)		Depressurize: (5-3.3) Initiate EC (8-1.1) Open 3 electromatics (8-1.2)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
When RPV is depressurized	Terminate scenario Return to snapshot Inform operator that remaining steps will be conducted as a talkthrough			

NMP-1 EOP VALIDATION

SCENARIO E2

DESCRIPTION: Primary containment leakage following steam line rupture.

PROCEDURES EXERCISED: EOP-5
EOP-8

INITIAL PLANT CONDITIONS:

Simulator Mode: IC.14	**Mode Switch:** Run
Reactor Power: 100%	**RPV Pressure:** Normal
Feedwater Lineup: Normal	
Malfunctions: DG01	
Equipment OOS: DG 102	

REMARKS:

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
T_o	Initialize IC 14 Malfunction #DG01 (DG 102 fails to start) Inform operator that maintenance is being performed on DG 102			
T_o + 3min.	Malfunction #MS04 (steam line rupture) Malfunction #ED01 (logs of both 115 KV lines) Malfunction #CT01 (containment spray pumps 121 and 122 trip)	DW pressure and temp increase RPV water level decreases Reactor scram Auto isolations ECCS initiation	Enter EOP-2 Verify auto actions (2-2.1) Restore/maintain RPV water level 53-95 in. (2-2.2) Maintain RPV pressure <1080 psig (2-3.2)	
T_o + 10 min.	Malfunction #PC03 (primary containment leakage)	Secondary containment radiation levels increase		
T_o + 12 min.	Malfunction #RM03 (ARM upscale)		Enter EOP-5 Attempt to isolate leak (5-3.1)	
T_o + 15 min	Malfunction #RM04 (ARM upscale)		Depressurize: (5-3.3) Initiate EC (8-1.1) Open 3 electromatics (8-1.2)	

TIME	INSTRUCTOR ACTION	PLANT RESPONSE	OPERATOR ACTION	NOTES
When RPV is depressurized	Terminate scenario			

APPENDIX C

SCENARIO CHECKLISTS

NMP-1 EOP SCENARIO CHECKLIST

1. Did the operators recognize the EOP entry conditions and select the appropriate procedures? Yes No

   Comments _____

   _____

   _____

   _____

   Discrepancy ID# _____

2. Did the operators perform all expected actions in the specified sequence? Yes No

   Comments _____

   _____

   _____

   _____

   Discrepancy ID# _____

3. Were the operators able to comply with all prescribed steps? Yes No

   Comments _____

   _____

   _____

   _____

   Discrepancy ID# _____

4. Were the prescribed actions effective in stabilizing plant conditions during the transient? Yes No

Comments _____

_____

_____

_____

Discrepancy ID# _____

5. Did the operators perform any inappropriate actions? Yes No

Comments _____

_____

_____

_____

Discrepancy ID#. _____

6. Did the operators appear to have difficulty understanding any step in the procedures? Yes No

Comments _____

_____

_____

_____

Discrepancy ID# _____

7. Did the operators appear to need additional guidance at any time during the transient? Yes No

Comments _____

_____

_____

_____

Discrepancy ID# _____

8. Were all necessary controls and instrumentation available to the operators? Yes No

Comments _____

_____

_____

_____

Discrepancy ID# _____

9. Did the operators refer to the SPDS to detect or verify an EOP entry condition? Yes No

Comments _____

_____

_____

_____

_____

10. How frequently did the operators consult the SPDS during the transient?

	First Half	Second Half
Very frequently	_____	_____
Fairly frequently	_____	_____
Infrequently	_____	_____
Never	_____	_____

