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TERRY,C.D. Niagara Mohawk Power Corp. 566 RPP
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SUBJECT: Forwards addl info re simulator certification for facility, per 890803 request.

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R I D S / A D D S

NIAGARA MOHAWK

NIAGARA MOHAWK POWER CORPORATION/301 PLAINFIELD ROAD, SYRACUSE, N.Y. 13212/TELEPHONE (315) 474-1511

September 29, 1989
NMP1L 0440

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Re: Nine Mile Point Unit 1
Docket No. 50-220
DPR-63

Gentlemen:

This letter is in reply to your letter dated August 3, 1989 regarding Simulator Certification for Nine Mile Point Unit 1. Enclosure A includes answers to your questions and additional documents that you requested. On September 6, 1989, Ms. M.M. Slosson of your staff verbally granted a schedule extension until September 30, 1989.

Very truly yours,

NIAGARA MOHAWK POWER CORPORATION

C. D. Terry
Vice President
Nuclear Engineering and Licensing

MS/mjd
7830G

xc: Regional Administrator, Region I
Mr. R. A. Capra, Director
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ENCLOSURE A

Simulator Certification - Unit 1
Response to Questions
September 1989

8910060064

NIAGARA MOHAWK POWER CORPORATION
Nine Mile Point Unit 1
Docket No. 50-220
DPR-63

NIAGARA MOHAWK POWER CORPORATION
RESPONSE TO NRC QUESTIONS ON UNIT 1
SIMULATOR CERTIFICATION

Question 1:

On Form 474 you indicate that "Simulation Facility Performance Test Abstracts (are) attached." However, Attachment 1, "Performance Testing", is only a list of tests performed. Please provide the abstracts for these tests. These abstracts should include the following:

1. Date test was conducted.

2. Name and description of test (including relationship to Section 3.1.2, "Plant Malfunctions", of the Standard, if applicable).

3. Available options (e.g., range of rates or severity of which the simulation facility is capable).

4. Tested options (i.e., what was actually tested for certification).

5. Initial conditions (for each tested option).

6. Final conditions (for each tested option).

7. Descriptions of baseline data used to determine fidelity to the reference plant.

8. Deficiencies found as a result of the test, corrective action planned and dates by which corrections will be made.

9. Exceptions taken to ANSI/ANS-3.5-1985 as a result of the test, with justification.

If the baseline data used was the judgment of a panel of experts, then documentation of their review, sufficient for a third party to evaluate the adequacy of the test(s) and results, should be included. This documentation may include such items as the make-up and qualifications of the panel and any differing professional opinions as to the outcome of the test(s).

Response 1:

Enclosed are copies of the ANSI/ANS 3.5 Annual Reports for 1986 (initial), 1987 and 1988. The baseline data did not involve the judgement of a panel of experts. Also enclosed is the 1989 ANSI/ANS 3.5 Test Procedures (Test Methodology and Performance Tests). The detailed response is as follows:

1.1 Factory acceptance test - March 1984 to May 1984.
On-site final acceptance test - August 1984 to September 1984.
Initial ANSI 3.5 1986 test - March 1986.
ANSI 3.5 1987 test - May 1987.
ANSI 3.5 1988 test - May 1988.

[illegible]

[illegible]

[illegible]

[illegible]

1.2 Tests are described in the following sections:

ANSI 3.5 1986, 1987, and 1988 Annual Reports, Section III.
ANSI 3.5 1986 Attachment 3 (lists the malfunction names).

1.3 The available options/malfunctions are listed in ANSI 3.5 1986 Annual Report, Attachment 3. Each malfunction has a specific cause and effect (refer to sample malfunction cause and effect ED09 enclosed). A complete copy of the malfunction cause and effect book will be supplied upon request.

1.4 Tested options are described in the ANSI 3.5 1986 Annual Report. All options/malfunctions (listed in Attachment 3) and other tests (listed in Section III) were tested for certification.

1.5 Each tested option/malfunction has a specific test procedure similar to the test procedure for malfunction ED09 enclosed. The complete malfunction test procedures occupies three books (two inch binders) which are available for your review on-site.

1.6 This response is the same as 1.5.

1.7 The baseline data was the simulator design data base which contained the following:

a. Reference plant controlled drawings (PID, Electrical, etc.).

b. Reference plant FSAR.

c. Selected GEK's.

d. Reference plant panel photographs.

e. Referent plant BOP logs.

f. Reference plant P-1 edits and other OD printouts.

g. Reference plant Operating Procedures.

1.8 All deficiencies identified during the applicable tests were recorded and corrected. No Discrepancy Reports remain open from the original 474 submittal test procedures.

1.9 Exceptions are described in the following sections:

a. ANSI 3.5 1986 Annual Report, Section I.B.

b. ANSI 3.5 1987 Annual Report, Section I.B.

c. ANSI 3.5 1988 Annual Report, Section I.B.

(7830G)

Question 2:

You have also indicated on Form 474 that a Simulation Facility Performance Testing Schedule (is) attached. However, Attachment 2, "Malfunction Testing", appears to be only a list of 4-character malfunction designators, which are intended to indicate which malfunctions will be tested in each year. Please provide a schedule which more fully describes these tests.

Response 2:

ANSI/ANS 3.5 1986 Annual Report, Attachment 3, provides a word description for each malfunction. They are tested using the original factory acceptance test and the malfunction cause and effect for that malfunction. A sample copy of malfunction ED09 (AC Power Board Electrical Fault - PB13, Section A) factory acceptance test and malfunction cause and effect is enclosed. Additional malfunction test procedures will be supplied upon request. All malfunctions have been tested during the past four year period. Malfunction CU05 was missed in 1987 and subsequently tested in 1989.

Question 3:

In Attachment 1, Item III indicates that an initial ANSI 3.5 test report was prepared. It would be helpful if you could provide this report as it may provide some of the information requested in Item 1 of this enclosure.

Response 3:

Enclosed please find the ANSI 3.5 Annual Reports for 1986 (initial), 1987, and 1988. Included, also, is the 1989 ANSI 3.5 Test Procedures.

Question 4:

Items III.3 and III.4 of Attachment 1 state that simulator performance was compared against the FSAR. ANSI/ANS-3.5-1985 states in Appendix A, Section A.3.3(2) that FSAR transients may be inappropriate for real-time dynamic simulation comparisons. Please provide justification for making such comparisons.

Response 4:

The use of Nine Mile Point Unit 1 FSAR for transient response was the only transient data available to the testers, during initial construction. This issue was recognized by Niagara Mohawk in January 1989. The 1989 ANSI transient test results are being compared to General Electric transient data NEDO24708A Rev. 1 (December 1980). The 1989 ANSI Test Report will include the results of this analysis. Preliminary results indicate that the simulator response complies with ANSI 3.5 requirements.

Question 5:

ANSI/ANS 3.5-1985, Section 5.4.1, "Simulator Performance Testing", requires testing within the requirements of Section 4 (Performance Criteria). One of the criteria in Section 4 is that "administrative controls or other means shall be provided to alert the instructor when certain parameters approach values indicative of events beyond the implemented model or known plant behavior." It appears that no testing was performed to ensure that this criterion was met. Performance test abstracts for such testing, or justification for exception to this requirement, should be provided.

Response 5:

Review of the Factory acceptance, on-site final acceptance, and annual ANSI 3.5 testing shows no evidence of such testing. The simulator does have a light indication to warn the instructor when the operating limits are exceeded in accordance with ANSI/ANS 3.5 Section 4.3. A special test procedure is being written, will be conducted, and the resulting data included with the 1989 ANSI 3.5 test data, which is presently scheduled for December 1989.

UNIT 1 SIMULATOR

1989 ANSI/ANS 3.5 TEST PROCEDURES

Submitted	Gary E. Corbin Supervisor Simulator Technology	8/24/89 Date
Reviewed	R. T. Seifried Assistant Superintendent Training	8/29/89 Date
Approved	A. D. Rivers Superintendent Training - Nuclear	8/29/89 Date

UNIT - 1 SIMULATOR ANSI 3.5 TEST METHODOLOGY

I. Assemble Test Package Sections:

   A. Computer Real Time Test

   B. Appendix "B" Steady State Tests:

      1. 25% Steady State
      2. 50% Steady State
      3. 75% Steady State
      4. 100% Steady State
      5. 100% Steady State 60 minute run

      NOTE: The following data is required for each test run (critical data)

         a. Neutron flux
         b. Core thermal power
         c. Individual Recirculation loop flows
         d. Total core flow
         e. Reactor dome pressure
         f. Reactor water level (narrow range)
         g. Total steam flow
         h. Total feedwater flow
         i. Feedwater temperature (after last stage of feedwater heaters)
         j. Control Rod Drive System
            1) flow
            2) temperature
         k. Reactor Water Cleanup System
            1) inlet flow
            2) return flow
            3) return temperature
         l. Main Generator gross electrical watts
         m. Drywell
            1) temperature
            2) pressure

n. Secondary plant heat balance data

NOTE: Performance Criteria -

a. Simulator instrument error shall be NO greater than that of the related instrument in the Reference plant

b. Principal mass and energy balances shall be satisfied:

1) Net NSSS thermal power to generated electrical power

2) Feedwater flow to reactor thermal power

c. Simulator computed values for steady state, full power reference plant configuration operation, shall be stable and not vary more than ± 2% of the initial values over a 60 minute period

d. Simulator computed values of critical parameters shall agree within ± 2% of the reference plant parameter at the specified power level

C. Appendix "B" Transient tests:
(Section B1.2.1)

1. Manual scram
2. Simultaneous trip of all feedwater pumps
3. Simultaneous closure of all Main Steam Isolation Valves
4. Main turbine trip (from max power WITHOUT immediate Rx. Scram)
5. Maximum rate power ramp (100% - 75% - 100%)

NOTE: Recric Flow Control in Master Manual

Test parameters recorded vs. time with a resolution ≤ 0.5 seconds

a. Reactor power (% neutron flux)
b. Total steam flow
c. Total feedwater flow
d. Wide range reactor pressure
e. Narrow range reactor pressure
f. Wide range reactor water level
g. Narrow range reactor water level (feedwater control)
h. Generator gross electrical power
i. Turbine steam flow
j. Total core flow (total recirc flow)

6. Simultaneous trip of all recirculation pumps
7. Single recirculation pump trip

   Test parameters recorded vs. time with a resolution ≤ 0.5 seconds
   a. Reactor power (% neutron flux)
   b. Total steam flow
   c. Total feedwater flow
   d. Narrow range reactor pressure
   e. Narrow range reactor water level (feedwater control)
   f. Total core flow (no accurate indication with less than 5 loops)
   g. Individual recirculation loop flows
8. Maximum size reactor coolant system rupture combined with loss of all offsite power
9. Maximum size unisolable main steam line rupture
10. Simultaneous closure of all Main Steam Isolation Valves combined with single stuck open safety/relief valve

   Test parameters recorded vs. time with a resolution ≤ 0.5 seconds
   a. Reactor power (% neutron flux)
   b. Wide range pressure
   c. Wide range water level
   d. Fuel zone water level
   e. Total steam flow
   f. total feedwater flow/high pressure coolant injection flow
   g. Torus water temperature
   h. Torus air temperature
   i. Torus pressure
   j. Drywell temperature
   k. Drywell pressure
   l. Total low pressure core spray flow

NOTE: Transient test Performance Criteria:

1) Be the same as reference plant startup test criteria where applicable.

2) The observable change in the monitored parameters correspond in direction to those expected from a best estimate analysis for the simulated transient and do not violate the physical laws of nature. Reference Document NEDO24708A Rev. 1 8/79 for transient data.

3) Not fail to cause an alarm or automatic action if the reference plant would have and not cause an alarm or automatic action if the reference plant would not have.

D. Malfunction Tests

(meets requirements of ANSI A3.5 and Regulatory Guide 1.149)

1. AD04 Relief Valve Leaks
2. CS01 Core Spray Pump Trip
3. CT02 Containment Spray RAW Water Pump Trip
4. CU03 RWCU Reject FCV Fails Open
5. CU07 RWCU Low Pressure Control Valve Fails Open
6. CU11 Coolant Leak Outside Primary Containment
7. CW04 RBCLC Pump Trip
8. CW08 Circulating Water Intake Structure Icing
9. DG02 Diesel Generator Trip
10. EC04 Emergency Cooling System Return Valve Fails Open
11. ED01 Loss of Offsite 115KV Power
12. ED05 PB12 Electrical Fault
13. ED09 PB13 Section "A" Electrical Fault
14. ED13 PB14 Section "B" Electrical Fault
15. ED17 PB15 Section "C" Electrical Fault
16. ED21 PB17 Section "B" Electrical Fault
17. ED25 Loss of Power to Instrument Control Bus 130 Normal and Alt
18. EG04 Main Generator Core Internal Heating
19. EG08 Generator Hydrogen Emergency Seal Oil Pump Failure
20. EG12 Power Grid Network Load Transient - Decrease
21. FP02 Electric Fire Pump Failure
22. FP06 Control Room Fire Detection - Various Panels
23. FP10 Reactor Building Fire Detection
24. FW04 Shaft Driven Feedwater Pump 13 Failure
25. FW08 Feedwater Control Valve 11 Controller Fails - Low
26. FW12 Feedwater Control Valve 13 Controller Fails - Low

D. Malfunction Tests (Cont'd)

27. FW16 Feedwater Master Controller Fails as is
28. FW20 Condensate Recirc Valve (FCV 50-24) Fails Closed
29. FW24 Feedwater Control Valve Fails Closed (13A/13B)
30. FW28 HPCI Mode Failure to Initiate
31. IA01 Loss of Instrument Air
32. MC03 Hotwell Level Controllers in Auto Fail - High
33. MS01 Steam Line Rupture Outside Primary Containment
34. MS05 Turbine Steam Seal Regulator Fails Closed
35. MS09 Second State Reheater 112 Drain Tk Level Control Fail Low
36. NM02 SRM Channel Failure - Downscale
37. NM10 IRM Channel Failure - Upscale
38. NM18 IRM Channel Detector Stuck
39. NM25 LPRM Failure - Upscale
40. NM36 Recirc Flow Converter Channel Failure - Upscale
41. NM40 Recirc Flow Converter Failure - Comparator
42. OG04 Off Gas Discharge to Stack Isolation Valve Fails Closed
43. PP01 Failure of Plant Process Computer
44. RD04 Control Rod Failure - Stuck
45. RD08 Control Rod Failure - RPIS
46. RD36 CRD Flow Control Valve Failure - Closed
47. RD40 Reactor Manual Control System Timer Malfunction - Settle
48. RM03 Area Radiation Monitor Drawer Upscale
49. RP04 Reactor Protection System Failure to Scram - Automatic
50. RP08 Anticipated Transient Without Scram (ATWS)
51. RR04 Recirculation Pump 11 Control Signal Failure
52. RR08 Recirculation Pump 12 Seizure
53. RR12 Recirc Pump 13 Field Breaker Trip
54. RR15 Recirc pump 14 Drive Breaker Trip
55. RR20 Recirc Pump 14 Incomplete Start Sequence
56. RR24 Recirc Pump 15 Control Signal Failure
57. RR27 Master Recirc Flow Controller Failure - Low
58. RR31 Reactor Vessel Pressure Recorder Failure - Low
59. RR35 Reactor Vessel Pressure Indicator Failure - Upscale
60. RR39 Reactor Vessel Level Recorder Failure - Downscale

61. RR43 Rx Vessel Level Indication (Control Sys) Fail - as is
62. RR47 Recirc Pump Discharge Valve Stem Separates From Gate
63. RR51 Rx Vessel Level Transmitter (RPS Input) Fails - High
64. RR55 Rx Vessel Level Transmitter (Control Input) Fails - Low
65. RR59 Rx Vessel Pressure Transmitter (RPS Input) Fails as is
66. RR63 Reactor Recirc Pump 12 Inner Seal Failure
67. RR67 Reactor Recirc Pump 15 Tachometer Fails - Oscillates
68. RR71 Reactor Safety Valve Inadvertently Opens
69. RX02 Increased Rod Worth
70. TC02 Turbine Governor Fails - High
71. TC06 Electrical Pressure Regulator Fails - Oscillates
72. TC10 First Bypass Valve Sticks Open
73. TU01 Exhaust Hood Spray Valve Fails Closed
74. TU05 Main Turbine Bearing High Temperature

NOTE: Performance Criteria -

a. Be the same as reference plant startup test criteria where applicable
b. The observable change in the monitored parameters correspond in direction to those expected from a best estimate analysis for the simulated transient and do not violate the physical laws of nature.
c. Not fail to cause an alarm or automatic action if the reference plant would have and not cause an alarm or automatic action if the reference plant would not have.
d. Respond in accordance with the malfunction cause and effect

E. Appendix "A" Section A3.2 Steady State and Normal Operations

NOTE: Using controlled operating procedures conduct all evolutions listed in ANSI 3.5 Section 3.1.1.

1. Plant start-up to Hot Standby, Operation at Hot Standby, and Start-up from Hot Standby to Rated Power including Turbine and Generator Start-up and Load Changes [meets requirements of Section 3.1.1 (1), (2), (3), (5) and (6)]
   a. Master Start-up Checkoff Form III
   b. Master Systems Pre-Start-up Checkoff List Form IV
   c. Plant Start-up N1-OP-43 Sections "E" and "H.2.1"

2. Plant Shutdown to Hot Standby, and cooldown to Cold Shutdown Conditions (meets requirements of Section 3.1.1 (8)
   a. Plant Shutdown N1-OP-43, Section "G"
   b. Reactor Hot Standby N1-OP-43, Section "H.2.2.2"
3. Reactor trip followed by three (3) Recirc Loop Reactor startup to 90% power, Start-up of idle Recirc Loops, continuation to Rated Power, Shutdown of Recirc Pump at power, and Shutdown and Cooldown to Cold Shutdown Condition (meets requirements of 3.1.1 (4), and (7)
   a. Special Operating Procedure No. 1 "Reactor Scram"
   b. Short Pre-Start-up Check-Off-Systems Form I
   c. Plant Start-up N1-OP-43, Section "E"
   d. Plant Shutdown N1-OP-43, Section "G"
   e. Nuclear Steam Supply System N1-OP-1, Section "H.1, H.2 and H.3"
4. Surveillance test procedures (using Control Room installed instrumentation) [meets requirements of Section 3.1.1 (9) and (10)]. As designated by the Simulator Configuration Control Board"

F. Appendix "A" Section A3.3 Transients
   1. LER's with reference plant data, as selected by the Simulator Configuration Control Board

NIAGARA MOHAWK SIMULATION FACILITY

PERFORMANCE TEST

Simulation facility: NINE MILE POINT UNIT - 1
Reference Plant: NINE MILE POINT UNIT - 1
Performance Test: ANSI 3.5 Appendix "A" Section A3.2 Steady State and Normal Operation Test

I. Initial conditions: As specified in each individual test section

II. Data Collection:

A. Method:

1. Data for the 100% steady state 60 minute run will be gathered on the critical parameters using a Simulator program called "ANSI SS60"
   a. Data is gathered at 30 second intervals, and collected for the 60 minute period
   b. Data is then down loaded to a Personal Computer (PC) and graphed for evaluation
2. Data for the Normal operating and 25%, 50%, 75% 100% steady state operation tests will be gathered on the critical parameters using the Process Plant Computer (PPC) on demand BOP log, P-1 and OD-3 edits and procedure checkoff forms as specified.

B. Critical Parameters:

	Critical Parameters	Computer Point
1.	Neutron Flux (%)	H441
2.	Core Thermal Power	C875
3.	Total Core Flow (Total Recirc Flow)	A445
4.	Reactor Dome Pressure	D372
5.	Reactor Water Level (Narrow Range)	D377
6.	Total Steam Flow	D376
7.	Total Feedwater Flow	A391
8.	Feedwater temperature (after last stage of feedwater heaters)	A390
9.	Control Rod Drive System	
	a. Flow	C328
	b. Temperature	D417

10. Reactor Water Cleanup System
    a. Inlet Flow F361
    b. Return Flow
    c. Return Temperature F360
11. Main Generator Gross Electrical Watts F414
12. Drywell
    a. Temperature D322
    b. Pressure D320
13. Secondary Plant Heat Balance Data (OD-3 and BOP Log)

C. Supplemental Data:
   1. None

III. Prerequisites

A. All participants read applicable test sections and fill out section VIII.a (performed by)

IV. Procedure: (individual test sections)

A. <u>Plant start-up to Hot Standby, Operation at Hot Standby, and Start-up from Hot Standby to Rate Power including Turbine and Generator Start-up and Load Changes</u>

Using controlled procedures attached perform the following and initial procedures where applicable

1. Initial conditions - Cold Shutdown with normal reference plant equipment lineup
2. Complete Master Start-up Checkoff Form III
3. Complete Master Systems per-start-up Checkoff List Form IV
4. Perform a Plant Start-up to Hot Standby and maintain Hot Standby conditions in accordance with (IAW) N1-OP-43 Sections "E" and "H.2.1"
5. Continue Start-up to rated power IAW N1-OP-43, Section "E"
   a. Hold power steady at 25%, 50%, 75% and 100%; gather critical data IAW Section II.A.2

   NOTE: Verify AGAF's within technical specification limits

6. Test Section Acceptance

   a. The simulator plant start-up accomplished IAW reference plant controlled operating procedures, any procedure exceptions documented IAW NTI-4.5.3

   ______/____ Satisfactory ______/____ Unsatisfactory
   Initial/Date   Initial/Date

   b. The simulator steady state parameters meet performance criteria of Section V.A, V.B, and V.C

   ______/____ Satisfactory ______/____ Unsatisfactory
   Initial/Date   Initial/Date

B. <u>Plant Shutdown to Hot Standby, and Cooldown to Cold S/D Conditions</u>

Using controlled procedures attached perform the following and initial procedures where applicable.

1. Initial conditions - rated power steady state with normal reference plant equipment lineup
2. Perform a plant shutdown to Hot Standby IAW N1-OP-43, Section "G" and "H.2.2.2"
3. Continue plant cooldown to cold shutdown IAW N1-OP-43, Section "G"
4. Test section acceptance

   a. The simulator plant shutdown accomplished in accordance with (IAW) reference plant controlled operating procedures, any procedures exceptions documented IAW NTI-4.5.3.

   ______/____ Satisfactory ______/____ Unsatisfactory
   Initial/Date   Initial/Date

C. <u>Reactor trip followed by recover to rated power; Startup, Shutdown and power operation with less than full reactor coolant flow -</u>

Using controlled procedures attached perform the following and initial procedures where applicable

1. Initial conditions - Rated power steady state with normal reference plant equipment lineup
2. Manually scram the Reactor and perform Special Operating Procedure No. 1 "Reactor Scram"
3. Perform Short Pre-Start-up Check-Off-Systems Form I
4. Shutdown Recirc Pumps 12 and 14 IAW N1-OP-1, leaving 3 recirc loops in operation for Reactor startup
5. Perform a Reactor start-up to maximum attainable with 3 loop configuration IAW N1-OP-43, Section "E"
6. Startup idle Recirc Loops IAW N1-OP-1, Section "H.1.0"
7. Continue power ascension to rated
9. Reduce power to the maximum attainable in 3 loop configuration (Step IV.C.5) and shutdown recirc Pumps 11 and 15 IAW N1-OP-1, Section "H.2.0"
11. Perform a Reactor shutdown to all control rods inserted to position 00 IAW N1-OP-43, Section "G"
12. Test section acceptance
    a. All manipulations in test Section "III.C" accomplished in accordance with (IAW) reference plant controlled operating procedures, any procedure exceptions documented IAW NTI-4.5.3

______/______ Satisfactory ______/______ Unsatisfactory

Initial/Date Initial/Date

D. <u>100% steady state 60 minute run performance test</u>

1. Initial conditions: Full power steady state, Equilibrium Xenon at 100% $\pm$ 1%, Middle of cycle, with normal reference plant equipment lineup

NOTE: Use fast time X_e and snap shot a test IC if necessary to establish initial conditions

2. Reset to test condition IC, DO NOT TAKE OUT OF FREEZE
3. Activate data gathering program ANSI DATA COLLECTION option - 4
4. Un-freeze the Simulator and allow it to run
5. At problem time 61:00 minutes freeze the simulator
6. Download the collected data to a PC and graph the information
7. Evaluate the critical parameter graphs or raw data for acceptance in accordance with performance criteria section V.D.

______/______ Satisfactory ______/______ Unsatisfactory
Initial/Date Initial/Date

E. Surveillance Tests -

Using controlled procedures attached perform the following listed surveillance tests. Initial and sign test procedures where applicable.

NOTE: Use only installed Control Room indications

1. N1-ST-C2, Manual Opening of Solenoid Actuated Pressure Relief Valves and Flow Verification
2. N1-ST-C1, Auto Startup of High Press Cool Injec Sys
3. N1-ST-C5, Secondary Containment and Reactor Building Emergency Ventilation System Operability
4. N1-ST-C7, Automatic Securing and Isolation of the Mechanical Vacuum Pumps
5. N1-ST-C8, Automatic Initiation of Off-Gas Isolation Valve
6. N1-ST-C14, Alternate Control Rod Insertion/Back-up Scram Valve/Scram
7. N1-ST-D0, Daily Checks
8. N1-ST-IC1, Liq POI Pump Inoper Comp Oper Test
9. N1-ST-IC2, Emer Cool Surv With an Inoper Sys Test
10. N1-ST-IC3, Core Spr Redundant Comp or Sys Oper Test
11. N1-ST-IC4, Control Rod Dr Pump Surv W/Inoper Comp Test
12. N1-ST-IC5, High Pressure Coolant Injection Surveillance with Inoperable Component Test
13. N1-ST-IC7, Emer Vent Sys Surv with an Inoper Branch
14. N1-ST-IC9, Emer Diesel Gen Inoper Comp Oper Test

15. N1-ST-M1, Liquid Poision System Pump & Valve Operability Test
16. N1-ST-M2, Emers Cool Sys Makeup Tanks Lvl Control Vlvs Exer
17. N1-ST-M3, Supp Pool Drywell Relief Vlvs Exer
18. N1-ST-M4, Emergency Diesel Generators Manual Start & 1 Hr Rated Load Test Power Board 102 & 103 Undervoltage Relay Test
19. N1-ST-M6, Core Spray Keep Fill System
20. N1-ST-M8, Emer Vent Sys Oper Test
21. N1-ST-M10, Scram Discharge Volume Vent & Drain Valve Position Verification
22. N1-ST-Q1, Core Spray Pumps Valves Operability Test
23. N1-ST-Q2, Control Rod Drive Pumps Flow Rate Test
24. N1-ST-Q3, High Press Cool Injec Pump and Valve Oper Test
25. N1-ST-Q4, Reactor Coolant System Isolation Valves Operability Test
26. N1-ST-Q5, Primary Cont Iso Vlvs Exercising
27. N1-ST-Q6, Containment Spray System Quarterly Operability Test
28. N1-ST-Q7, Manual Scram Instrument Channel Test
29. N1-ST-Q8, Liquid Poison Pump and Check Valve Operability Test
30. N1-ST-Q13, Emerg Service Water Pump & Check Valve Operability Test
31. N1-ST-Q15, Condensate Transfer System Operability Test
32. N1-ST-Q16, Emergency Diesel Generator Quarterly Test
33. N1-ST-Q17, N2 Supply Systems Valves Operability Test
34. N1-ST-Q21, Instrument Air Valves
35. N1-ST-Q24, Drywell/Torus and Torus/Reactor Building Vacuum Breakers Test
36. N1-ST-R1, Control Rod Scram Insertion Time Test
37. N1-ST-R8, Hi Cool & Prim Cont Iso Vlvs Timing
38. N1-ST-R16, Emergency Service Water Pump Header Test
39. N1-ST-V3, Rod Worth Minimizer Operability Test
40. N1-ST-V4, Feedwater & Main Steam Line Power Operatied Iso Vlvs Ex

41. N1-ST-V5, Suppression Temperature Monitoring During Relief Valve Operation

42. N1-ST-V7, Reactor Building Closed Loop Cooling System Pump & Valve Operability Test

43. N1-ST-V8, Main Steam Iso Vlv Full Closure Test

44. N1-ST-W1, Control Rod Exercising

45. N1-ST-W4, Main Steamline High Radiaion Instrument Channel

Test Section Acceptance

a. All manipulations in test Section "III.D" accomplished in accordance with (IAW) reference plant controlled operating procedures, any procedure exceptions documented IAW NTI-4.5.3

_____/_____ Satisfactory _____/_____ Unsatisfactory

Initial/Date Initial/Date

V. Performance Criteria

A. Simulator instrument error shall be NO greater than that of the related instrument in the reference plant

B. Principal mass and energy balances shall be satisfied

1. Net NSSS thermal power to generated electrical power

2. Feedwater flow to reactor thermal power

C. Simulator computed values of critical parameters shall agree within ± 2% of the reference plant parameter at the specified power level

D. Simulator computed values for steady state, full power reference plant configuration operation, shall be stable and not vary more than ± 2% of the initial values over a 60 minute period

VI. Remarks:

VII. Acceptance

		INITIALS	SIGNATURE	PRINTED NAME /DEPARTMENT
A.	Performed By:	________	________________	____________ / ________
		________	________________	____________ / ________
		________	________________	____________ / ________
		________	________________	____________ / ________
		________	________________	____________ / ________

B. Approved by SCCB __________________________________ ____________

Signature Date

NIAGARA MOHAWK SIMULATION FACILITY

PERFORMANCE TEST

Simulation facility: NINE MILE POINT UNIT - 1
Reference Plant: NINE MILE POINT UNIT - 1
Performance Test: 1989 ANSI 3.5 A3.4 Plant Malfunctions Tests

I. Initial conditions: In accordance with the Malfunction applicable Acceptance Test Procedure (ATP) Section

II. Data Collection:

A. Method: Manual as specified by the applicable ATP section

B. Parameters: In accordance with the applicable ATP section

III. Prerequisites

A. All participants read test procedure and fill out section VII.A (performed by)

IV. Procedure

A. Perform each of the following listed Malfunction tests in accordance with the applicable ATP section and Malfunction Cause and Effect

1. AD04 Relief Valve Leaks
2. CS01 Core Spray Pump Trip
3. CT02 Containment Spray RAW Water Pump Trip
4. CU03 RWCU Reject FCV Fails Open
5. CU07 RWCU Low Pressure Control Valve Fails Open
6. CU11 Coolant Leak Outside Primary Containment
7. CW04 RBCLC Pump Trip
8. CW08 Circulating Water Intake Structure Icing
9. DG02 Diesel Generator Trip
10. EC04 Emergency Cooling System Return Valve Fails Open
11. ED01 Loss of Offsite 115 KV Power
12. ED05 PB12 Electrical Fault
13. ED09 PB13 Section "A" Electrical Fault
14. ED13 PB14 Section "B" Electrical Fault
15. ED17 PB15 Section "C" Electrical Fault
16. ED21 PB17 Section "B" Electrical Fault

17. ED25 Loss of Power to Instrument Control Bus 130 Normal and Alt
18. EG04 Main Generator Core Internal Heating
19. EG08 Generator Hydrogen Emergency Seal Oil Pump Failure
20. EG12 Power Grid Network Load Transient - Decrease
21. FP02 Electric Fire Pump Failure
22. FP06 Control Room Fire Detection - Various Panels
23. FP10 Reactor Building Fire Detection
24. FW04 Shaft Driven Feedwater Pump 13 Failure
25. FW08 Feedwater Control Valve 11 Controller Fails - Low
26. FW12 Feedwater Control Valve 13 13 Controller Fails - Low
27. FW16 Feedwater Master Controller Fails as is
28. FW20 Condensate Recirc Valve (FCV 50-24) Fails Closed
29. FW24 Feedwater Control Valve Fails Closed (13A/13B)
30. FW28 HPCI Mode Failure to Initiate
31. IA01 Loss of Instrument Air
32. MC03 Hotwell Level Controllers in Auto Fail - High
33. MS01 Steam Line Rupture Outside Primary Containment
34. MS05 Turbine Steam Seal Regulator Fails Closed
35. MS09 Second Stage Reheater 112 Drain Tk Level Control Fail Low
36. NM02 SRM Channel Failure - Downscale
37. NM10 IRM Channel Failure - Upscale
38. NM18 IRM Channel Detector Stuck
39. NM25 LPRM Failure - Upscale
40. NM36 Recirc Flow Converter Channel Failure - Upscale
41. NM40 Recirc Flow Converter Failure - Comparator
42. OG04 Off Gas Discharge to Stack Isolation Valve Fails Closed
43. PP01 Failure of Plant Process Computer
44. RD04 Control Rod Failure - Stuck
45. RD08 Control Rod Failure - RPIS
46. RD36 CRD Flow Control Valve Failure - Closed
47. RD40 Reactor Manual Control System Timer Malfunction - Settle

48. RM03 Area Radiation Monitor Drawer Upscale
49. RP04 Reactor Protection System Failure to Scram - Automatic
50. RP08 Anticipated Transient Without Scram (ATWS)
51. RR04 Recirculation Pump 11 Control Signal Failure
52. RR08 Recirculation Pump 12 Seizure
53. RR12 Recirc Pump 13 Field Breaker Trip
54. RR16 Recirc Pump 14 Drive Breaker Trip
55. RR20 Recirc Pump 14 Incomplete Start Sequence
56. RR24 Recirc Pump 15 Control Signal Failure
57. RR27 Master Recirc Flow Controller Failure - Low
58. RR31 Reactor Vessel Pressure Recorder Failure - Low
59. RR35 Reactor Vessel Pressure Indicator Failure - Upscale
60. RR39 Reactor Vessel Level Recorder Failure - Downscale
61. RR43 Rx Vessel Level Indication (Control Sys) Fail - as is
62. RR47 Recirc Pump Discharge Valve Stem Separates From Gate
63. RR51 Rx Vessel Level Transmitter (RPS Input) Fails - High
64. RR55 Rx Vessel Level Transmitter (Control Input) Fails - Low
65. RR59 Rx Vessel Pressure Transmitter (RPS Input) Fails as is
66. RR63 Reactor Recirc Pump 12 Inner Seal Failure
67. RR67 Reactor Recirc Pump 15 Tachometer Fails - Oscillates
68. RR71 Reactor Safety Valve Inadvertently Opens
69. RX02 Increased Rod Worth
70. TC02 Turbine Governor Fails - High
71. TC06 Electrical Pressure Regulator Fails - Oscillates
72. TC10 First Bypass Valve Sticks Open
73. TU01 Exhaust Hood Spray Valve Fails Closed
74. TU05 Main Turbine Bearing High Temperature
75. CU05 RWCU High Pressure Control Valve Fails Open

V. Acceptance Criteria

A. All malfunction tests completed satisfactorily in accordance with applicable ATP sections and Malfunction Cause and Effect

______/____ Satisfactory ______/____ Unsatisfactory

Initial/Date Initial/Date

VI. Remarks:

VII. Acceptance

	INITIALS	SIGNATURE	PRINTED NAME /DEPARTMENT
A. Performed By:	________	________________	________ / ________
	________	________________	________ / ________
	________	________________	________ / ________
	________	________________	________ / ________
	________	________________	________ / ________

B. Approved by SCCB ______________________________ __________

Signature Date

NIAGARA MOHAWK SIMULATION FACILITY

PERFORMANCE TEST

Simulation facility: NINE MILE POINT UNIT - 1
Reference Plant: NINE MILE POINT UNIT - 1
Performance Test: 1989 ANSI APPENDIX "B" B1.2(1) MANUAL SCRAM TRANSIENT

I. Initial conditions: Full power steady state, middle of cycle, with normal reference plant equipment lineup

II. Data Collection:

A. Method

1. Data will be gathered on the critical parameters using a Simulator program called "ANSI B121"
   a. Data is gathered at 0.5 second intervals, starting 15 seconds before the transient and lasting for 10 minutes of the transient
   b. Data is then down loaded to a personal computer (PC) and graphed for evaluation
2. Process Plant Computer (PPC) alarm and Sequence of Events (SOE) printouts will be gathered for alarm and automatic action evaluation

B. Critical Parameters:

	Critical Parameters	Computer Point
1.	Reactor Power (Neutron Flux %)	H441
2.	Total Steam Flow	D376
3.	Total Feedwater Flow	A391
4.	Wide Range Reactor Pressure	D373
5.	Narrow Range Reactor Pressure	D372
6.	Wide Range Reactor Water Level	J342
7.	Narrow Range Reactor Water Level (Feedwater Control)	D377
8.	Generator Gross Electrical Power	F414
9.	Turbine Steam Flow (By First Stage Shell Press)	B465
10.	Total Core Flow (Total Recirc Flow)	A445

C: Supplemental Data

1. Alarm Typer Printout
2. Sequence of Events Log Printout

III. Prerequisites

A. All participants read test procedure and fill out Section VII.a (performed by)

IV. Procedure

A. Reset to initial conditions specified in Section "I.", DO NOT TAKE OUT OF FREEZE, and perform the following:

1. Insert the following malfunction with delay time start of problem time 1:00 minute
   a. RP03----Reactor Scram
2. Activate the data gathering program specified (II.A.1)
3. Roll ahead the printer paper for a clean start point
4. Un-freeze the Simulator and allow the transient to progress with NO operator actions
5. At problem time 11:30 freeze the simulator and gather the PPC printouts, and label with the performance test title and date
6. Evaluate the printouts for acceptance criteria V.B and V.C, initial the appropriate acceptance blocks, write any DR's, and enter any appropriate remarks in Section VI.
7. Download the collected data to a PC and graph the information
8. Evaluate the critical parameter graphs or raw data for acceptance criteria V.A, initial the appropriate acceptance block, write any DR's, and enter any appropriate remarks in Section VI
9. Simulator Configuration Control Board (SCCB) review and approve test results, Section VII.B

V. Acceptance Criteria

A. The observable change in the Simulator monitored parameter corresponds in direction to those expected in the reference plant

Re: Critical parameter raw data or PC graph

_____/_____ Satisfactory _____/_____ Unsatisfactory

Initial/Date Initial/Date

B. The Simulator caused alarms and automatic actions that would have happened in the reference plant

Re: PPC alarm and SOE printouts

_____/_____ Satisfactory _____/_____ Unsatisfactory

Initial/Date Initial/Date

C. The Simulator did not cause an alarm or automatic action that would NOT have happened in the reference plant

Re: PPC alarm and SOE printouts

_____/_____ Satisfactory _____/_____ Unsatisfactory

Initial/Date Initial/Date

VI. Remarks

VII. Acceptance

	INITIALS	SIGNATURE	PRINTED NAME /DEPARTMENT
A. Performed By:	_____	_____	_____/_____
	_____	_____	_____/_____
	_____	_____	_____/_____
	_____	_____	_____/_____
	_____	_____	_____/_____

B. Approved by SCCB _______________ _______

Signature Date

NIAGARA MOHAWK SIMULATION FACILITY

PERFORMANCE TEST

Simulation facility: NINE MILE POINT UNIT - 1
Reference Plant: NINE MILE POINT UNIT - 1
Performance Test: 1989 ANSI APPENDIX "B" B1.2(2) SIMULTANEOUS TRIP OF ALL FEEDWATER PUMPS

I. Initial conditions: Full power steady state, end of cycle, with normal reference plant equipment lineup

II. Data Collection:

A. Method

1. Data will be gathered on the critical parameters using a Simulator program called ANSI DATA COLLECTION option - 1 seconds before the transient and lasting for 10 minutes of the transient
   a. Data is gathered at 0.5 second intervals, starting 15 seconds before the transient and lasting for 10 minutes of the transient
   b. Data is then down loaded to a Personal Computer (PC) and graphed for evaluation
2. Process Plant Computer (PPC) alarm and Sequence of Events (SOE) printouts will be gathered for alarm and automatic action evaluation

B. Critical Parameters:

	Critical Parameters	Computer Point
1.	Reactor power (% neutron flux)	H441
2.	Total Steam Flow	D376
3.	Total Feedwater Flow	A391
4.	Wide Range Reactor Pressure	D373
5.	Narrow Range Reactor Pressure	D372
6.	Wide Range Reactor Water Level	J342
7.	Narrow Range Reactor Water Level (Feedwater Control)	D377
8.	Generator Gross Electrical Power	F414
9.	Turbine Steam Flow (By First Stage Shell Press)	B465
10.	Total Core Flow (Total Recirc Flow)	A445

C. Supplemental Data
   1. Alarm Typer Printout
   2. Sequence of Events Log Printout

III. Prerequisites
   A. All participants read test procedure and fill out Section VII.a (performed by)

IV. Procedure
   A. Reset to initial conditions specified in Section "I.", DO NOT TAKE OUT OF FREEZE, and perform the following:
      1. Insert the following malfunction with delay time start of problem time 1:00 minute
         a. FW01A----"A" feedwater pump trip
         b. FW01B----"B" feedwater pump trip
         c. FW01C----"C" feedwater pump trip
      2. Activate the data gathering program specified (II.A.1)
      3. Roll ahead the printer paper for a clean start point
      4. Un-freeze the Simulator and allow the transient to progress with NO operator actions
      5. At problem time 11:30 freeze the simulator and gather the PPC printouts, and label with the performance test title and date
      6. Evaluate the printouts for acceptance criteria V.B and V.C, initial the appropriate acceptance blocks, write any DR's, and enter any appropriate remarks in Section VI.
      7. Download the collected data to a PC and graph the information
      8. Evaluate the critical parameter graphs or raw data for acceptance criteria V.A, initial the appropriate acceptance block, write any DR's, and enter any appropriate remarks in Section VI.
      9. Simulator Configuration Control Board (SCCB) review and approve test results, Section VII.B