Comments _____

_____

_____

_____

_____

11. Did the SPDS remain operable throughout the transient? Yes No

Comments _____

_____

_____

_____

_____

12. Were the operators able to use the SPDS hardware without difficulty? Yes No

Comments _____

_____

_____

_____

_____

13. Were the operators able to interpret the SPDS displays without difficulty? Yes No

Comments _____

_____

_____

_____

_____

14. Was the information provided by the SPDS always consistent with that displayed on the control panels? Yes No

Comments _____

_____

_____

_____

_____

15. What posture were the operators generally in while viewing the SPDS?

_____ Standing _____ Seated

Comments _____

_____

_____

_____

_____

16. Additional comments pertaining to the EOPs:

Comments _____

_____

_____

_____

_____

17. Additional comments pertaining to the SPDS:

Comments _____

_____

_____

_____

_____

COMMENT CONTINUATION SHEET

Comments (Continued) _____

COMMENT CONTINUATION SHEET

Comments (Continued) _____

COMMENT CONTINUATION SHEET

Comments (Continued) _____

APPENDIX D

OPERATOR QUESTIONNAIRES

NMP-1 EOP VALIDATION

OPERATOR QUESTIONNAIRE -- PART 1

INSTRUCTIONS

Please complete the attached questionnaire based upon your impressions during the scenario just performed. For each question, circle "yes" or "no," including any necessary explanations in the space provided. Use the attached Comment Continuation Sheets if you need more room. Please make your comments as specific as possible.

Name _____

Scenario _____

NMP-1 EOP VALIDATION OPERATOR QUESTIONNAIRE -- PART 1

1. Was any step in the EOPs difficult to understand? Yes No

   Comments _____

2. Were you able to perform the prescribed steps in the specified order? Yes No

   Comments _____

3. Was the flowpath through the procedures easy to follow? Yes No

   Comments _____

4. Did you need additional procedural guidance at any time during the transient? Yes No

Comments _____

_____

_____

_____

_____

5. Was the terminology used in the procedures consistent with that used on the control panels and in other procedures? Yes No

Comments _____

_____

_____

_____

_____

6. Was all required instrumentation available in the control room? Yes No

Comments _____

_____

_____

_____

_____

7. Was the available instrumentation of the appropriate range and accuracy? Yes No

Comments _____

_____

_____

_____

_____

8. Were all graphs and tables referenced by the procedures easy to read and interpret? Yes No

Comments _____

_____

_____

_____

_____

9. Did the procedures ever mislead you, specify inappropriate actions, or provide you with incorrect information? Yes No

Comments _____

_____

_____

_____

_____

10. Other comments:

COMMENT CONTINUATION SHEET

Comments (Continued) _____

COMMENT CONTINUATION SHEET

Comments (Continued) _____

COMMENT CONTINUATION SHEET

Comments (Continued) _____

NMP-1 EOP VALIDATION

OPERATOR QUESTIONNAIRE --- PART 2

INSTRUCTIONS

Please complete the attached questionnaire based upon your overall impressions of the new EOPs and the SPDS displays. For each question, select the answer that most closely matches your opinion, then use the space provided to list any additional comments you have. Use the attached Comment Continuation Sheets if you need more room. Please be as specific as possible.

Name _____

NMP-1 EOP VALIDATION OPERATOR QUESTIONNAIRE — PART 2

1. What is your general opinion of the format used in the EOPs?

   _____ Very effective and easy to use.

   _____ Generally acceptable and usable.

   _____ Marginally acceptable; somewhat difficult to use.

   _____ Poor; very difficult to use.

   Specific comments:

2. Was it easy to decide which procedures to follow in each scenario?

   _____ Always, with no difficulty.

   _____ Yes, but with occasional difficulty.

   _____ Yes, but with considerable difficulty.

   _____ Very seldom or never.

   Specific comments:

3. In general, how would you rate the usability of the new EOPs?

_____ The procedures are very easy to use and understand.

_____ The procedures are generally usable and understandable.

_____ The procedures are somewhat difficult to use and understand.

_____ The procedures are very difficult to use and understand.

If you experienced difficulty using or understanding the new EOPs, what changes would you recommend to improve them?