V. Acceptance Criteria

A. The observable change in the Simulator monitored parameter corresponds in direction to those expected in the reference plant

Re: Critical parameter raw data or PC graph

______/_____ Satisfactory ______/_____ Unsatisfactory

Initial/Date Initial/Date

B. The Simulator caused alarms and automatic actions that would have happened in the reference plant

Re: PPC alarm and SOE printouts

______/_____ Satisfactory ______/_____ Unsatisfactory

Initial/Date Initial/Date

C. The Simulator did not cause an alarm or automatic action that would NOT have happened in the reference plant

Re: PPC alarm and SOE printouts

______/_____ Satisfactory ______/_____ Unsatisfactory

Initial/Date Initial/Date

VI. Remarks

VII. Acceptance

		INITIALS	SIGNATURE	PRINTED NAME /DEPARTMENT
A.	Performed By:	______	__________	________ / ________
		______	__________	________ / ________
		______	__________	________ / ________
		______	__________	________ / ________
		______	__________	________ / ________

B. Approved by SCCB ________________________ __________

Signature Date

NIAGARA MOHAWK SIMULATION FACILITY

PERFORMANCE TEST

Simulation facility: NINE MILE POINT UNIT - 1
Reference Plant: NINE MILE POINT UNIT - 1
Performance Test: 1989 ANSI APPENDIX "B" B1.2(3) SIMULTANEOUS CLOSURE OF ALL MAIN STEAM ISOLATION VALVE

I. Initial conditions: Full power steady state, middle of cycle, with normal reference plant equipment lineup

II. Data Collection:

A. Method

1. Data will be gathered on the critical parameters using a Simulator program called "ANSI B123"
   a. Data is gathered at 0.5 second intervals, starting 15 seconds before the transient and lasting for 10 minutes of the transient
   b. Data is then down loaded to a Personal Computer (PC) and graphed for evaluation
2. Process Plant Computer (PPC) alarm and Sequence of Events (SOE) printouts will be gathered for alarm and automatic action evaluation

B. Critical Parameters:

	Critical Parameters	Computer Point
1.	Reactor Power (% neutron flux)	H441
2.	Total Steam Flow	D376
3.	Total Feedwater Flow	A391
4.	Wide Range Reactor Pressure	D373
5.	Narrow Range Reactor Pressure	D372
6.	Wide Range Reactor Water Level	J342
7.	Narrow Range Reactor Water Level (Feedwater Control)	D377
8.	Generator Gross Electrical Power	F414
9.	Turbine Steam Flow (By First Stage Shell Press)	B465
10.	Total Core Flow (Total Recirc Flow)	A445

C. Supplemental Data

1. Alarm Typer Printout
2. Sequence of Events Log Printout

III. Prerequisites

A. All participants read test procedure and fill out Section VII.a (performed by)

IV. Procedure

A. Reset to initial conditions specified in Section "I.", DO NOT TAKE OUT OF FREEZE, and perform the following:

1. Insert the following malfunction with delay time start of problem time 1:00 minute
   a. RP06----Vessel Isolation
2. Activate the data gathering program specified (II.A.1)
3. Roll ahead the printer paper for a clean start point
4. Un-freeze the Simulator and allow the transient to progress with NO operator actions
5. At problem time 11:30 freeze the simulator and gather the PPC printouts, and label with the performance test title and date
6. Evaluate the printouts for acceptance criteria V.B and V.C, initial the appropriate acceptance blocks, write any DR's, and enter any appropriate remarks in Section VI.
7. Download the collected data to a PC and graph the information
8. Evaluate the critical parameter graphs or raw data for acceptance criteria V.A, initial the appropriate acceptance block, write any DR's, and enter any appropriate remarks in Section VI
9. Simulator Configuration Control Board (SCCB) review and approve test results, Section VII.B

V. Acceptance Criteria

A. The observable change in the Simulator monitored parameter corresponds in direction to those expected in the reference plant

Re: Critical parameter raw data or PC graph

______/______ Satisfactory ______/______ Unsatisfactory
Initial/Date Initial/Date

B. The Simulator caused alarms and automatic actions that would have happened in the reference plant

Re: PPC alarm and SOE printouts

______/______ Satisfactory ______/______ Unsatisfactory
Initial/Date Initial/Date

C. The Simulator did not cause an alarm or automatic action that would NOT have happened in the reference plant

Re: PPC alarm and SOE printouts

______/______ Satisfactory ______/______ Unsatisfactory
Initial/Date Initial/Date

VI. Remarks

VII. Acceptance

	INITIALS	SIGNATURE	PRINTED NAME /DEPARTMENT
A. Performed By:	______	______	______/______
	______	______	______/______
	______	______	______/______
	______	______	______/______
	______	______	______/______

B. Approved by SCCB ____________________ ________
Signature Date

NIAGARA MOHAWK SIMULATION FACILITY

PERFORMANCE TEST

Simulation facility: NINE MILE POINT UNIT - 1
Reference Plant: NINE MILE POINT UNIT - 1
Performance Test: 1989 ANSI APPENDIX "B" B1.2(4) SIMULTANEOUS TRIP OF ALL RECIRCULATION PUMPS

I. Initial conditions: Full power steady state, middle of cycle, with normal reference plant equipment lineup

II. Data Collection:

A. Method

1. Data will be gathered on the critical parameters using a Simulator program called "ANSI B124"
   a. Data is gathered at 0.5 second intervals, starting 15 seconds before the transient and lasting for 10 minutes of the transient
   b. Data is then down loaded to a Personal Computer (PC) and graphed for evaluation
2. Process Plant Computer (PPC) alarm and Sequence of Events (SOE) printouts will be gathered for alarm and automatic action evaluation

B. Critical Parameters:

	Critical Parameters	Computer Point
1.	Reactor power (% neutron flux)	H441
2.	Total Steam Flow	D376
3.	Total Feedwater Flow	A391
4.	Narrow Range Reactor Pressure	D372
5.	Narrow Range Reactor Water Level (Feedwater Control)	D377
6.	Total Core Flow = (Total Recirc Flow)	A445
7.	Individual Recirculation Loop Flows	
a.	Loop 11	A430
b.	Loop 12	A434
c.	Loop 13	A438
d.	Loop 14	A442
e.	Loop 15	A446

C. Supplemental Data

1. Alarm Typer Printout
2. Sequence of Events Log Printout

III. Prerequisites

A. All participants read test procedure and fill out Section VII.a (performed by)

IV. Procedure

A. Reset to initial conditions specified in Section "I.", DO NOT TAKE OUT OF FREEZE, and perform the following

1. Insert the following malfunction with delay time start of problem time 1:00 minute
   a. RR01----- Pump 11 Trip
   b. RR06----- Pump 12 Trip
   c. RR11----- Pump 13 Trip
   d. RR16----- Pump 14 Trip
   e. RR21----- Pump 15 Trip
2. Activate the data gathering program specified (II.A.1)
3. Roll ahead the printer paper for a clean start point
4. Un-freeze the Simulator and allow the transient to progress with NO operator actions
5. At problem time 11:30 freeze the simulator and gather the PPC printouts, and label with the performance test title and date
6. Evaluate the printouts for acceptance criteria V.B and V.C, initial the appropriate acceptance blocks, write any DR's, and enter any appropriate remarks in Section VI.
7. Download the collected data to a PC and graph the information
8. Evaluate the critical parameter graphs or raw data for acceptance criteria V.A, initial the appropriate acceptance block, write any DR's, and enter any appropriate remarks in Section VI.
9. Simulator Configuration Control Board (SCCB) review and approve test results, Section VII.B

V. Acceptance Criteria

A. The observable change in the Simulator monitored parameter corresponds in direction to those expected in the reference plant

Re: Critical parameter raw data or PC graph

_____/_____ Satisfactory _____/_____ Unsatisfactory
Initial/Date Initial/Date

B. The Simulator caused alarms and automatic actions that would have happened in the reference plant

Re: PPC alarm and SOE printouts

_____/_____ Satisfactory _____/_____ Unsatisfactory
Initial/Date Initial/Date

C. The Simulator did not cause an alarm or automatic action that would NOT have happened in the reference plant

Re: PPC alarm and SOE printouts

_____/_____ Satisfactory _____/_____ Unsatisfactory
Initial/Date Initial/Date

VI. Remarks

VII. Acceptance

	INITIALS	SIGNATURE	PRINTED NAME /DEPARTMENT
A. Performed By:			/
			/
			/
			/
			/

B. Approved by SCCB ______________________ __________
Signature Date

NIAGARA MOHAWK SIMULATION FACILITY

PERFORMANCE TEST

Simulation facility: NINE MILE POINT UNIT - 1

Reference Plant: NINE MILE POINT UNIT - 1

Performance Test: 1989 ANSI APPENDIX "B" B1.2(5) SINGLE RECIRCULATION PUMP TRIP

I. Initial conditions: Full power steady state, middle of cycle, with normal reference plant equipment lineup

II. Data Collection:

A. Method

1. Data will be gathered on the critical parameters using a Simulator program called "ANSI B125"
   a. Data is gathered at 0.5 second intervals, starting 15 seconds before the transient and lasting for 10 minutes of the transient
   b. Data is then down loaded to a Personal Computer (PC) and graphed for evaluation
2. Process Plant Computer (PPC) alarm and Sequence of Events (SOE) printouts will be gathered for alarm and automatic action evaluation

B. Critical Parameters: Computer Point

1.	Reactor power (% neutron flux)	H441
2.	Total Steam Flow	D376
3.	Total Feedwater Flow	A391
4.	Narrow Range Reactor Pressure	D372
5.	Narrow Range Reactor Water Level (Feedwater Control)	D377
6.	Total Core Flow (accurate indication not available)	
7.	Individual Recirculation Loop Flows	
a.	Loop 11	A430
b.	Loop 12	A434
c.	Loop 13	A438
d.	Loop 14	A442
e.	Loop 15	A446

C. Supplemental Data

1. Alarm Typer Printout
2. Sequence of Events Log Printout

III. Prerequisites

A. All participants read test procedure and fill out Section VII.a (performed by)

IV. Procedure

A. Reset to initial conditions specified in Section "I.", DO NOT TAKE OUT OF FREEZE, and perform the following

1. Insert the following malfunction with delay time start of problem time 1:00 minute
   a. RR21----- Pump 15 Trip
2. Activate the data gathering program specified (II.A.1)
3. Roll ahead the printer paper for a clean start point
4. Un-freeze the Simulator and allow the transient to progress with <u>NO</u> operator actions
5. At problem time 11:30 freeze the simulator and gather the PPC printouts, and label with the performance test title and date
6. Evaluate the printouts for acceptance criteria V.B and V.C, initial the appropriate acceptance blocks, write any DR's, and enter any appropriate remarks in Section VI.
7. Download the collected data to a PC and graph the information
8. Evaluate the critical parameter graphs or raw data for acceptance criteria V.A, initial the appropriate acceptance block, write any DR's, and enter any appropriate remarks in Section VI.
9. Simulator Configuration Control Board (SCCB) review and approve test results, Section VII.B

V. Acceptance Criteria

A. The observable change in the Simulator monitored parameter corresponds in direction to those expected in the reference plant

Re: Critical parameter raw data or PC graph

______/____ Satisfactory ______/____ Unsatisfactory

Initial/Date Initial/Date

B. The Simulator caused alarms and automatic actions that would have happened in the reference plant

Re: PPC alarm and SOE printouts

______/____ Satisfactory ______/____ Unsatisfactory

Initial/Date Initial/Date

C. The Simulator did not cause an alarm or automatic action that would NOT have happened in the reference plant

Re: PPC alarm and SOE printouts

______/____ Satisfactory ______/____ Unsatisfactory

Initial/Date Initial/Date

VI. Remarks

VII. Acceptance

	INITIALS	SIGNATURE	PRINTED NAME /DEPARTMENT
A. Performed By:			/
			/
			/
			/
			/

B. Approved by SCCB ____________________ __________

Signature Date

NIAGARA MOHAWK SIMULATION FACILITY

PERFORMANCE TEST

Simulation facility: NINE MILE POINT UNIT - 1

Reference Plant: NINE MILE POINT UNIT - 1

Performance Test: 1989 ANSI APPENDIX "B" B1.2(6) MAIN TURBINE TRIP TRANSIENT TEST

I. Initial conditions: Maximum power level which does not result in immediate reactor scram, and normal reference plant equipment lineup

II. Data Collection:

A. Method

1. Data will be gathered on the critical parameters using a Simulator program called "ANSI B126"
   a. Data is gathered at 0.5 second intervals, starting 15 seconds before the transient and lasting for 10 minutes of the transient
   b. Data is then down loaded to a Personal Computer (PC) and graphed for evaluation
2. Process Plant Computer (PPC) alarm and Sequence of Events (SOE) printouts will be gathered for alarm and automatic action evaluation

B. Critical Parameters:

	Critical Parameters	Computer Point
1.	Reactor power (% neutron flux)	H441
2.	Total Steam Flow	D376
3.	Total Feedwater Flow	A391
4.	Wide Range Reactor Pressure	D373
5.	Narrow Range Reactor Pressure	D372
6.	Wide Range Reactor Water Level	J342
7.	Narrow Range Reactor Water Level (Feedwater Control)	D377
8.	Generator Gross Electrical Power	F414
9.	Turbine Steam Flow (By First Stage Shell Press)	B465
10.	Total Core Flow (Total Recirc Flow)	A445

C. Supplemental Data

1. Alarm Typer Printout
2. Sequence of Events Log Printout

III. Prerequisites

A. All participants read test procedure and fill out Section VII.a (performed by)

IV. Procedure

A. Reset to full power steady state, end of cycle, with normal reference plant equipment lineup, and perform the following

1. Reduce reactor power until annunciator F3-4-6 comes in, in accordance with N1-OP-43
2. Stabilize power and snap shot a test initial condition (IC) labeled as ANSI B1.2(6)
3. Reset to the test IC, DO NOT TAKE OUT OF FREEZE
4. Insert the following malfunction with delay time start of problem time 1:00 minute
   a. TC01----- Turbine Trip
5. Activate the data gathering program specified (II.A.1)
6. Roll ahead the printer paper for a clean start point
7. Un-freeze the Simulator and allow the transient to progress with NO operator actions
8. At problem time 11:30 freeze the simulator and gather the PPC printouts, and label with the performance test title and date
9. Evaluate the printouts for acceptance criteria V.B and V.C, initial the appropriate acceptance blocks, write any DR's, and enter any appropriate remarks in Section VI.
10. Download the collected data to a PC and graph the information
11. Evaluate the critical parameter graphs or raw data for acceptance criteria V.A, initial the appropriate acceptance block, write any DR's, and enter any appropriate remarks in Section VI.
12. Simulator Configuration Control Board (SCCB) review and approve test results, Section VII.B

V. Acceptance Criteria

A. The observable change in the Simulator monitored parameter corresponds in direction to those expected in the reference plant

Re: Critical parameter raw data or PC graph

______/____ Satisfactory ______/____ Unsatisfactory

Initial/Date Initial/Date

B. The Simulator caused alarms and automatic actions that would have happened in the reference plant

Re: PPC alarm and SOE printouts

______/____ Satisfactory ______/____ Unsatisfactory

Initial/Date Initial/Date

C. The Simulator did not cause an alarm or automatic action that would NOT have happened in the reference plant

Re: PPC alarm and SOE printouts

______/____ Satisfactory ______/____ Unsatisfactory

Initial/Date Initial/Date

VI. Remarks

VII. Acceptance

	INITIALS	SIGNATURE	PRINTED NAME /DEPARTMENT
A. Performed By:			/
			/
			/
			/
			/

B. Approved by SCCB ______________________ __________

Signature Date

NIAGARA MOHAWK SIMULATION FACILITY

PERFORMANCE TEST

Simulation facility: NINE MILE POINT UNIT - 1

Reference Plant: NINE MILE POINT UNIT - 1

Performance Test: 1989 ANSI APPENDIX "B" B1.2(7) MAXIMUM RATE POWER RAMP (100% - 75% - 100%)

I. Initial conditions: Full power steady state, middle of cycle, with normal reference plant equipment lineup

II. Data Collection:

A. Method

1. Data will be gathered on the critical parameters using a Simulator program called "ANSI B127"
   a. Data is gathered at 0.5 second intervals, starting 15 seconds before the transient and lasting for 10 minutes of the transient
   b. Data is then down loaded to a Personal Computer (PC) and graphed for evaluation
2. Process Plant Computer (PPC) alarm and Sequence of Events (SOE) printouts will be gathered for alarm and automatic action evaluation

B. Critical Parameters:

	Critical Parameters	Computer Point
1.	Reactor power (% neutron flux)	H441
2.	Total Steam Flow	D376
3.	Total Feedwater Flow	A391
4.	Wide Range Reactor Pressure	D373
5.	Narrow Range Reactor Pressure	D372
6.	Wide Range Reactor Water Level	J342
7.	Narrow Range Reactor Water Level (Feedwater Control)	D377
8.	Generator Gross Electrical Power	F414
9.	Turbine Steam Flow (By First Stage Shell Press)	B465
10.	Total Core Flow (Total Recirc Flow)	A445

C. Supplemental Data

1. Alarm Typer Printout
2. Sequence of Events Log Printout

III. Prerequisites

A. All participants read test procedure and fill out Section VII.a (performed by)

IV. Procedure

A. Reset to initial conditions specified in Section "I.", DO NOT TAKE OUT OF FREEZE, and perform the following

1. Activate the data gathering program specified (II.A.1)
2. Roll ahead the printer paper for a clean start point
3. Un-freeze the Simulator and wait for 1 minute problem time
4. At problem time = 1 minute, using the Master Controller, Ramp reactor power at a rate of 6 MWE/SEC by reducing recirculation flow until reactor power is 75%, then raise recirculation flow until reactor power is 97.5%
   a. In accordance with N1-OP-43
5. When reactor power = 97.5%, raise reactor power to 100% at 5 MWE per hour using the Master recirc flow controller
6. At problem time 11:30 freeze the simulator and gather the PPC printouts, and label with the performance test title and date
7. Evaluate the printouts for acceptance criteria V.B. and V.C, initial the appropriate acceptance blocks, write any DR's, and enter any appropriate remarks in Section VI.
8. Download the collected data to a PC and graph the information
9. Evaluate the critical parameter graphs or raw data for acceptance criteria V.A, initial the appropriate acceptance block, write any DR's, and enter any appropriate remarks in Section VI.
10. Simulator Configuration Control Board (SCCB) review and approve test results, Section VII.B

V. Acceptance Criteria

A. The observable change in the Simulator monitored parameter corresponds in direction to those expected in the reference plant

Re: Critical parameter raw data or PC graph

_____/____ Satisfactory _____/____ Unsatisfactory

Initial/Date Initial/Date

B. The Simulator caused alarms and automatic actions that would have happened in the reference plant

Re: PPC alarm and SOE printouts

_____/____ Satisfactory _____/____ Unsatisfactory

Initial/Date Initial/Date

C. The Simulator did not cause an alarm or automatic action that would NOT have happened in the reference plant

Re: PPC alarm and SOE printouts

_____/____ Satisfactory _____/____ Unsatisfactory

Initial/Date Initial/Date

VI. Remarks

VII. Acceptance

	INITIALS	SIGNATURE	PRINTED NAME /DEPARTMENT
A. Performed By:			/
			/
			/
			/
			/

B. Approved by SCCB ____________________ ________

Signature Date

NIAGARA MOHAWK SIMULATION FACILITY

PERFORMANCE TEST

Simulation facility: NINE MILE POINT UNIT - 1

Reference Plant: NINE MILE POINT UNIT - 1

Performance Test: 1989 ANSI APPENDIX "B" B1.2(8) MAXIMUM SIZE REACTOR COOLANT SYSTEM RUPTURE (LOCA) COMBINED WITH LOSS OF ALL OFF SITE POWER (LOOP)

I. Initial conditions: Full power steady state, middle of cycle, with normal reference plant equipment lineup

II. Data Collection:

A. Method

1. Data will be gathered on the critical parameters using a Simulator program called "ANSI B128"
   a. Data is gathered at 0.5 second intervals, starting 15 seconds before the transient and lasting for 10 minutes of the transient
   b. Data is then down loaded to a Personal Computer (PC) and graphed for evaluation
2. Process Plant Computer (PPC) alarm and Sequence of Events (SOE) printouts will be gathered for alarm and automatic action evaluation

B. Critical Parameters:

Critical Parameters	Computer Point
1. Reactor power (% neutron flux)	H441
2. Total Steam Flow	D376
3. Total Feedwater/High Pressure Coolant Injection Flow	A391
4. Wide Range Reactor Pressure	D373
5. Wide Range Reactor Water Level	J342
6. Fuel Zone Water Level	H447
7. Torus Water Temperature	H478
8. Torus Air Temperature	H477
9. Torus Pressure	D324
10. Drywell Temperature	D322
11. Drywell Pressure	D320
12. Low Pressure Core Spray Flow (No Point Available See FI RV-35A & B)	

C. Supplemental Data

1. Alarm Typer Printout
2. Sequence of Events Log Printout

III. Prerequisites

A. All participants read test procedure and fill out Section VII.a (performed by)

IV. Procedure

A. Reset to initial conditions specified in Section "I.", DO NOT TAKE OUT OF FREEZE, and perform the following

1. Insert the following malfunctions with delay time start of problem time 1:00 minute
   a. RR29----- RRP Suction Break
   b. ED01AB--- Loss of 115KV
2. Activate the data gathering program specified (II.A.1)
3. Roll ahead the printer paper for a clean start point
4. Un-freeze the Simulator and allow the transient to progress with NO operator actions
5. At problem time 11:30 freeze the simulator and gather the PPC printouts, and label with the performance test title and date
6. Evaluate the printouts for acceptance criteria V.B. and V.C, initial the appropriate acceptance blocks, write any DR's, and enter any appropriate remarks in Section VI.
7. Download the collected data to a PC and graph the information
8. Evaluate the critical parameter graphs or raw data for acceptance criteria V.A, initial the appropriate acceptance block, write any DR's, and enter any appropriate remarks in Section VI.
9. Simulator Configuration Control Board (SCCB) review and approve test results, Section VII.B

V. Acceptance Criteria

A. The observable change in the Simulator monitored parameter corresponds in direction to those expected in the reference plant

Re: Critical parameter raw data or PC graph

______/______ Satisfactory ______/______ Unsatisfactory
Initial/Date Initial/Date

B. The Simulator caused alarms and automatic actions that would have happened in the reference plant

Re: PPC alarm and SOE printouts

______/______ Satisfactory ______/______ Unsatisfactory
Initial/Date Initial/Date

C. The Simulator did not cause an alarm or automatic action that would NOT have happened in the reference plant

Re: PPC alarm and SOE printouts

______/______ Satisfactory ______/______ Unsatisfactory
Initial/Date Initial/Date

VI. Remarks

VII. Acceptance

	INITIALS	SIGNATURE	PRINTED NAME /DEPARTMENT
A. Performed By:	______	______	______/______
	______	______	______/______
	______	______	______/______
	______	______	______/______
	______	______	______/______

B. Approved by SCCB ______________________ ______
Signature Date

NIAGARA MOHAWK SIMULATION FACILITY

PERFORMANCE TEST

Simulation facility: NINE MILE POINT UNIT - 1
Reference Plant: NINE MILE POINT UNIT - 1
Performance Test: 1989 ANSI APPENDIX "B" B1.2(9) MAXIMUM SIZE UNISOLABLE MAIN STEAM LINE RUPTURE

I. Initial conditions: Full power steady state, middle of cycle, with normal reference plant equipment lineup

II. Data Collection:

A. Method

1. Data will be gathered on the critical parameters using a Simulator program called "ANSI B129"
   a. Data is gathered at 0.5 second intervals, starting 15 seconds before the transient and lasting for 10 minutes of the transient
   b. Data is then down loaded to a Personal Computer (PC) and graphed for evaluation
2. Process Plant Computer (PPC) alarm and Sequence of Events (SOE) printouts will be gathered for alarm and automatic action evaluation

B. Critical Parameters:

Critical Parameters	Computer Point
1. Reactor power (% neutron flux)	H441
2. Total Steam Flow	D376
3. Total Feedwater/High Pressure Coolant Injection Flow	A391
4. Wide Range Reactor Pressure	D373
5. Wide Range Reactor Water Level	J342
6. Fuel Zone Water Level	H447
7. Torus Water Temperature	H478
8. Torus Air Temperature	H477
9. Torus Pressure	D324
10. Drywell Temperature	D322
11. Drywell Pressure	D320
12. Low Pressure Core Spray Flow (No Point Available See FI RV-35A & B)	

C. Supplemental Data

   1. Alarm Typer Printout

   2. Sequence of Events Log Printout

III. Prerequisites

A. All participants read test procedure and fill out Section VII.a (performed by)

IV. Procedure

A. Reset to initial conditions specified in Section "I.", DO NOT TAKE OUT OF FREEZE, and perform the following

   1. Insert the following malfunctions with delay time start of problem time 1:00 minute

      a. MS04----- Steam Line Rupture Inside Primary Containment

   2. Activate the data gathering program specified (II.A.1)

   3. Roll ahead the printer paper for a clean start point

   4. Un-freeze the Simulator and allow the transient to progress with NO operator actions

   5. At problem time 11:30 freeze the simulator and gather the PPC printouts, and label with the performance test title and date

   6. Evaluate the printouts for acceptance criteria V.B. and V.C, initial the appropriate acceptance blocks, write any DR's, and enter any appropriate remarks in Section VI.

   7. Download the collected data to a PC and graph the information

   8. Evaluate the critical parameter graphs or raw data for acceptance criteria V.A, initial the appropriate acceptance block, write any DR's, and enter any appropriate remarks in Section VI.

   9. Simulator Configuration Control Board (SCCB) review and approve test results, Section VII.B

V. Acceptance Criteria

A. The observable change in the Simulator monitored parameter corresponds in direction to those expected in the reference plant

Re: Critical parameter raw data or PC graph

______/____ Satisfactory ______/____ Unsatisfactory

Initial/Date Initial/Date

B. The Simulator caused alarms and automatic actions that would have happened in the reference plant

Re: PPC alarm and SOE printouts

______/____ Satisfactory ______/____ Unsatisfactory

Initial/Date Initial/Date

C. The Simulator did not cause an alarm or automatic action that would NOT have happened in the reference plant

Re: PPC alarm and SOE printouts

______/____ Satisfactory ______/____ Unsatisfactory

Initial/Date Initial/Date

VI. Remarks

VII. Acceptance

	INITIALS	SIGNATURE	PRINTED NAME /DEPARTMENT
A. Performed By:	______	______________	__________/__________
	______	______________	__________/__________
	______	______________	__________/__________
	______	______________	__________/__________
	______	______________	__________/__________

B. Approved by SCCB ______________________________ __________

Signature Date

NIAGARA MOHAWK SIMULATION FACILITY

PERFORMANCE TEST

Simulation facility: NINE MILE POINT UNIT - 1

Reference Plant: NINE MILE POINT UNIT - 1

Performance Test: 1989 ANSI APPENDIX "B" B1.2(10) SIMULATANEOUS CLOSURE OF ALL MAIN STEAM ISOLATION VALVES (MSIV) COMBINED WITH SINGLE STUCK OPEN ELECTROMATIC RELIEF VALVE TRANSIENT TEST

I. Initial conditions: Full power steady state, middle of cycle, with normal reference plant equipment lineup

II. Data Collection:

A. Method

1. Data will be gathered on the critical parameters using a Simulator program called "ANSI B1210"
   a. Data is gathered at 0.5 second intervals, starting 15 seconds before the transient and lasting for 10 minutes of the transient
   b. Data is then down loaded to a Personal Computer (PC) and graphed for evaluation
2. Process Plant Computer (PPC) alarm and Sequence of Events (SOE) printouts will be gathered for alarm and automatic action evaluation

B. Critical Parameters:

	Critical Parameters	Computer Point
1.	Reactor power (% neutron flux)	H441
2.	Total Steam Flow	D376
3.	Total Feedwater/High Pressure Coolant Injection Flow	A391
4.	Wide Range Reactor Pressure	D373
5.	Wide Range Reactor Water Level	J342
6.	Fuel Zone Water Level	H447
7.	Torus Water Temperature	H478
8.	Torus Air Temperature	H477
9.	Torus Pressure	D324
10.	Drywell Temperature	D322
11.	Drywell Pressure	D320
12.	Low Pressure Core Spray Flow (No Point Available See FI RV-35A & B)	

C. Supplemental Data

1. Alarm Typer Printout
2. Sequence of Events Log Printout

III. Prerequisites

A. All participants read test procedure and fill out Section VII.a (performed by)

IV. Procedure

A. Reset to initial conditions specified in Section "I.", DO NOT TAKE OUT OF FREEZE, and perform the following

1. Insert the following malfunctions with delay time start of problem time 1:00 minute
   a. RP06----- Vessel Isolation
   b. AD06----- ERV 111 Sticks Open
2. Activate the data gathering program specified (II.A.1)
3. Roll ahead the printer paper for a clean start point
4. Un-freeze the Simulator and allow the transient to progress with NO operator actions
5. At problem time 11:30 freeze the simulator and gather the PPC printouts, and label with the performance test title and date
6. Evaluate the printouts for acceptance criteria V.B. and V.C, initial the appropriate acceptance blocks, write any DR's, and enter any appropriate remarks in Section VI.
7. Download the collected data to a PC and graph the information
8. Evaluate the critical parameter graphs or raw data for acceptance criteria V.A, initial the appropriate acceptance block, write any DR's, and enter any appropriate remarks in Section VI.
9. Simulator Configuration Control Board (SCCB) review and approve test results, Section VII.B

V. Acceptance Criteria

A. The observable change in the Simulator monitored parameter corresponds in direction to those expected in the reference plant

Re: Critical parameter raw data or PC graph

______/_____ Satisfactory ______/_____ Unsatisfactory
Initial/Date Initial/Date

B. The Simulator caused alarms and automatic actions that would have happened in the reference plant

Re: PPC alarm and SOE printouts

______/_____ Satisfactory ______/_____ Unsatisfactory
Initial/Date Initial/Date

C. The Simulator did not cause an alarm or automatic action that would NOT have happened in the reference plant

Re: PPC alarm and SOE printouts

______/_____ Satisfactory ______/_____ Unsatisfactory
Initial/Date Initial/Date

VI. Remarks

VII. Acceptance

	INITIALS	SIGNATURE	PRINTED NAME /DEPARTMENT
A. Performed By:	______	____________	________/________
	______	____________	________/________
	______	____________	________/________
	______	____________	________/________
	______	____________	________/________

B. Approved by SCCB ______________________ __________
Signature Date

MALF ED09 AC POWER BOARD ELECTRICAL FAULT
(PB 13 SECTION A)

01 INITIALIZE THE TRAINER TO A FULL POWER IC.

PCM:
TRAINER RESET

02 INSERT MALF ED09

PCM:
MALF ED09 ACTIVE

THIS RESULTS IN THE TRIPPING OF THE MANUAL SUPPLY BREAKER FROM AUXILIARY FEEDER 11.

A4-4-3: "POWER BOARD 13-14-15 LOW BUS VOLTAGE"
REF: C-19426-2

________ INITIAL ________ DATE

THE FOLLOWING LOADS (BUS TABLE 7-3A) WILL EXPERIENCE A TOTAL LOSS OF POWER:

1. POWER BOARD 131A. REFER TO BUS TABLE 7-11A FOR A LIST OF AFFECTED LOADS.
2. MECHANICAL VACUUM PUMP 11
3. STATOR WATER CIRC PUMP 11. REFER TO SECTION 3.076 FOR DETAILS.
4. REACTOR TRIP MG SET. REFER TO BUS TABLE 7-29A.

________ INITIAL ________ DATE

03 ATTEMPT TO CLOSE THE MANUAL SUPPLY BREKAER FROM FEEDER 11 TO PB 13 SECTION A.

PCM:
REMOTE FUNCTION RED26 CLOSES BREAKER, BUT BREAKER IMMEDIATELY TRIPS OPEN.

________ INITIAL ________ DATE

04 ATTEMPT TO CLOSE THE MANUAL SUPPLY BREAKER FROM POWER BORAD 13 SECTION B.

PCM:
REMOTE FUNCTION RED03 CLOSES BREAKER, BUT BREAKER IMMEDIATELY TRIPS OPEN.

________ INITIAL ________ DATE

05 CLOSE THE MANUAL SUPPLY BREAKER FROM PB 131A TO PB 131B.

PCM:
REMOTE FUNCTION RED15 OPENS MANUAL SUPPLY TO PB 131A FROM PB 13A AND CLOSES SUPPLY BREAKER FROM PB 131B.

POWER IS RESTORED TO PB 131A.

INITIAL DATE

06 REMOVE MALF ED09

PCM:
MALF ED09 REMOVED

RECLOSE THE MANUAL SUPPLY BREAKER FROM FEEDER 11 TO POWER BOARD 13 SECTION A

PCM:
REMOTE FUNCTION RED26 CLOSES THE BREAKER

A4-4-3 CLEARS: "POWER BOARD 13-14-15 LOW BUS VOLTAGE"

INITIAL DATE

POWER IS RESTORED TO PB 13A

INITIAL DATE

END OF MALF ED09

MALF NO.	MALFUNCTION TITLE/RANGE/CAUSE AND EFFECT

ED09 AC POWER BOARD ELECTRICAL FAULT (PB13 SECTION A)

TYPE:
ED - DISCRETE

CAUSE:
SHORT TO GROUND ON PB13A BUS BAR.

PLANT STATUS:
100% POWER

EFFECTS:

THIS MALFUNCTION WILL RESULT IN THE TRIPPING OF THE SUPPLY BREAKER TO PB13A FROM AUXILIARY FEEDER 11. IF THE TIE BREAKER BETWEEN SECTIONS A AND B IS CLOSED IN (BY USE OF REMOTE FUNCTION) IT WILL TRIP. THIS RESULTS IN A TOTAL LOSS OF POWER TO PB13A.

THE FOLLOWING ANNUNCIATOR WILL BE RECEIVED IMMEDIATELY:

PANEL	WINDOW	ENGRAVING
A4	A4-27	POWER BOARD 13-14-15 LOW BUS VOLTAGE

REFER TO BUS TABLE 7-3A FOR EQUIPMENT THAT WILL BE AFFECTED

EACH SYSTEM AFFECTED BY THIS MALFUNCTION WILL RESPOND APPROPRIATELY FOR THE LOSS OF THE VARIOUS COMPONENTS.

ALL APPROPRIATE ALARMS AND INDICATIONS WILL ACTUATE.

REMOVAL OF THIS MALFUNCTION WILL REMOVE THE SHORT FROM THE BUS BAR. THE MANUAL SUPPLY BREAKER FROM AUXILIARY FEEDER 11 WILL CLOSE WHEN THE MALFUNCTION IS REMOVED.

REF; C-19426-C

ANSI/ANS 3.5 ANNUAL REPORT

prepared for
NIAGARA MOHAWK POWER CORPORATION

GP-R-115007
March 1, 1986

GENERAL PHYSICS CORPORATION
Oswego, New York

I. SIMULATOR INFORMATION

This section provides pertinent descriptive information on the Nine Mile Point Unit One simulator. This section summarizes the relevant information concerning the simulator and its suitability and applicability as an operator training device.

A. General

1. The Nine Mile Point Unit One simulator is owned by General Physics Niagara Corporation, a wholly owned subsidiary of General Physics Corporation. The simulator is operated jointly by Niagara Mohawk Power Corporation and General Physics Niagara Corporation instructors. All maintenance and modifications have been performed by General Physics at the direction of Niagara Mohawk Power Corporation. The simulator was manufactured by Singer/Link.

2. The Nine Mile Point Unit One simulator is a full-scope control room simulator which simulates the Nine Mile Point Unit One plant, owned and operated by Niagara Mohawk Power Corporation. Nine Mile Point Unit One is an 1850-MWt BWR-2 manufactured by General Electric. The rated electrical output is 620 MWe.

3. The Nine Mile Point Unit One simulator was declared Ready for Training on 1 September, 1984.

4. This report is the initial report on the Unit One simulator performance. This report was prepared to document simulator modifications since the Ready for Training date and to document the simulator's performance subsequent to the modifications.

   As of 1 March, 1986, the simulator has been updated to reflect all modifications made to the reference plant through 1 September, 1984. In addition, the simulator has been modified to reflect actual plant performance characteristics for several additional parameters.

B. Control Room

1. The physical configuration of the reference plant control room is shown in Figure 1. The physical configuration of the simulator control room is shown in Figure 2. A comparison of these figures reveals a high degree of similarity between the simulator and the reference plant control room. The following differences exist in the physical arrangements:

Simulator	Reference Plant
• Has the instructor console next to the NSSS typer.	• Has a desk at this location.
• Does not have the ASSS office addition.	• Has an addition on the SSS office for the ASSS.
• No simulation of plant Meteorological Computer.	• A Meteorological Computer is located in the control room.

2. Panels and Equipment

The Nine Mile Point Unit One simualtor contains all the panels which are in the reference plant control room, and it fully simulates all front panel and back panel controls and indications. Some equipment which has neither controls nor indications is cosmetically simulated. The following list summarizes the equipment differences between the simulator and the reference plant control room:

- RPS relays are installed but are non-functional in the simulator.
- Electrical protective relays are cosmetically simulated utilizing photographs mounted inside the relay enclosures.
- The simulator utilizes one operating TIP machine and a selector switch to functionally simulate the four plant TIP machines; the three remaining three TIP machines have all panel hardware installed but remain non-functional.

3. Systems

All the systems which are operable from the reference plant control room are fully simulated. For completeness, Attachment 1 lists those systems which are fully simulated.

4. Simulator Control Room Environment

The simulator control room was specifically designed to duplicate as nearly as possible the reference plant control room environment. The floor tile and lighting systems are identical. The physical configuration of the panels is dimensionally identical, and false doors and posts are placed in the simulator control room at the same locations in which they occur in the reference plant.

All instrumentation, controls, mimic, labels, and operator aids are identical within the limits of hardware availability. The paint color and shade used on the panels is very nearly the same. All communications equipment provided in the reference plant is provided in the simulator. The ambient noise levels in the simulator are approximately the same as those in the reference plant control room.

C. Instructor Interface

1. There are twenty initial condition sets available for instructor use. See Attachment 2 for a description of these. Thirty additional initial condition sets are available for use by the instructors.

2. The malfunctions are listed on Attachment 3.

3. The remote functions, for controls located outside the control room are listed on Attachment 4.

4. Additional instructor aids include:
   - Display of Monitored Parameters: DMP is available on an instructor station computer terminal; the instructor may select and display up to sixteen of the 100 available monitored plant parameters. Parameters are listed on Attachment 5.
   - Line Printer Plotter: The LPP function permits the instructor to print simultaneously up to 12 DMP variables on the computer room line printer. The time resolution of the LPP function is 0.1 seconds.
   - Record/Replay is an instructor-controlled feature by which the instructor may record trainee actions to magnetic tape in real time and later play this back through the simulator to enable a discussion of these actions.

D. Reference Plant Operating Procedures

Trainees in the simulator utilize a controlled set of plant procedures whenever they are operating the simulator. When a plant procedure is inappropriate or cannot be utilized on the simulator, such as when a plant modification has not been incorporated into the simulator at the time of a procedure revision, the difference is identified in the operating procedure in accordance with the Niagara Mohawk Power Corporation Nuclear Training Instruction for Simulator Instruction.

II. SIMULATOR DESIGN DATA

The simulator initial design data is listed in the original Database document on file at the simulator library. The initial simulator design data was frozen in April, 1982. Since the Ready for Training date (1 September, 1984), a number of modifications have been made to the simulator, based on changes made to the reference plant.

As a result of these modifications, many new data items have been added to the simulator database, and several original database prints have been upgraded to more recent revision numbers. Simulator modifications and affected documents for the current reporting period are listed on Attachment 6.

III. SIMULATOR TESTS

The simulator underwent a series of tests in the period between January 13, 1986 and February 28, 1986. Testing was done to verify real time operation, steady state and transient performance, and malfunction responses.

Documentation of the tests is available in the simulator database and records under the title "Simulator Performance Test Data - March 1986".