4. What is your opinion of the overall appearance of the SPDS displays?

_____ I like the way the displays look.

_____ I like most things about the displays, but there are a few things I don't like.

_____ There are some things I like about the displays, but many things I don't like.

_____ I don't like the appearance of the displays at all.

Specific comments:

5. What is your opinion of the amount of information presented on the SPDS displays?

_____ Not enough information.

_____ About right.

_____ Too much information.

Please list any specific information you would like to see added or removed:

6. What is your opinion of the way information on the SPDS displays is organized?

_____ Information on the displays is logically grouped and organized.

_____ Information on the displays is generally well organized, but some things could be improved.

_____ There is some logic to the organization of information on the displays, but many things could be improved.

_____ There is no logic to the organization of information on the displays.

Specific comments:

7. Is the information on the SPDS displays easy to understand?

_____ All information is easy to understand.

_____ Most information is easy to understand.

_____ Some information is easy to understand, but some is difficult to understand.

_____ Most information is difficult to understand.

Please list any specific information which you found confusing or difficult to understand:

8. Could any information on the SPDS displays be presented in a form which is more directly applicable to plant operation?

_____ Yes _____ No

Please list any specific information you would like changed:

9. Is the terminology used on the SPDS displays consistent with that used on the control panels and in the EOPs?

_____ All terminology is consistent.

_____ Most terminology is consistent, but some is not.

_____ Some terminology is consistent, but most is not.

_____ All terminology is inconsistent.

Specific comments:

10. Is the SPDS conveniently located?

_____ Yes _____ No

Please list any alternate locations you would prefer:

11. Are words, letters, numbers, and symbols on the SPDS displays easy to read?

_____ All are easy to read.

_____ Most are easy to read.

_____ Many are difficult to read.

_____ Most or all are difficult to read.

Specific comments:

12. Was the SPDS hardware?

_____ Very easy to operate.

_____ Fairly easy to operate.

_____ Somewhat difficult to operate.

_____ Very difficult to operate.

Specific comments:

13. How would you rate the SPDS as an aid in the detection of EOP entry conditions?

_____ Extremely useful.

_____ Of some value.

_____ Of little value.

_____ Detrimental.

Specific comments:

14. How would you rate the overall usefulness of the displays during the execution of the EOPs?

_____ Extremely useful.

_____ Of some value.

_____ Of little value.

_____ Detrimental.

Specific comments:

15. Did the SPDS displays ever mislead you or provide you with incorrect information?

_____ Yes _____ No

Specific comments:

16. Are there any display features that you particularly liked? (Please list in the space below.)

17. Is there anything you would specifically like to see changed on the displays? (Please list in the space below.)

18. Which statement below best describes your opinion of the requirement that an SPDS be installed in the control room?

_____ An SPDS is definitely needed if the plant is to be operated safely.

_____ An SPDS is a good idea, but is not needed for safe operation of the plant.

_____ An SPDS is not a good idea, but will not interfere with safe operation of the plant.

_____ An SPDS will be a detriment to safe operation of the plant.

Specific comments:

19. Other comments:

COMMENT CONTINUATION SHEET

Comments (Continued) _____

COMMENT CONTINUATION SHEET

Comments (Continued) _____

COMMENT CONTINUATION SHEET

Comments (Continued) _____

APPENDIX E

DISCREPANCY RESOLUTION REPORTS

DISCREPANCY RESOLUTION REPORT INSTRUCTIONS

1. List the following information at the top of the form:

   (a) The discrepancy identification number.

   (b) The number of the scenario in which the discrepancy was noted. (Enter "NA" if the discrepancy was generated from Part 2 of the Operator Questionnaire.)

   (c) The source of the discrepancy, i.e. "Scenario Outline," "Scenario Checklist," or "Operator Questionnaire.

   (d) The number and revision of the EOP evaluated.

   (e) Procedure step numbers for which the discrepancy was noted. (For non-numbered steps, list the applicable page number and specify where on the page the step is located.)

2. Number the sheet in the bottom right corner.

3. In the space allotted, provide a complete description of the discrepancy. If additional space is needed, continue the description on a second sheet.

4. When analysis of the discrepancy has been completed, document the corrective action to be taken in the space provided. If no corrective action is necessary, provide appropriate justification.

5. When implementation of the corrective action is complete, sign and date the form in the space allotted. (Enter "NA" if no corrective action is necessary.)

DISCREPANCY RESOLUTION REPORT

DISCREPANCY ID # _____ SCENARIO # _____

SOURCE _____

EOP NUMBER _____ REVISION _____

STEPS _____

DESCRIPTION:

CORRECTIVE ACTION:

IMPLEMENTED BY: _____ DATE: _____