A. Computer Real Time Test

Simulator real time testing was performed by measuring the individual simulation model times during steady state and accident conditions. During this testing, no frame slippage or program overtimes accrued. In addition to the verification of timing, the simulator has designed safeguards which preclude operation outside of real time with two exceptions. The exceptions to real time operation are two instructor- controlled aids: Fast Time; and Slow Time. In slow time all simulator responses are in one-half of normal or real time. Fast time operation is specially handled and only affects reactor core xenon, condenser evacuation, and turbine warming.

B. Steady State and Normal Operations

Steady state performance and simualtor stability have been verified at four power levels against reference plant Balance of Plant Logs. The testing power levels utilized were approximately 25, 50, 75 and 100 percent of rated power. Normal operation testing was performed by doing a plant startup and shutdown in accordance with reference plant procedures. Strip charts and process computer logs which document the acceptable stability of the simulator are contained in Volume 2 of the Simulator Performance Test Data books.

C. Transient Tests

The following transient tests were performed on the Nine Mile Point Unit One simulator:

(1) Manual Scram
(2) Simultaneous trip of all feedwater pumps
(3) Simultaneous closure of all main steam isolation valves
(4) Simultaneous trip of all recirculation pumps
(5) Single recirculation pump trip
(6) Main turbine trip (maximum power level which does not result in immediate reactor scram)
(7) Maximum rate power ramp (master recirculation flow controller in "manual") down to approximately 75% and back up to 100%
(8) Maximum size reactor coolant system rupture combined with loss of all offsite power
(9) Maximum size unisolable main steam line rupture
(10) Simultaneous closure of all main steam isolation valves combined with single stuck open safety/relief valve (inhibit activation of high pressure Emergency Core Cooling Systems)

No actual plant response data is available for these specific transients. However, a number of other plant transients (e.g., pressure control failure; turbine trip from rated power) have occurred. The simulator performance for these events compares very favorably with actual plant data.

The Final Safety Analysis Report (FSAR) analyzed six of the above transients. Four of the listed transients have neither specific plant data nor FSAR analysis. Those transients are the following: manual scram; main turbine trip at 35% power; maximum rate power ramp - 100% to 75% to 100%; simultaneous closure of all MSIVs; with stuck open relief valve, and no high pressure ECCS. For these four events, the best-estimate method was used to evaluate simulator performance.

The transients were tested, and data was obtained in accordance with ANSI/ANS 3.5-1985 Appendix B. The following comments apply to the tested transients:

(1) Manual scram

The simulator showed a 10 psi pressure spike when the turbine tripped, and a 6 psi pressure spike when the MSIVs closed on low pressure (no operator action). Opinion varies on the accuracy of these magnitudes. However, no plant data exists for this event (a procedural violation would be required), and the FSAR does not follow this event through MSIV closure.

(2) Simultaneous trip of all feedwater pumps

The FSAR did not analyze a simultaneous trip of all feedwater pumps. However, in the interest of comparing simulator performance to analyzed data, this event was compared to the Feedwater Controller (zero demand) Malfunction. This changed the timing of the feedwater flow decrease, but otherwise the events are very similar.

The FSAR predicts a small, gradual increase in recirculation flow of approximately 5% over a period of about 5 seconds. The simulator shows no change in recirculation flow throughout the event. The reason for the discrepancy appears to be that recirculation flow increases due to the effects of reduced two-phase core flow. The simulator does not dynamically model two-phase pressure drop and flow effects. Since the discrepancy is slight and occurs after the low level scram, it is judged to be non-critical. This difference has no effect on training.

(3) Main steam isolation valve closure

The simulator performance correlated very well with the FSAR prediction.

(4) Simultaneous trip of all recirculation pumps

The simulator performance correlated very well with the FSAR prediction.

(5) Single recirculation pump trip

The simulator performance correlated very well with the FSAR prediction.

(6) Main turbine trip (maximum power level which does not result in immediate reactor scram)

The FSAR does not analyze this event, since it has no safety implications. There is no reference plant data available for this event. Therefore the simulator performance was compared to the best estimate. All measured parameters showed smooth, predictable responses. Reactor pressure rose very slightly (approximately 5 psi). This was expected on the basis that the bypass valves present a slightly different flow resistance than the turbine does. A very mild feedwater flow transient occurred. This was also predicted based on the automatic trip of #13 feedwater pump and the automatic initiation of the HPCI mode of feedwater.

(7) Maximum rate power ramp (master recirculation flow controller in "manual") down to approximately 75% and back up to 100%

This event was neither analyzed in the FSAR nor performed at the plant as a test or normal evolution. The simulator performance was smooth and predictable on all parameters. No abnormalities were noted.

(8) Maximum size reactor coolant system rupture combined with loss of all offsite power

The simulator response was very close to the FSAR prediction for all parameters except two: reactor vessel pressure response and drywell pressure response. The reactor vessel pressure decreased to zero in approximately 30 seconds on the simulator; the FSAR predicts that the pressure will reach zero in about 15 seconds. The simulator drywell pressure reached a maximum of approximately 21 psi; the FSAR predicts a peak of about 33 psi. The simulator drywell pressure peaks in approximately 20 seconds; the FSAR predicts that drywell pressure will peak in about 2 seconds. The discrepancy between the simulator performance and the FSAR prediction is traceable to the vessel blowdown rate, and lower plenum flashing. These problems are being addressed by the software support group. As a practical matter, this has no effect on training, since the operator doesn't have time to analyze this type of data until all immediate actions are taken, and the plant condition is stabilized. This discrepancy does not mask any valid indications, nor does it produce any false indications. No operator or automatic protective actions are affected.

(9) Maximum size unisolable main steam line rupture

The simulator performance correlated very well with the FSAR prediction.

(10) Simultaneous closure of all main steam isolation valves combined with single stuck open safety/relief valve (inhibit activation of high pressure Emergency Core Cooling Systems)

This event was not analyzed in the FSAR, and it has never occurred in the reference plant. The simulator performance correlated very closely with the FSAR prediction for MSIV Closure. When the simulator relief valve stuck open, the pressure response departed from the FSAR prediction as expected. For the duration of the event, all parameters showed smooth, predictable response.

In addition, the following five events were tested:

1. Turbine trip without bypass
2. Recirculation pump stall (seizure)
3. Inadvertant actuation of an EMRV
4. Safety valve actuation
5. EPR/MPR failure (reactor pressure decreases)

Although these transients are not part of the testing which is required for this report, they were performed because FSAR analysis data is available for them. In all five transients, the simulator performance correlated very closely with the FSAR prediction.

D. Malfunction Tests

All malfunctions were tested during the Customer Acceptance Test at the manufacturer's facility during the first half of 1984. Approximately 30 percent of the malfunctions were re-tested for this report. See Attachment 7 for a list of all malfunctions verified during this testing period. The malfunctions to be tested were chosen to include all generic malfunctions required to be simulted by ANSI/ANS 3.5 Regulatory Guide 1.149. Minor discrepancies were noted during the 1986 testing. These discrepancies were documented and are scheduled for correction in accordance with the discrepancy reporting system.

IV. DISCREPANCY RESOLUTION AND UPDATING

Discrepancies, modifications, and enhancements are all addressed by the Niagara Mohawk Power Corporation Nuclear Training Instruction 4.5.3, "Simulator Configuration Management." Discrepancy reports may be initiated by any individual utilizing the simulator for testing or training. Plant modifications are tracked by a computerized configuration management system.

SYSTEMS FULLY SIMULATED

1. Nuclear Boiler and Instrumentation

2. Reactor Recirculation System
   a. Reactor Recirculation Loops
   b. Boiler Process Instrumentation
   c. Recirculation Flow Control

3. Control Rod Drive and Hydraulics System (CRDHS)

4. Reactor Manual Control System (RMCS)

5. Reactor Core (Physics and Thermodynamics)
   a. Reactor Core Neutron Kinetics
   b. Reactor Core Thermodynamics

6. Rod Worth Minimizer (RWM)

7. Main Steam Systems
   a. Main Steam and Main Steam Bypass Systems
   b. Moisture Separators-Reheaters
   c. Extraction Steam System
   d. Auxiliary Steam System

8. Reactor Water Cleanup System

9. Nuclear Instrumentation System
   a. Source Range Monitor (SRM) System
   b. Intermediate Range Monitor (IRM) System
   c. Local Power Range Monitoring (LPRM) System
   d. Average Power Range Monitoring (APRM) System
   e. Rod Block Monitor (RBM) System
   f. Traversing In-Core Probe (TIP) System

10. Reactor Protection System

11. Simulation of the Primary Containment and Isolation System
    a. Primary Containment
    b. Primary Containment Isolation System

12. Secondary Containment

13. Emergency Ventilation
    a. Reactor Building Ventilation
    b. Turbine Building Ventilation
    c. Building Ventilation

14. Primary Containment Atmosphere Control and Sampling System

15. Emergency Core Cooling Systems
    a. Automatic Depressurization and Pressure Relief System
    b. Core Spray
    c. High Pressure Coolant Injection (HPCI) System
    d. Containment Spray
    e. Emergency Cooling System

16. Shutdown Cooling

17. Standby Liquid Control (SLC) System

18. Condensate and Feedwater System
    a. Condensate System
    b. Condensate Demineralizer System
    c. Feedwater System
    d. Condensate Storage and Transfer System
    e. Reactor Vessel Level Control System
    f. Feedwater Heaters, Vents and Drains

19. Off-Gas Recombiner and Condenser Air Removal

20. Main Condenser

21. Circulating Water System

22. Reactor Building Closed Loop Cooling

23. Turbine Building Closed Loop Cooling

24. Service Water System

25. Instrument, Service, and Breathing Air

26. Area Radiation Monitoring System

27. Process Radiation Monitoring System

28. Ventilation Radiation Monitoring System

29. Main Turbine and Turbine Control
    a. Turbine Oil System
    b. Turbine Kinematics
    c. Turbine Mechanics
    d. Turbine Supervisory and Safety System
    e. Gland Seal System
    f. Low Pressure Hood Spray System
    g. Moisture Separator and Reheat System
    h. Main Turbine Electro-Hydraulic Control System

30. Plant Electrical System
    a. Main Generator and Auxiliary Systems
        1) Main Generator Synchronous Machine
        2) Excitation and Voltage Regulator System
        3) Synchroscope
        4) Hydrogen Cooling System
        5) Stator and Iso-Phase Duct Cooling System
        6) Hydrogen Seal Oil System
    b. Electrical Distribution System
        1) Buses and Transformers
        2) Breakers
        3) Currents, Voltages, and Frequencies
        4) DC Electrical Distribution and Control
        5) Power System Electrical Grid
    c. Diesel Generators

31. Containment Atmosphere Dilution, Vent and Purge System

32. Radiation Waste Disposal System Containment Equipment and Floor Drain Sump

33. Plant Carbon Dioxide System

34. Diesel Fire Pump and Pressurized Water Fire System

35. Fire Control Ventilation Systems

36. Control Room Heating, Ventilation, and Air Conditioning

37. Communication System

38. Plant Process Computer System
    a. Applicable Experience

39. Meteorological Experience

40. Plant Annunciators and Fire System Alarm

INITIAL CONDITIONS

01	COLD SHUTDOWN
02	COLD SHUTDOWN, AUXILIARY SYSTEMS RUNNING
03	STARTUP, 10 RODS SUBCRITICAL
04	9 RODS SUBCRITICAL SEQUENCE A
05	15 RODS SUBCRITICAL
06	HOT SCRAM RECOVERY
07	STARTUP, 75 PSIG
08	STARTUP, 375 PSIG
09	STARTUP, 800 PSIG
10	3.5 BYPASSES - COLD TURBINE
11	HOT TURBINE, 3.5 BYPASSES OPEN
12	NUMBER 13 FEEDWATER PUMP STARTUP
13	50% POWER
14	FULL POWER
15	FULL POWER ALL RODS OUT
16	POWER DECREASE FROM 100% POWER
17	FOUR HOURS AFTER SCRAM
18	PRECONDITIONING
19	
20	

NINE MILE POINT UNIT ONE MALFUNCTIONS

AD01	ADS FAILURE TO INITIATE - PRIMARY VALVES
AD02	ADS FAILURE TO INITIATE - COMPLETE
AD03	SOLENOID ACTUATED PRESSURE RELIEF VALVE (#111) FAILURE - SOLENOID
AD04	SOLENOID ACTUATED PRESSURE RELIEF VALVE (#111) FAILURE - VALVE LEAKS
AD05	SOLENOID ACTUATED PRESSURE RELIEF VALVE (#111) FAILURE - OPENS INADVERTENTLY
AD06	SOLENOID ACTUATED PRESSURE RELIEF VALVE (#111) FAILURE - STUCK OPEN
AN01	CONTROL ROOM ANNUNCIATOR SYSTEM FAILURE
CS01	CORE SPRAY PUMP TRIP (111, 112, 121, 122, OR ANY)
CS02	CORE SPRAY TOPPING PUMP TRIP (111, 112, 121, 122, OR ANY)
CS03	CORE SPRAY INBOARD INJECTION VALVE FAILURE TO OPEN (IV40-01, IV40-09, IV40-11, IV40-10, OR ANY)
CT01	CONTAINMENT SPRAY PUMP TRIP (111, 112, 121, 122, OR ANY)
CT02	CONTAINMENT SPRAY RAW WATER PUMP TRIP (111, 112, 121, 122, OR ANY)
CT03	CONTAINMENT SPRAY HEAT EXCHANGER (111, 112, OR BOTH) TUBE LEAK
CU01	COOLANT LEAKAGE INSIDE PRIMARY CONTAINMENT
CU02	REACTOR WATER CLEANUP PUMP TRIP (11, 12, OR BOTH)
CU03	REACTOR WATER CLEANUP REJECT FLOW CONTROL VALVE (FCV-ND22) FAILS OPEN
CU04	REACTOR WATER CLEANUP REJECT FLOW CONTROL VALVE (FCV-ND22) FAILS CLOSED
CU05	REACTOR WATER CLEANUP HIGH PRESSURE CONTROL VALVE (PCV 33-39) FAILS OPEN
CU06	REACTOR WATER CLEANUP HIGH PRESSURE CONTROL VALVE (PCV 33-39) FAILS CLOSED
CU07	REACTOR WATER CLEANUP LOW PRESSURE CONTROL VALVE (PCV-ND37) FAILS OPEN
CU08	REACTOR WATER CLEANUP LOW PRESSURE CONTROL VALVE (PCV-ND37) FAILS CLOSED
CU09	REACTOR WATER CLEANUP NON REGENERATIVE HEAT EXCHANGER TUBE LEAK
CU10	REACTOR WATER CLEANUP DEMINERALIZER RESIN DEPLETION (11, 12, OR BOTH)

CU11	COOLANT LEAKAGE OUTSIDE PRIMARY CONTAINMENT
CW01	HIGH RADIATION IN SERVICE WATER
CW02	SERVICE WATER PUMP TRIP (11, 12, OR BOTH)
CW03	EMERGENCY SERVICE WATER PUMP TRIP (11, 12, OR BOTH)
CW04	REACTOR BUILDING CLOSED LOOP COOLING (11, 12, 13, OR ANY) PUMP TRIP
CW05	TURBINE BUILDING CLOSED LOOP COOLING PUMP TRIP (11, 12, OR BOTH)
CW06	CIRCULATING WATER PUMP TRIP (11, 12, OR BOTH)
CW07	CIRCULATING WATER EXPANSION JOINT LEAKAGE
CW08	CIRCULATING WATER INTAKE STRUCTURE ICING
CW09	LOSS OF DRYWELL COOLING
CW10	MAIN CONDENSER TUBE LEAK
DG01	DIESEL GENERATOR FAILURE TO START (102, 103, OR BOTH)
DG02	DIESEL GENERATOR TRIP (102, 103, OR BOTH)
EC01	STEAM LEAKAGE INSIDE PRIMARY CONTAINMENT
EC02	STEAM LEAKAGE OUTSIDE PRIMARY CONTAINMENT
EC03	EMERGENCY COOLING SYSTEM RETURN VALVE FAILS OPEN (IV39-05, IV39-06, OR BOTH)
EC04	EMERGENCY COOLING SYSTEM RETURN VALVE FAILS TO OPEN (IV39-05,IV39-06, OR BOTH)
EC05	EMERGENCY COOLING SYSTEM EMERGENCY CONDENSER MAKEUP CONTROL VALVE FAILS CLOSED (LCV60-17, LCV60-18, OR BOTH)
EC06	EMERGENCY CONDENSER TUBE LEAK (111, 121, OR BOTH)
ED01	LOSS OF OFFSITE 115 KV POWER SOURCES (LIGHTHOUSE HILL-JAF, OSWEGO STEAM, OR BOTH)
ED02	BATTERY CHARGER AND EMERGENCY LIGHTING SUPPLY MOTOR GENERATOR TRIPS (161, 171, OR BOTH)
ED03	COMPUTER POWER SUPPLY MOTOR GENERATOR TRIPS (167)
ED04	AC POWERBOARD ELECTRICAL FAULT (PB11)
ED05	AC POWERBOARD ELECTRICAL FAULT (PB12)

ED06	AC POWERBOARD ELECTRICAL FAULT (PB101)
ED07	AC POWERBOARD ELECTRICAL FAULT (PB102)
ED08	AC POWERBOARD ELECTRICAL FAULT (PB103)
ED09	AC POWERBOARD ELECTRICAL FAULT (PB13 SECTION A)
ED10	AC POWERBOARD ELECTRICAL FAULT (PB13 SECTION B)
ED11	AC POWERBOARD ELECTRICAL FAULT (PB13 SECTION C)
ED12	AC POWERBOARD ELECTRICAL FAULT (PB14 SECTION A)
ED13	AC POWERBOARD ELECTRICAL FAULT (PB14 SECTION B)
ED14	AC POWERBOARD ELECTRICAL FAULT (PB14 SECTION C)
ED15	AC POWERBOARD ELECTRICAL FAULT (PB15 SECTION A)
ED16	AC POWERBOARD ELECTRICAL FAULT (PB15 SECTION B)
ED17	AC POWERBOARD ELECTRICAL FAULT (PB15 SECTION C)
ED18	AC POWERBOARD ELECTRICAL FAULT (PB16 SECTION A)
ED19	AC POWERBOARD ELECTRICAL FAULT (PB16 SECTION B)
ED20	AC POWERBOARD ELECTRICAL FAULT (PB17 SECTION A)
ED21	AC POWERBOARD ELECTRICAL FAULT (PB18 SECTION B)
ED22	DC POWERBOARD ELECTRICAL FAULT (11, 12, OR BOTH)
ED23	LOSS OF POWER TO INSTRUMENT CONTROL BUS 130 - NORMAL
ED24	LOSS OF POWER TO INSTRUMENT CONTROL BUS 130 - ALTERNATE
ED25	LOSS OF POWER TO INSTRUMENT CONTROL BUS 130 - NORMAL AND ALTERNATE
EG01	MAIN GENERATOR TRIP - ELECTRICAL FAULT
EG02	GENERATOR AUTOMATIC VOLTAGE REGULATOR FAILS - INCREASE
EG03	GENERATOR AUTOMATIC VOLTAGE REGULATOR FAILS - DECREASE
EG04	MAIN GENERATOR CORE INTERNAL HEATING
EG05	MAIN TRANSFORMER LOSS OF COOLING
EG06	GENERATOR HYDROGEN COOLING SYSTEM LEAKAGE

EG07	GENERATOR HYDROGEN MAIN SEAL OIL PUMP FAILURE
EG08	GENERATOR HYDROGEN EMERGENCY SEAL OIL PUMP FAILURE
EG09	STATOR COOLING PUMP TRIP (11, 12, OR BOTH)
EG10	LOSS OF CONTROL AIR TO 345 KV BREAKER (R-915, R-925, OR BOTH)
EG11	POWER GRID NETWORK LOAD TRANSIENT - INCREASE
EG12	POWER GRID NETWORK LOAD TRANSIENT - DECREASE
EG13	STATOR WATER COOLING DEMINERALIZER RESIN DEPLETION
FP01	DIESEL FIRE PUMP FAILURE
FP02	ELECTRIC FIRE PUMP FAILURE
FP03	AC FOAM PUMP FAILURE
FP04	DC FOAM PUMP FAILURE
FP05	TURBINE ISLAND FIRE DETECTION (D-1195, D-1155, D-1165, D-1175, D-1061, DA-1114, DA-1131, OR ANY)
FP06	CONTROL ROOM FIRE DETECTION (FIRE PANEL 2, CONTROL CONSOLE, "L" PANEL, "K" PANEL, "H" PANEL, "F" PANEL, "A" PANEL, OR ANY)
FP07	TURBINE BUILDING FIRE DETECTION (DA-22092MG, DA-2083M, DA-2081S, DA2092E, D-2102, OR ANY)
FP08	DIESEL ROOM FIRE DETECTION (DX-2113A, DX-2113B, DX-2141A, DA-2141, DX-2151B, DA-2151, D-2151, OR ANY)
FP09	AUXILIARY CONTROL ROOM/CABLE SPREADING ROOM FIRE DETECTION (D-3031PL, DX-3031A, DX-3011B, WD-8131, WD-8082, OR ANY)
FP10	REACTOR BUILDING FIRE DETECTION (DX-4217A, DA-4116W, DA-4076E, D-4207, D-4156, SP-4126, D-4086, OR ANY)
FW01	CONDENSATE PUMP TRIP (11, 12, 13, OR ANY)
FW02	FEEDWATER BOOSTER PUMP TRIP (11, 12, 13, OR ANY)
FW03	FEEDWATER PUMP TRIP (11, 12, OR BOTH)
FW04	SHAFT DRIVEN FEEDWATER PUMP 13 FAILURE
FW05	SHAFT DRIVEN FEEDWATER PUMP CLUTCH FAILURE TO ENGAGE
FW06	SHAFT DRIVEN FEEDWATER PUMP CLUTCH FAILURE TO DISENGAGE
FW07	FEEDWATER CONTROL VALVE 11 CONTROLLER FAILS HIGH

FW08	FEEDWATER CONTROL VALVE 11 CONTROLLER FAILS LOW
FW09	FEEDWATER CONTROL VALVE 12 CONTROLLER FAILS HIGH
FW10	FEEDWATER CONTROL VALVE 12 CONTROLLER FAILS LOW
FW11	FEEDWATER CONTROL VALVE 13 CONTROLLER FAILS HIGH
FW12	FEEDWATER CONTROL VALVE 13 CONTROLLER FAILS LOW
FW13	FEEDWATER CONTROL VALVE 13 CONTROLLER FAILS AS IS
FW14	FEEDWATER MASTER CONTROLLER FAILS HIGH
FW15	FEEDWATER MASTER CONTROLLER FAILS LOW
FW16	FEEDWATER MASTER CONTROLLER FAILS AS IS
FW17	CONDENSATE DEMINERALIZER DEPLETION
FW18	FEEDWATER CONDUCTIVITY INCREASE
FW19	CONDENSATE RECIRCULATION VALVE (FCV 50-24) FAILS OPEN
FW20	CONDENSATE RECIRCULATION VALVE (FCV 50-24) FAILS CLOSED
FW21	FEEDWATER BOOSTER PUMP RECIRCULATION VALVE FAILS OPEN (FCV 51-58, FCV 51-59, FCV 51-60, OR ANY)
FW22	FEEDWATER HEATER TUBE LEAK
FW23	FEEDWATER PUMP RECIRCULATION VALVES FAIL OPEN (11, 12, 13, OR ANY)
FW24	FEEDWATER CONTROL VALVE FAILS CLOSED (13A, 13B, OR BOTH)
FW25	THREE MILE ISLAND ACCIDENT (BWR EQUIVALENT)
FW26	CONDENSATE BYPASS SPRAY TO MAIN CONDENSER FLOW CONTROL VALVE (FCV 50-22) FAILS CLOSED
FW27	LOSS OF COMPENSATION TO FEEDWATER FLOW TRANSMITTER
FW28	HPCI MODE FAILURE TO INITIATE (11, 12, OR BOTH)
FW29	HPCI MODE INADVERTANT INITIATION (11, 12, OR BOTH)
HV01	REACTOR BUILDING EXHAUST FAN TRIP (11, 12, OR BOTH)
HV02	EMERGENCY VENTILATION FAN TRIP (11, 12, OR BOTH)
IA01	LOSS OF INSTRUMENT AIR
LP01	LIQUID POISON PUMP TRIP (A, B, OR BOTH)

MC01	MAIN CONDENSER AIR INLEAKAGE
MC02	STEAM JET AIR EJECTOR STEAM SUPPLY VALVE FAILS CLOSED
MC03	HOTWELL LEVEL CONTROLLERS IN AUTO FAIL HIGH
MC04	HOTWELL LEVEL CONTROLLERS IN AUTO FAIL LOW
MC05	HOTWELL LEVEL CONTROLLERS IN AUTO FAIL AS IS
MC06	EXPLOSION IN AIR EJECTOR DISCHARGE PIPING
MS01	STEAM LEAK RUPTURE OUTSIDE PRIMARY CONTAINMENT (DESIGN BASIS)
MS02	MSIV DISC SEPARATES FROM STEM
MS03	ONE MSIV FAILS CLOSED (VALVE 122)
MS04	STEAM LINE RUPTURE INSIDE PRIMARY CONTAINMENT (DESIGN BASIS)
MS05	TURBINE STEAM SEAL REGULATOR FAILS CLOSED
MS06	MOISTURE SEPARATOR DRAIN TANK LEVEL CONTROL FAILS LOW
MS07	FIRST STAGE REHEATER 111 STEAM SUPPLY VALVE CLOSES
MS08	SECOND STAGE REHEATER 112 STEAM SUPPLY VALVE CLOSES
MS09	SECOND STAGE REHEATER 112 DRAIN TANK LEVEL CONTROL FAILS LOW
MS10	LOSS OF EXTRACTION STEAM TO HIGH PRESSURE FEEDWATER HEATER (115, 125, 135, OR ANY)
MS11	LOSS OF COMPENSATION TO STEAM FLOW TRANSMITTER
NM01	SRM CHANNEL (11, 12, 13, 14, OR ANY) FAILURE - UPSCALE
NM02	SRM CHANNEL (11, 12, 13, 14, OR ANY) FAILURE - DOWNSCALE
NM03	SRM CHANNEL RECORDER FAILURE (RED, BLACK, OR BOTH PENS)
NM04	SRM CHANNEL (11, 12, 13, 14, OR ANY) FAILURE - INOPERATIVE
NM05	SRM CHANNEL (11, 12, 13, 14, OR ANY) FAILURE - UPSCALE, RECORDER INOPERATIVE
NM06	SRM CHANNEL (11, 12, 13, 14, OR ANY) FAILURE - DOWNSCALE
NM07	SRM CHANNEL (11, 12, 13, 14, OR ANY) FAILURE - RECORDER
NM08	SRM CHANNEL (11, 12, 13, 14, OR ANY) FAILURE - INOPERATIVE

NM09	SRM CHANNEL (11, 12, 13, 14, OR ANY) DETECTOR STUCK
NM10	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18, OR ANY) FAILURE - UPSCALE
NM11	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18, OR ANY) FAILURE - DOWNSCALE
NM12	IRM/APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18, OR ANY) FAILURE - RECORDER
NM13	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18, OR ANY) FAILURE - INOPERATIVE
NM14	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18, OR ANY) FAILURE - UPSCALE
NM15	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18, OR ANY) FAILURE - DOWNSCALE
NM16	IRM/APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18, OR ANY) FAILURE - RECORDER
NM17	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18, OR ANY) INOPERATIVE
NM18	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18, OR ANY) DETECTOR STUCK
NM19	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18, OR ANY) FAILURE - UPSCALE
NM20	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18, OR ANY) FAILURE - DOWNSCALE
NM21	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18, OR ANY) FAILURE - INOPERATIVE
NM22	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18, OR ANY) FAILURE - UPSCALE
NM23	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18, OR ANY) FAILURE - DOWNSCALE
NM24	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18, OR ANY) FAILURE - INOPERATIVE
NM25	ANY LPRM (X-Y-J) FAILURE - UPSCALE
NM26	ANY LPRM (X-Y-J) FAILURE - UPSCALE
NM27	ANY LPRM (X-Y-J) FAILURE - UPSCALE
NM28	ANY LPRM (X-Y-J) FAILURE - DOWNSCALE
NM29	ANY LPRM (X-Y-J) FAILURE - DOWNSCALE
NM30	ANY LPRM (X-Y-J) FAILURE - DOWNSCALE

NM31	ANY LPRM (X-Y-JO FAILURE - DOWNSCALE
NM33	TIP DETECTOR STUCK IN CORE
NM34	ANY LPRM (X-Y-J) DRIFT +/- 25%
NM35	ANY LPRM (X-Y-J) DRIFT +/- 25%
NM36	RECIRC FLOW CONVERTER CHANNEL (11, 12, OR BOTH) FAILURE - UPSCALE
NM37	RECIRC FLOW CONVERTER CHANNEL (11, 12, OR BOTH) FAILURE - DOWNSCALE
NM38	RECIRC FLOW CONVERTER CHANNEL (11, 12, OR BOTH) FAILURE - AS IS
NM39	RECIRC FLOW CONVERTER CHANNEL (11, 12, OR BOTH) FAILURE - INOPERATIVE
NM40	RECIRC FLOW CONVERTER (11, 12, OR BOTH) FAILURE - COMPARATOR
OG01	OFF GAS RECOMBINER PREHEATER STEAM SUPPLY FAILS CLOSED
OG02	OFF GAS RECOMBINER MIXING JET STEAM SUPPLY FAILS OPEN
OG03	OFF GAS RECOMBINER MIXING JET STEAM SUPPLY FAILS CLOSED
OG04	OFF GAS DISCHARGE TO STACK ISOLATION VALVE FAILS CLOSED
PC01	DRYWELL-TORUS DIFFERENTIAL PRESSURE CONTROL FAILURE - INCREASE
PC02	DRYWELL-TORUS DIFFERENTIAL PRESSURE CONTROL FAILURE - DECREASE
PC03	PRIMARY CONTAINMENT LEAKAGE
PP01	FAILURE OF PLANT PROCESS COMPUTER
RD01	CONTROL ROD XX-YY FAILURE - DRIFT IN
RD02	CONTROL ROD XX-YY FAILURE - DRIFT OUT
RD03	CONTROL ROD XX-YY FAILURE - ACCUMULATOR STUCK
RD04	CONTROL ROD XX-YY FAILURE - STUCK
RD05	CONTROL ROD XX-YY FAILURE - UNCOUPLED
RD06	CONTROL ROD XX-YY FAILURE - SCRAMMED
RD07	CONTROL ROD XX-YY FAILURE - SLOW SCRAM TIME
RD08	CONTROL ROD XX-YY FAILURE - RPIS
RD09	CONTROL ROD XX-YY FAILURE - DRIFT IN
RD10	CONTROL ROD XX-YY FAILURE - DRIFT OUT

RD11	CONTROL ROD XX-YY FAILURE - ACCUMULATOR TROUBLE
RD12	CONTROL ROD XX-YY FAILURE - STUCK
RD13	CONTROL ROD XX-YY FAILURE - UNCOUPLED
RD14	CONTROL ROD XX-YY FAILURE - SCRAMMED
RD15	CONTROL ROD XX-YY FAILURE - SLOW SCRAM TIME
RD16	CONTROL ROD XX-YY FAILURE - RPIS
RD17	CONTROL ROD XX-YY FAILURE - DRIFT IN
RD18	CONTROL ROD XX-YY FAILURE - DRIFT OUT
RD19	CONTROL ROD XX-YY FAILURE - ACCUMULATOR TROUBLE
RD20	CONTROL ROD XX-YY FAILURE - STUCK
RD21	CONTROL ROD XX-YY FAILURE - UNCOUPLED
RD22	CONTROL ROD XX-YY FAILURE - SCRAMMED
RD23	CONTROL ROD XX-YY FAILURE - SLOW SCRAM TIME
RD24	CONTROL ROD XX-YY FAILURE - RPIS
RD25	CONTROL ROD XX-YY FAILURE - DRIFT IN
RD26	CONTROL ROD XX-YY FAILURE - DRIFT OUT
RD27	CONTROL ROD XX-YY FAILURE - ACCUMULATOR TROUBLE
RD28	CONTROL ROD XX-YY FAILURE - STUCK
RD29	CONTROL ROD XX-YY FAILURE - UNCOUPLED
RD30	CONTROL ROD XX-YY FAILURE - SCRAMMED
RD31	CONTROL ROD XX-YY FAILURE - SLOW SCRAM TIME
RD32	CONTROL ROD XX-YY FAILURE - RPIS
RD33	CONTROL ROD BANK FAILURE TO SCRAM (BANK I, II, III, IV, V, OR ANY)
RD34	LOSS OF CRD INSTRUMENT AIR PRESSURE
RD35	CRD HYDRAULIC PUMP TRIP (11, 12, OR BOTH)
RD36	CRD FLOW CONTROL VALVE FAILURE - CLOSED (11, 12, OR BOTH)

RD37	RPIS FAILURE - COMPLETE SYSTEM FAILURE
RD38	REACTOR MANUAL CONTROL SYSTEM TIMER MALFUNCTION - WITHDRAWN
RD39	REACTOR MANUAL CONTROL SYSTEM TIMER MALFUNCTION - INSERT
RD40	REACTOR MANUAL CONTROL SYSTEM TIMER MALFUNCTION - SETTLE
RD41	SCRAM DISCHARGE VOLUME RUPTURE
RM01	DRAWER INOPERATIVE FOR ANY PROCESS RADIATION MONITOR SIMULATED (INSTRUCTOR SELECT)
RM02	DRAWER DOWNSCALE FOR ANY AREA RADIATION MONITOR SIMULATED (INSTRUCTOR SELECT)
RM03	DRAWER UPSCALE FOR ANY AREA RADIATION MONITOR SIMULATED
RM04	DRAWER UPSCALE FOR ANY AREA RADIATION MONITOR SIMULATED
RM05	CONTINUOUS AIR MONITOR FAILURE (TURBINE BUILDING, REACTOR BUILDING, WASTE BUILDING, DRYWELL)
RM06	ANY PROCESS RADIATION MONITOR FAILURE
RP01	REACTOR TRIP POWER SUPPLY MOTOR GENERATOR (131, 141, OR BOTH)
RP02	CONTROL POWER SUPPLY BOTH MOTOR GENERATOR TRIPS (162, 172, OR BOTH)
RP03	REACTOR SCRAM
RP04	REACTOR PROTECTION SYSTEM FAILURE TO SCRAM - AUTOMATIC
RP05	REACTOR PROTECTION SYSTEM FAILURE TO SCRAM - COMPLETE
RP06	REACTOR VESSEL ISOLATION
RP07	PRIMARY CONTAINMENT ISOLATION
RP08	ANTICIPATED TRANSIENT WITHOUT SCRAM (ATWS)
RP09	EMERGENCY CONDENSER FAILS TO ISOLATE (11, 12, OR BOTH)
RR01	RECIRCULATION PUMP 11 DRIVE BREAKER TRIP
RR02	RECIRCULATION PUMP 11 FIELD BREAKER TRIP
RR03	RECIRCULATION PUMP 11 SEIZURE
RR04	RECIRCULATION PUMP 11 CONTROL SIGNAL FAILURE
RR05	RECIRCULATION PUMP 11 INCOMPLETE START SEQUENCE

RR06	RECIRCULATION PUMP 12 DRIVE BREAKER TRIP
RR07	RECIRCULATION PUMP 12 FIELD BREAKER TRIP
RR08	RECIRCULATION PUMP 12 SEIZURE
RR09	RECIRCULATION PUMP 12 CONTROL SIGNAL FAILURE
RR10	RECIRCULATION PUMP 12 INCOMPLETE START SEQUENCE
RR11	RECIRCULATION PUMP 13 DRIVE BREAKER TRIP
RR12	RECIRCULATION PUMP 13 FIELD BREAKER TRIP
RR13	RECIRCULATION PUMP 13 SEIZURE
RR14	RECIRCULATION PUMP 13 CONTROL SIGNAL FAILURE
RR15	RECIRCULATION PUMP 13 INCOMPLETE START SEQUENCE
RR16	RECIRCULATION PUMP 14 DRIVE BREAKER TRIP
RR17	RECIRCULATION PUMP 14 FIELD BREAKER TRIP
RR18	RECIRCULATION PUMP 14 SEIZURE
RR19	RECIRCULATION PUMP 14 CONTROL SIGNAL FAILURE
RR20	RECIRCULATION PUMP 14 INCOMPLETE START SEQUENCE
RR21	RECIRCULATION PUMP 15 DRIVE BREAKER TRIP
RR22	RECIRCULATION PUMP 15 FIELD BREAKER TRIP
RR23	RECIRCULATION PUMP 15 SEIZURE
RR24	RECIRCULATION PUMP 15 CONTROL SIGNAL FAILURE
RR25	RECIRCULATION PUMP 15 INCOMPLETE START SEQUENCE
RR26	MASTER RECIRCULATION FLOW CONTROLLER FAILURE - HIGH
RR27	MASTER RECIRCULATION FLOW CONTROLLER FAILURE - LOW
RR28	MASTER RECIRCULATION FLOW CONTROLLER FAILURE - AS IS
RR30	REACTOR VESSEL PRESSURE RECORDER FAILURE (ID77) - UPSCALE
RR31	REACTOR VESSEL PRESSURE RECORDER FAILURE (ID77) - DOWNSCALE
RR32	REACTOR VESSEL PRESSURE RECORDER FAILURE (ID77) - AS IS
RR33	RECIRCULATION PUMP LOWER (INNER) SEAL FAILURE - PUMP 11

RR34	RECIRCULATION PUMP UPPER (OUTER) SEAL FAILURE - PUMP 11
RR35	REACTOR VESSEL PRESSURE INDICATOR FAILURE (ID76C) - UPSCALE
RR36	REACTOR VESSEL PRESSURE INDICATOR FAILURE (ID76C) - DOWNSCALE
RR37	REACTOR VESSEL PRESSURE INDICATOR FAILURE (ID76C) - AS IS
RR38	REACTOR VESSEL LEVEL RECORDER FAILURE (ID14) - UPSCALE
RR39	REACTOR VESSEL LEVEL RECORDER FAILURE (ID14) - DOWNSCALE
RR40	REACTOR VESSEL LEVEL RECORDER FAILURE (ID14) - AS IS
RR41	REACTOR VESSEL LEVEL INDICATION (CONTROL SYSTEM) FAILURE - UPSCALE (ID59D)
RR42	REACTOR VESSEL LEVEL INDICATION (CONTROL SYSTEM) FAILURE - DOWNSCALE (ID59D)
RR43	REACTOR VESSEL LEVEL INDICATION (CONTROL SYSTEM) FAILURE - AS IS (ID59D)
RR44	REACTOR VESSEL LEVEL INDICATION (WIDE RANGE SAFETY SYSTEM) FAILURE - UPSCALE (LI 36-19, CH.12)
RR45	REACTOR VESSEL LEVEL INDICATION (WIDE RANGE SAFETY SYSTEM) FAILURE - DOWNSCALE (LI 36-19, CH.12)
RR46	REACTOR VESSEL LEVEL INDICATION (WIDE RANGE SAFETY SYSTEM) FAILURE - AS IS (LI 36-19, CH.12)
RR47	RECIRCULATION PUMP DISCHARGE VALVE STEM SEPARATES FROM VALVE GATE (11,12,13,14,15,OR ANY)
RR48	REACTOR VESSEL LEVEL INDICATION (FUEL ZONE SAFETY SYSTEM) FAILURE - UPSCALE
RR49	REACTOR VESSEL LEVEL INDICATION (FUEL ZONE SAFETY SYSTEM) FAILURE - DOWNSCALE
RR50	REACTOR VESSEL LEVEL INDICATION (FUEL ZONE SAFETY SYSTEM) FAILURE - AS IS
RR51	REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - HIGH
RR52	REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - LOW
RR53	REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - AS IS

RR54	REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - HIGH
RR55	REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - LOW
RR56	REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - AS IS
RR57	REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - HIGH
RR58	REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - LOW
RR59	REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - AS IS
RR60	REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - HIGH
RR61	REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - LOW
RR62	REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - AS IS
RR63	REACTOR RECIRCULATION PUMP 12 INNER SEAL FAILURE
RR64	REACTOR RECIRCULATION PUMP 12 OUTER SEAL FAILURE
RR65	REACTOR RECIRCULATION PUMP 15 TACHOMETER FAILS - HIGH
RR66	REACTOR RECIRCULATION PUMP 15 TACHOMETER FAILS - LOW
RR67	REACTOR RECIRCULATION PUMP 15 TACHOMETER FAILS - OSCILLATES
RR68	REACTOR RECIRCULATION PUMP M/A STATION FAILURE - INCREASE (11, 12, 13, 14, 15, OR ANY)
RR69	REACTOR RECIRCULATION PUMP M/A STATION FAILURE - DECREASE (11, 12, 13, 14, 15, OR ANY)
RR70	REACTOR RECIRCULATION PUMP M/A STATION FAILURE - AS IS (11, 12, 13, 14, 15, OR ANY)
RR71	REACTOR SAFETY VALVE INADVERTENTLY OPENS (PSV NR28A)
RR72	LOSS OF LEVEL COMPENSATION TO FEEDWATER CONTROL SYSTEM (GEMAC) LEVEL TRANSMITTER
RW01	ROD WORTH MINIMIZER FAILURE

RX01	FUEL CLADDING FAILURE
RX02	INCREASED ROD WORTH FOR ANY CONTROL ROD
SC01	SHUTDOWN COOLING PUMP TRIP (11, 12, 13, OR ANY)
SC02	SHUTDOWN COOLING HEAT EXCHANGER TUBE LEAK (11, 12, 13, OR ANY)
TC01	MAIN TURBINE TRIP
TC02	TURBINE GOVERNOR FAILS - HIGH
TC03	TURBINE GOVERNOR FAILS - LOW
TC04	ELECTRICAL PRESSURE REGULATOR FAILS - HIGH
TC05	ELECTRICAL PRESSURE REGULATOR FAILS - LOW
TC06	ELECTRICAL PRESSURE REGULATOR FAILS - OSCILLATES
TC07	MECHANICAL PRESSURE REGULATOR FAILS - HIGH
TC08	MECHANICAL PRESSURE REGULATOR FAILS - LOW
TC09	MECHANICAL PRESSURE REGULATOR FAILS - OSCILLATES
TC10	FIRST BYPASS VALVE STICKS OPEN
TC11	ALL BYPASS VALVES FAIL - OPEN
TC12	ALL BYPASS VALVES FAIL - CLOSED
TC13	TURBINE CONTROL VALVE FAILS CLOSED (11, 12, 13, 14, OR ANY)
TU01	EXHAUST HOOD SPRAY VALVE FAILS CLOSED
TU02	MAIN TURBINE HIGH VIBRATION BEARINGS #5 AND #6
TU03	MAIN TURBINE HIGH ECCENTRICITY
TU04	MAIN TURBINE BEARING OIL LOW PRESSURE
TU05	MAIN TURBINE BEARING HIGH TEMPERATURE
TU06	MAIN TURBINE THRUST BEARING WEAR

REMOTE FUNCTIONS

AD			
ADS	NONE		
AN			
ANNUNCIATOR SYSTEM	NONE		
CS			
CORE SPRAY	NONE		
CT			
CONTAINMENT SPRAY	RCT 1 80-43 TEST LINE TO TORUS BV	OPEN	CLOSE
	RCT 2 80-42 WASTE DISP MAN ISOLATION	OPEN	CLOSE
CU			
REACTOR CLEANUP	RCU1 CU-16 PCV ND37 MANUAL ISOLATION	OPEN	CLOSE
	RCU2 CU-19 FILTER BYPASS VALVE	OPEN	CLOSE
	RCU3 CU FILTER 11 INLET/OUTLET VALVES	OPEN	CLOSE
	RCU4 CU FILTER 12 INLET/OUTLET VALVES	OPEN	CLOSE
	RCU5 CU DEMIN 11 INLET/OUTLET VALVES	OPEN	CLOSE
	RCU6 CU DEMIN 12 INLET/OUTLET VALVES	OPEN	CLOSE
	RCU7 CU-20 DEMIN BYPASS VALVES	OPEN	CLOSE
CW1			
AUXILIARY WATER	RCW1 INTAKE WATER TEMPERATURE	32/80 DEG	75.00
	RCW2 INTAKE TUNNEL REVERSE FLOW	YES	NO
	RCW3 UPPER WIND SPEED	0.100 MPH	52.00
	RCW4 UPPER WIND SPEED VARIATION	0/30 MPH	5.00
	RCW5 LOWER WIND SPEED	0/100 MPH	45.00
	RCW6 LOWER WIND SPEED VARIATION	0/30 MPH	5.00
	RCW7 UPPER WIND DIRECTION	0/360 MPH	5.00
	RCW8 UPPER WIND DIRECTION VARIATION	0/90 DEG	150.00
	RCW9 LOWER WIND DIRECTION	0/360 DEG	150.00
	RCW10 LOWER WIND DIRECTION VARIATION	0/90 DEG	5.00
	RCW11 AMBIENT AIR TEMPERATURE	-30/+120 DEG	90.00
	RCW12 DELTA TEMPERATURE	-10/+120 DEG	10.00

CW2			
AUXILIARY WATER	NONE		
DG			
DIESEL GENERATOR	RDG1 DG 102 GOVERNOR SPEED DROOP	SET	RESET
	RDG2 DG 103 GOVERNOR SPEED DROOP	SET	RESET
EC			
EMERGENCY COOLING	REC1 IV 39-05 VALVE POSITION LIMIT	0/100%	100.00
	REC2 IV 39-06 VALVE POSITION LIMIT	0/100%	100.00
ED1			
ELECTRICAL DISTRIB.	RED1 SOUTH OSWEGO 115 KV BKR R10	OPEN	CLOSE
	RED2 FITZ 115 KV BKR R40	OPEN	CLOSE
	RED3 PB 13 BUS TIE BKR SEC A-SEC B	OPEN	CLOSE
	RED4 PB 13 BUS TIE BKR SEC B-SEC C	OPEN	CLOSE
	RED5 PB 14 BUS TIE BKR SEC A-SEC B	OPEN	CLOSE
ED1			
ELECTRICAL DISTRIB.	RED6 PB 14 BUS TIE BKR SEC B-SEC C	OPEN	CLOSE
	RED7 PB 15 BUS TIE BKR SEC A-SEC B	OPEN	CLOSE
	RED8 PB 16 BUS TIE BKR SEC B-SEC C	OPEN	CLOSE
	RED9 MG-SET 167 AC POWER SELECT	PB16	PB17
	RED10 MG-SET 167 DC POWER SELECT	PB11	PB12
	RED11 COMPUTER POWER SUPPLY SELECT	NORM	EMER
	RED12 IC BUS 130 NORM PWR BKR	OPEN	CLOSE
	RED13 IC BUS 130 ALT PWR BKR	OPEN	CLOSE
	RED14 PB1671 BUS TIE BKR	OPEN	CLOSE
	RED15 PB131 CLOSE A-B, OPEN 13A SUPPLY	YES	NO
	RED16 PB131 CLOSE A-B, OPEN 13C SUPPLY	YES	NO
	RED17 PB141 CLOSE A-B, OPEN 14A SUPPLY	YES	NO
	RED18 PB141 CLOSE A-B, OPEN 14C SUPPLY	YES	NO
ED2			
ELECTRICAL DISTRIB.	RED19 PB151 CLOSE A-B, OPEN 15A SUPPLY	YES	NO
	RED20 PB151 CLOSE A-B, OPEN 15C SUPPLY	YES	NO
	RED21 PB176 CLOSE A-B, OPEN 17A SUPPLY	YES	NO
	RED22 PB176 CLOSE AOB, OPEN 16A SUPPLY	YES	NO
	RED23 BAT BD11 EQUIP SW TO ALT	BB11	BB12

ED2			
ELECTRICAL DISTRIB.	RED24 BAT BD12 EQUIP SW TO ALT	BB12	BB11
	RED25 PB143 FEEDER BREAKER	14A	14C
ED3			
ELECTRICAL DISTRIB.	NONE		
EG1			
MAIN GENERATOR	REG1 345 KV BKR 100 42	OPEN	CLOSE
	REG2 345 KB MAN DISC 917	OPEN	CLOSE
	REG3 345 KV MAN DISC 926, 927	OPEN	CLOSE
	REG4 345 KV MOD SW 18	OPEN	CLOSE
	REG5 345 KV BKR R915/10	OPEN	CLOSE
	REG6 345 KV BKR R925/20	OPEN	CLOSE
	REG7 MAIN SEAL OIL PMP STATUS	STAT	NEUT
	REG8 EMER SEAL OIL PMP STATUS	START	NEUT
	REG9 EMER SEAL OIL PMP STATUS	TRIP	AUTO
	REG10 GEN STATOR COOLING PMP 11	START	NEUT
	REG11 GEN STATOR COOLING PMP 11	TRIP	AUTO
	REG12 GEN STATOR COOLING PMP 12	START	NEUT
	REG13 GEN STATOR COOLING PMP 12	TRIP	AUTO
EG1			
MAIN GENERATOR	REG14 GENERATOR OUTPUT LINKS	OPEN	CLOSE
	REG15 GEN HYDROGEN SUPPLY VALVE	OPEN	CLOSE
	REG16 BACKFEED INTERLOCKS	ON	OFF
EG2			
MAIN GENERATOR	NONE		
FP			
FIRE PROTECTION	RFP1 CITY WATER SUPPLY TO FP HDR	OPEN	CLOSE
	RFP2 SUPPLY TO EMER COOL MU TANK 11	OPEN	CLOSE
	RFP3 SUPPLY TO EMER COOL MU TANK 12	OPEN	CLOSE
	RFP4 SUPPLY TO FEEDWATER SYSTEM	OPEN	CLOSE
	RFP5 DIESEL FIRE PUMP STATUS	OFF	AUTO

<u>FW1</u>			
FEEDWATER	RFW1 50-10 COND PUMP 11 DISCH VLV	OPEN	CLOSE
	RFW2 50-11 COND PUMP 12 DISCH VLV	OPEN	CLOSE
	RFW3 50-12 COND PUMP 13 DISCH VLV	OPEN	CLOSE
	RFW4 50-31 COND DEMIN BYPASS VLV	OPEN	CLOSE
	RFW5 COND DEMIN 11 INLET/OUTLET VLV	OPEN	CLOSE
	RFW6 COND DEMIN 12 INLET/OUTLET VLV	OPEN	CLOSE
	RFW7 COND DEMIN 13 INLET/OUTLET VLV	OPEN	CLOSE
	RFW8 COND DEMIN 14 INLET/OUTLET VLV	OPEN	CLOSE
	RFW9 COND DEMIN 15 INLET/OUTLET VLV	OPEN	CLOSE
	RFW10 COND DEMIN 16 INLET/OUTLET VLV	OPEN	CLOSE
	RFW11 50-20 SJAE BYPASS FCB	0/100%	50.00
	RFW12 50-40 BOOSTER PUMP 11 SUCTION V	OPEN	CLOSE
	RFW13 50-39 BOOSTER PUMP 12 SUCTION V	OPEN	CLOSE
	RFW14 50-38 BOOSTER PUMP 13 SUCTION V	OPEN	CLOSE
	RFW15 FW HEATER STRING 11 ISOL VLVS	OPEN	CLOSE
	RFW16 FW HEATER STRING 12 ISOL VLVS	OPEN	CLOSE
	RFW17 FW HEATER STRING 13 ISOL VLVS	OPEN	CLOSE
	RFW18 DEMIN WATER STORAGE TANK REFILL	OPEN	CLOSE
<u>FW2</u>			
FEEDWATER	RFW19 50-16 BYPASS AROUND FCV 50-22	OPEN	CLOSE
	RFW20 MANUAL OPERATION OF LCV50-15	0/100%	0.00
	RFW21 MANUAL OPERATION OF LCV50-07,08	0/100%	0.00
	RFW22 FW HEATER 135 ISOL VALVES	OPEN	CLOSE
	RFW23 HOTWELL LEVEL CONTROL	MAN	AUTO
<u>FW3</u>			
FEEDWATER	NONE		
<u>HV</u>			
HVAC	NONE		
<u>IA</u>			
INSTRUMENT AIR	RIA1 INST AIR SUP TO BREATHING AIR	OPEN	CLOSE
	RIA2 BRW-G-6 WASTE DISPOSAL XTIE	OPEN	CLOSE
	RIA3 94-42 CONT SPRAY AIR RCVR ISOL	OPEN	CLOSE
	RIA4 SERV AIR TO INST AIR BV	TRIP	RESET

<u>LP</u>			
LIQUID POISON	RLP1 LIQ POISON PMP 11 LOCAL START	ON	OFF
	RLP2 LIQ POISON PMP 12 LOCAL START	ON	OFF
	RLP3 DEMIN WATER TO LP PUMPS	OPEN	CLOSE
<u>MC</u>			
CONDENSER	RMC1 OG-1,2 PRIM JET VAP SUCT VALVES	OPEN	CLOSE
	RMC2 OG-3,4 PRIM JET VAP SUCT VALVES	OPEN	CLOSE
	RMC3 MS 14,15 PRIM JET STEAM VLAVES	OPEN	CLOSE
	RMC4 MS-16,17 PRIM JET STEAM VALVES	OPEN	CLOSE
	RMC5 OG-9,10 SEC JET VAPOR SUCT VALVES	OPEN	CLOSE
	RMC6 MS-19,20 SEC JET STEAM VALVES	OPEN	CLOSE
	RMC7 MS-12 SJAE PCV BYPASS	OPEN	CLOSE
<u>MS1</u>			
MAIN STEAM	RMS1 HP FW HTR 115 RESET	TRIP	RESET
	RMS2 HP FW HTR 125 RESET	TRIP	RESET
	RMS3 HP FW HTR 135 RESET	TRIP	RESET
	RMS4 HP FW HTR STRING 11 RESET	TRIP	RESET
	RMS5 HP FW HTR STRING 12 RESET	TRIP	RESET
	RMS6 HP FW HTR STRING 13 RESET	TRIP	RESET
	RMS7 MS-8 MAIN STEAM LINE ISOL	OPEN	CLOSE
	RMS8 SPE 11 SUCTION VALVE	OPEN	CLOSE
	RMS9 SPE 12 SUCTION VALVE	OPEN	CLOSE
	RMS10 TRIP ALL FW HTR EXTR NRVS	TRIP	RESET
<u>MS1</u>			
MAIN STEAM	NONE		
<u>NM1</u>			
NEUTRON MONITOR	RNM1 APRM 11 GAIN	0/100%	2.43
	RNM2 APRM 12 GAIN	0/100%	2.38
	RNM3 APRM 13 GAIN	0/100%	2.36
	RNM4 APRM 14 GAIN	0/100%	2.39
	RNM5 APRM 15 GAIN	0/100%	2.20
	RNM6 APRM 16 GAIN	0/100%	2.18
	RNM7 APRM 17 GAIN	0/100%	2.16
	RNM8 APRM 18 GAIN	0/100%	2.17
<u>NM2</u>			
NEUTRON MONITOR	NONE		

NM3			
NEUTRON MONITOR	NONE		
OD			
ON DEMAND	NON-FUNCTIONAL		
DG			
OFF-GAS/RAD WASTE	RDG1 DG 102 GOVERNOR SPEED DROOP	SET	RESET
	RDG2 DG 103 GOVERNOR SPEED DROOP	SET	RESET
PC			
CONTAINMENT	RPC1 NITROGEN FROM VAPORIZER	YES	NO
	RPC2 201.7-13 DW CAM ISOL VLV 11	OPEN	CLOSE
	RPC3 201.7-29 DW CAM ISOL VLV 12	OPEN	CLOSE
	RPC4 201-40,41 DW, TORUS TO VENT SYS	OPEN	CLOSE
	RPC5 201-44,46 DW, TORUS TO ATMOS	OPEN	CLOSE
	RPC6 BV201.2-135,136 INTERLOCK DEFEAT	YES	NO
	RPC7 IV201-31,32 ISOLATION DEFEAT	YES	NO
PP			
PROCESS COMPUTER	RPP01 MEMORY PROTECT PLAN	NORM	REMOVD
RD1			
CONTROL RODS	RRD1 301-2A CRD PUMP 11 DISCH VLV	OPEN	CLOSE
	RRD2 301-2B CRD PUMP 12 DISCH VLV	OPEN	CLOSE
	RRD3 301-8A CRD PUMP 11 HEAD SPRAY ISOL	OPEN	CLOSE
	RRD4 301-8B CRD PUMP 12 HEAD SPRAY ISOL	OPEN	CLOSE
	RRD5 301-8B CRD FLOW CONTROL VLV ISOL	NC30A	NC30B
RD2			
CONTROL RODS	NONE		
RD3			
CONTROL RODS	NONE		
RM1			
RAD MONITOR	NONE		
RP			
RPS	RRP1 RX TRIP BUS 131 PWR SOURCE	NORM	EMER
	RRP2 RX TRIP BUS 141 PWR SOURCE	NORM	EMER
	RRP3 RPS BUS 11 PWR SOURCE	NORM	EMER
	RRP4 BUS 12 PWR SOURCE	NORM	EMER

RR1 REACTOR RECIRC	RRR1 RECIRC MG-SETS 11 LOCKOUT RELAY	TRIP	RESET
	RRR2 RECIRC MG-SETS 12 LOCKOUT RELAY	TRIP	RESET
	RRR3 RECIRC MG-SETS 13 LOCKOUT RELAY	TRIP	RESET
	RRR4 RECIRC MG-SETS 14 LOCKOUT RELAY	TRIP	RESET
	RRR5 RECIRC MG-SETS 15 LOCKOUT RELAY	TRIP	RESET
RR2 REACTOR RECIRC	NONE		
RR3 REACTOR RECIRC	NONE		
RR4 REACTOR RECIRC	NONE		
RW ROD WORTH MINIMIZER	RRW1 CONTROL ROD SEQUENCE SELECT	B	A
RX REACTOR CORE	NONE		
SC SHUTDOWN COOLING	NONE		
TC TURBINE CONTROL	RTC1 REACTOR FLOW LIMIT	0-120%	120.00
	RTC2 CONTROL VALVE LIMIT	0-120%	100.00
TU MAIN TURBINE	NONE		

MONITORED PARAMETERS

1. CORE REACTIVITY DK/K
2. CORE THERMAL POWER, %
3. CORE FLOW, LBM/HR
4. CORE PLATE DIFFERENTIAL PRESSURE, PSIG
5. CORE BORON CONCENTRATION, PPM
6. CORE AVERAGE VOID FRACTION, %
7. CORE MINIMUM CRITICAL POWER RATIO
8. CORE MAXIMUM LINEAR HEAT GENERATION, KW/FT
9. CORE INLET SUB COOLING, BTU/LBM
10. CORE AVERAGE FUEL TEMPERATURE, DEG F
11. CORE AVERAGE CLADDING TEMPERATURE, DEG F
12. CORE AVERAGE EXIT QUALITY, %
13. (SPARE)
14. (SPARE)
15. REACTOR COOLANT ACTIVITY, UCI/ML
16. REACTOR COOLANT CONDUCTIVITY, UMHO/CM
17. REACTOR HEATUP/COOLDOWN RATE, DEG F/HR
18. REACTOR LEVEL-NARROW RANGE, INCHES
19. REACTOR LEVEL-WIDE RANGE, FEET
20. REACTOR PRESSURE, PSIG
21. RECIRCULATION LOOP 11 FLOW, LBM/HR
22. RECIRCULATION LOOP 12 FLOW, LBM/HR
23. RECIRCULATION LOOP 13 FLOW, LBM/HR
24. RECIRCULATION LOOP 14 FLOW, LBM/HR
25. RECIRCULATION LOOP 15 FLOW, LBM/HR
26. RECIRCULATION LOOP 11 SUCTION TEMPERATURE, DEG F
27. RECIRCULATION LOOP 12 SUCTION TEMPERATURE, DEG F
28. RECIRCULATION LOOP 13 SUCTION TEMPERATURE, DEG F
29. CRD SYSTEM FLOW, LBM/HR
30. DRYWELL PRESSURE, PSIG
31. DRYWELL AVERAGE TEMPERATURE, DEG F
32. DRYWELL HYDROGEN CONCENTRATION, %
33. DRYWELL OXYGEN CONCENTRATION, %

34. SUPPRESSION CHAMBER PRESSURE, PSIG
35. SUPPRESSION POOL WATER TEMPERATURE, DEG F
36. SUPPRESSION POOL WATER LEVEL, FEET
37. SRM COUNT RATE, CPS
38. SRM PERIOD, SEC
39. APRM POWER LEVEL, %
40. CORE XENON CONCENTRATION, % OF FULL POWER EQU
41. RWCU SYSTEM PRESSURE, PSIG
42. RWCU SYSTEM FLOW, LBM/HR
43. RWCU NON-REGEN HEAT EXCHAN OUTLET TEMPERATURE, DEG F
44. RWCU DUMP FLOW, LBM/HR
45. TOTAL MAIN STEAM LINE FLOW, MLBM/HR
46. MAIN STEAM TUNNEL TEMPERATURE, DEG F
47. MAIN STEAM LINE RADIATION LEVEL, MR/HR
48. TOTAL MAIN STEAM RELIEF VALVE FLOW, LBM/HR
49. TURBINE SPEED, RPM
50. TURBINE INLET PRESSURE, PSIG
51. TURBINE STEAM FLOW, LBM/HR
52. TURBINE BYPASS VALVE STEAM FLOW, LBM/HR
53. TURBINE FIRST STAGE PRESSURE, PSIG
54. TURBINE EXHAUST HOOD TEMPERATURE, DEG F
55. SECOND STAGE REHEATER OUTLET PRESSURE, PSIG
56. SECOND STAGE REHEATER OUTLET TEMPERATURE, DEG F
57. CONDENSER VACUUM, IN HG V
58. CONDENSER HOTWELL LEVEL, INCHES
59. CONDENSER HOTWELL CONDUCTIVITY, UMHO/CM
60. CONDENSER VACUUM MAKEUP FLOW, LBM/HR
61. CONDENSER HOTWELL REJECT FLOW, LBM/HR
62. CONDENSATE DEPRESSION, BTU/LBM
63. CIRCULATING WATER INLET TEMPERATURE, DEG F
64. CIRCULATING WATER OUTLET TEMPERATURE, DEG F
65. TOTAL CIRCULATING WATER FLOW, GPM
66. CONDENSATE DEMINERA OUTLET CONDUC, UMHO/CM
67. TOTAL FEEDWATER SYSTEM FLOW, LBM/HR
68. FEEDWATER TEMPERATURE TO REACTOR, DEG F

69. GENERATOR LOAD, MWE
70. GENERATOR REACTIVE LOAD, MVAR
71. GENERATOR STATOR AMPS, AMP
72. GENERATOR TERMINAL VOLTS, VOLT
73. GENERATOR HYDROGEN PRESSURE, PSIG
74. DIESEL GENERATOR 102 LOAD, KWE
75. DIESEL GENERATOR 103 LOAD, KWE
76. OFF-GAS SYSTEM INLET FLOW, CFW
77. OFF-GAS SYSTEM OUTLET FLOW, CFW
78. OFF-GAS RECOMBINER INLET HYDROGEN CONCENTRATION, %
79. OFF-GAS RECOMBINER OUTLET HYDROGEN CONCENTRATION, %
80. OFF-GAS SYSTEM RADIATION LEVEL, MR/HR
81. CORE SPRAY LOOP 11 PRESSURE, PSIG
82. CORE SPRAY LOOP 12 PRESSURE, PSIG
83. CORE SPRAY LOOP 11 FLOW, LBM/HR
84. CORE SPRAY LOOP 12 FLOW, LBM/HR
85. EMERGENCY CONDENSER LOOP 11 FLOW, LBM/HR
86. EMERGENCY CONDENSER LOOP 12 FLOW, LBM/HR
87. EMERGENCY CONDENSER LOOP 11 RETURN TEMPERATURE, DEG F
88. EMERGENCY CONDENSER LOOP 12 RETURN TEMPERATURE, DEG F
89. EMERGENCY CONDENSER LOOP 11 VENT RAD LEVEL, MR/HR
90. EMERGENCY CONDENSER LOOP 12 VENT RAD LEVEL, MR/HR

NINE MILE POINT DATABASE CHANGES
AS GENERATED BY PLANT MODIFICATIONS

Modification N18040 caused the following prints/drawings to move up in revision level:

PRINT NUMBER	SHEET NUMBER(S)
18009	1,2
18041	7
19437	9
19438	6,8,9
19440	11
19845	4
19854	3
19859	8,8A,9,10,11A,13,14,17,18A
19951	8,9
19954	2,3,5,8
22020	4,5
22373	2,4,5
22381	1,2,4,11
22382	2,4,5
22383	1,4,8
22387	2
23119	1
34841	1,2,3,4
34842	1
34845	1,2,3

Modification N18042 caused the following prints/drawings to move up in revision level:

PRINT NUMBER	SHEET NUMBER(S)
19409	6,9,10
19438	1,7,8
19440	2,8,9,10
19854	1,3
22374	1,3,4

Modification N18090 caused the following prints/drawings to move up in revision level:

PRINT NUMBER	SHEET NUMBER(S)
19412	1,1A
19413	1,2
19416	2A
19417	1
19418	2
19847	---
22238	2
22239	7
22242	1
23126	1
23127	1

Modification N18266 caused the following prints/drawings to move up in revision level:

PRINT NUMBER	SHEET NUMBER(S)
18013	1
18014	1
19859	22
26726	1
N1-OP-9	---

Modification N182801 caused the following prints/drawings to move up in revision level:

PRINT NUMBER	SHEET NUMBER(S)
19437	2,6,10
19438	3
19440	2,6,10,11
19842	2
19845	2
19859	2,3,5,6,8,8A,10,10A,18,23
19951	10
22005	5,6,8,9,11,12,14,15
22302	1,2,6,7
22373	11,12,13
22374	2,3,4,5
22379	3
22381	5,6,7,8,9,10
22382	1,3
22383	3,5,6
22386	1,2

Malfunction N183582 caused the following prints/drawings to move up in revision level:

PRINT NUMBER	SHEET NUMBER(S)
26726	1,2,3,4

Modification N183583 caused the following specifications and summary to be added to the database:

SPDS Functional Specification
SPDS Software Design Specification
Process Computer Point Summary dated 2/15/85

Modification N183586 caused the following prints/drawings to move up in revision level:

PRINT NUMBER	SHEET NUMBER(S)
19859	18,18A
22373	3
22385	11,12,13,14,16,16A,17,17A,18,18A, 19,19A
23032	4

MALFUNCTIONS TESTED FOR ANSI/ANS 3.5 REPORT, 1986

AD01	FW17	RR09
AD05	FW21	RR13
AN01	FW25	RR17
CS02	FW29	RR21
CT03	IA01	RR25
CU04	LP01	RR28
CU08	MC01	RR29
CW01	MC04	RR32
CW02	MS01	RR36
CW05	MS02	RR40
CW09	MS04	RR44
DG02	MS07 ← ms10e	RR48
EC01	NM03	RR52
EC02	NM11	RR56
EC05	NM19	RR60
ED01	NM29	RR64
ED02	NM37	RR68
ED06	OG01	RR72
ED10	PC01	RX01
ED14	RD01	SC01
ED18	RD04	TC01
ED22	RD05	TC03
EG01	RD33	TC07
EG05	RD36	TC11
EG09	RD37	TU02
EG13	RD41	TU06
FP03	RM05	
FP07	RP01	
FW01	RP03	
FW05	RP05	
FW09	RR01	
FW13	RR05	

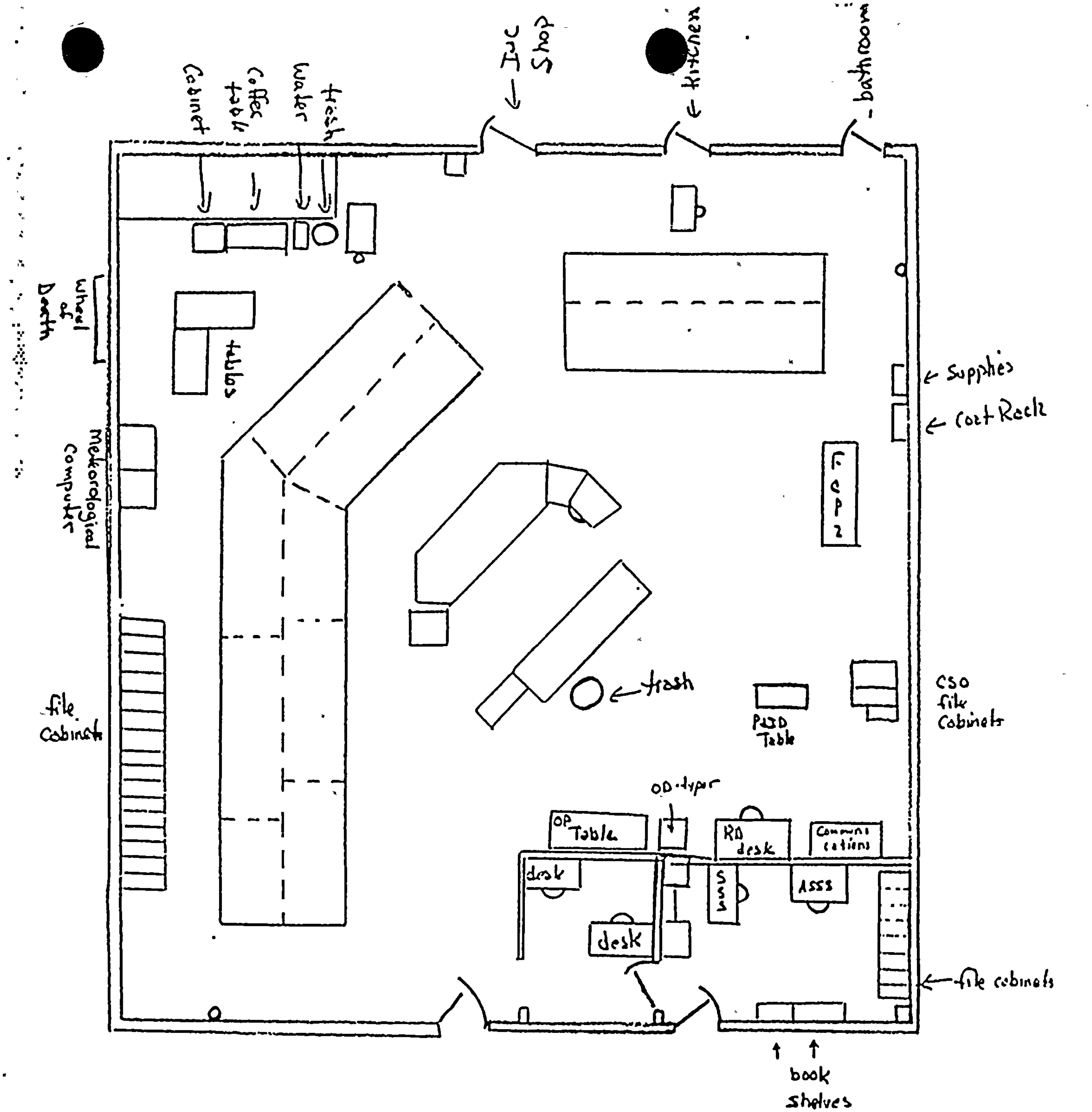
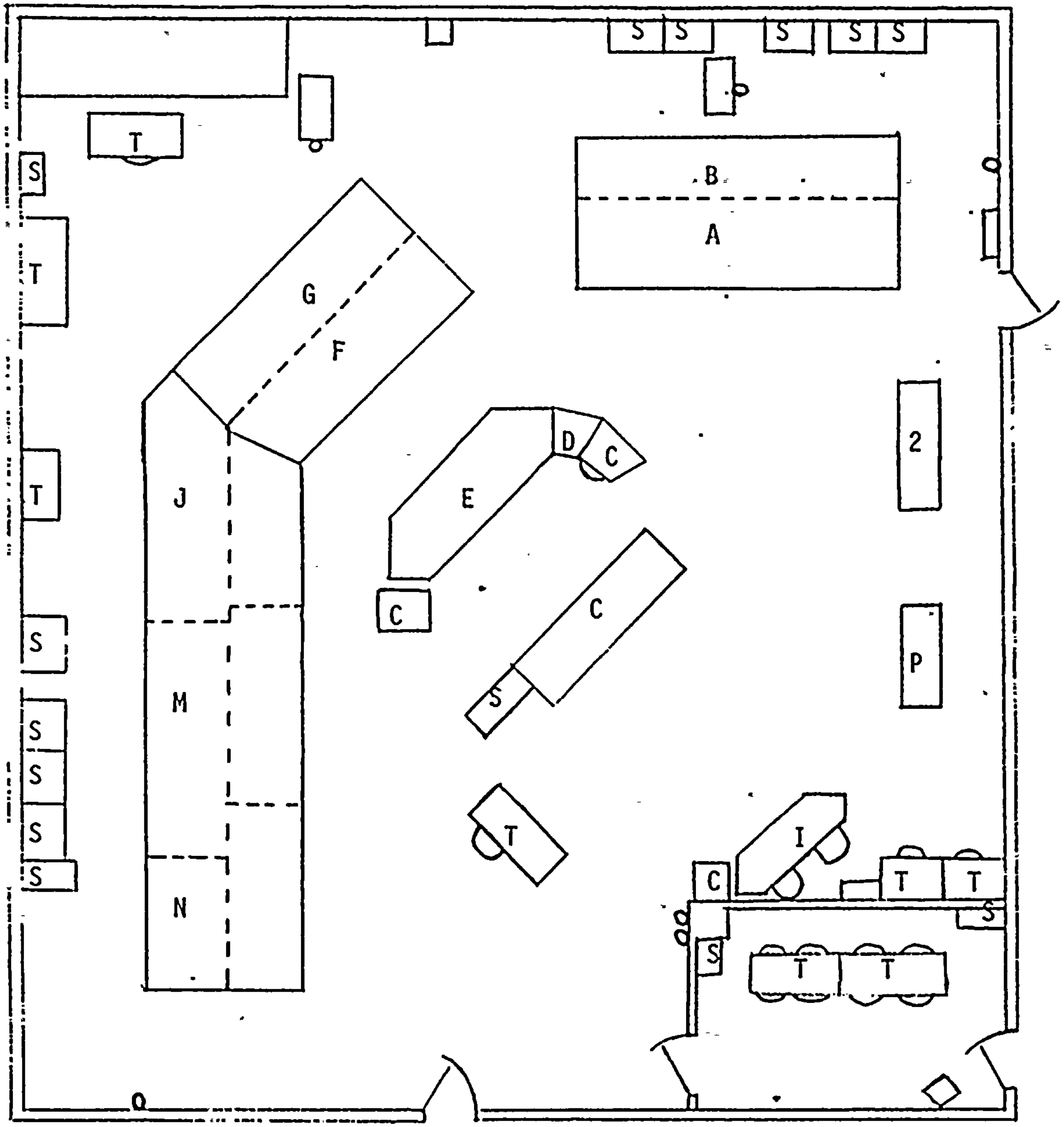


Figure 1 - Nine Mile Point Unit One Control Room



Legend

2	Main Fire Panel #2	
A	Panel A	Electric/Turbine Controls
B	Panel B	Relays/Turbine Controls
C	Plant Process Computer Equipment	
D	Chief Shift Operator Desk	
E	E Panel	Main Control Console
F	F Panel	NSSS
G	G Panel	Nuclear Instrumentation
H	H Panel	Balance of Plant
I	Instructors Console	
J	J Panel	Radiation Monitoring
K	K Panel	ECCS
L	L Panel	Primary Containment
M	M Panel	RPS
N	N Panel	Turbine
P	Print Rack	
S	Storage Cabinets	
T	Tables	

Figure 2 - Nine Mile Point Unit One Simulator Control Room

NINE MILE POINT NUCLEAR STATION

UNIT 1 PLANT REFERENCED SIMULATOR

ANNUAL REPORT: ANSI 3.5 - 1985

FOR THE YEAR

1987

Testing Conducted April - May 1987

Report Prepared June 1987

Prepared By: George Roarick

Reviewed By:

Supervisor, Unit #1 Operations Training	9/18/87 Date
Asst. Superintendent of Training	10/1/87 Date
Superintendent of Training	10/1/87 Date

I. SIMULATOR INFORMATION

The purpose of this section is to provide familiarization with the Nine Mile Point Unit 1 Plant Referenced Simulator and its applicability as an operator training device.

A. General

1. The simulator is owned by the General Physics Niagara Corporation which is a wholly-owned subsidiary of General Physics Corporation. It is used jointly by General Physics Corporation and Niagara Mohawk Power Corporation instructors. It is maintained and modified by the General Physics Corporation under the direction of Niagara Mohawk Power Corporation. The simulator was built by Singer/Link.
2. The simulator is a full scope control room simulator that simulates the Nine Mile Unit #1 plant. The plant is an 1850 Megawatt Thermal, BWR-2 plant with an electrical output of 620 Megawatts.
3. The simulator was declared ready for training on September 1, 1984.
4. The initial report on the simulator was prepared in March 1986. This report was prepared to document modification since March 1984 and to document simulator performance subsequent to the modifications.
5. In addition to training, the simulator has been used by the Operations Department to validate procedures prior to their implementation at the plant.

B. Control Room (Physical Fidelity)

1. The physical layout of the Nine Mile Point Unit #1 Control Room is shown in Attachment "A". The physical layout of the simulator is shown in Attachment "B". A comparison of these two drawings shows a high degree of similarity between the two rooms. The following differences exist:

   a. An additional office was added next to the "SSS" office at the plant. This office does not exist in the simulator (Note 1).
   b. The instructor's station occupies the area between Main Fire Panel 2 and the "SSS" office. A desk occupies this area at the plant (Note 1).
   c. A manual dose assessment calculator is mounted on the wall next to the stairwell in the plant's control room. A meteorological computer is located next to it. This equipment does not exist in the simulator.
   d. There are some minor differences in the amount and type of furniture in both rooms (Note 2).
   e. A TV camera is mounted on the wall above the NSSS typer at the plant. An emergency lighting system occupies this location in the simulator.

NOTES:

   1. Plans have been approved to move the instructor's station to an 18" high platform that is located in the same area that is occupied by the additional office.
   2. Items to correct this discrepancy are on order.

2. Panels and Equipment

The simulator contains all of the panels that are in the control room at the plant. All front panels and the "E" console are fully simulated. The back panels are fully simulated with the exception of the following:

a. RPS relays are installed, but are not functional.
b. Electrical protective relays are cosmetically simulated by photos mounted in the relay enclosures.
c. Only one of the four Transversing In-Core Probe control panels is functional.
d. Seismic Monitors are not functional.
e. Radwaste Solidification/Storage Building Area Radiations Monitors are not installed (Note 1).
f. The new Service Water, Radwaste Effluent and Control Room Vent Radiation Monitors are not installed (Note 2).

NOTES:

1. This modification is in the fabrication stage.
2. This modification is in the evaluation/approval stage but the older Service Water and Radwaste Effluent Monitors are still installed.

3. Systems

All systems that are operable from the Nine Mile Point Unit #1 Control Room are simulated. See Attachment "C" for a list of these systems.

4. Simulator Control Room Environment

The Simulator Control Room was specifically designed to duplicate as nearly as possible the reference plant control room environment. Other than the discrepancies noted in Section 1 of this part, the following differences exist:

a. Even though the lighting is identical to that in the plant, the lighting system is not functionally interfaced with t he simulator. Plans to interface the lights and the simulator are being evaluated for training value.

b. The ambient noise level that exists in the plant's control room is not simulated. The hardware to do this exists, but is not functional. Weighing the training impact against the financial considerations have warranted not pursuing this "luxury".

Phase I of the "Detailed Control Room Design Review" was completed and implemented in both the simulator and Plant Control Room in 1986. The initial study utilized the simulator to identify potential problems and try new concepts. Phase II is complete and scheduled for implementation in both the simulator and plant control room in early 1988.

C. Instructor Interface (Control Capabilities)

1. Initial Conditions

The instructor has the capability to initialize to any one of fifty (50) sets of initial conditions. The first twenty of these sets of conditions are guarded and can only be changed by the proper code. These initial conditions are the foundation to approximately 95% of the training. These twenty sets of initial conditions are listed in Attachment "D". The remaining thirty sets of initial conditions are set by the individual instructor and can be changed at any time.

2. Malfunctions

Malfunctions vary from a discrete nature (i.e.. pump trip) to ones of varying degrees of severity (i.e. leaks). They are listed in Attachment "E".

3. Remote Functions

The instructor has the capability to simulate most in-plant operation required to back-up control room operation. The only remote function, with major training impact, that is not simulated is the ability to jumper out the Low-Low Reactor Water Level MSIV isolation signal identified in Emergency Operating Procedures. Addition of this function is currently scheduled for late 1987 - early 1988 time frame. The list of remote functions can be found in Attachment "F".

4. Instructor Overrides

The instructor has the capability to override most functions that are simulated. This includes meter and chart recorder indications, indicating lights, annunciators and switch functions. A few discrepancies still exist in the I/O program, but are being documented for evaluation and repair as they are identified.

5. Monitoring

The instructor can monitor from the instructor station, up to sixteen (16) of any of ninty (90) parameters (See Attachment G). In addition, the instructor can select up to twelve (12) of the parameters to be plotted on the line printer in the control room.

6. Instructor Station Controls

Consists of three (3) keyboard/CRT's, two (2) for performing simulator functions, and one (1) which is used for minor troubleshooting. There are also various buttons which perform the following:

a. Freeze - stops (freezes) simulation at any point or restarts it.

b. Reset/Ready - initializes the simulator to a selected set of initial conditions. This button will turn green when all controls are properly positioned.

c. Snapshot - records and stores a set of conditions into any one of the IC's.

d. Malfunction Clear - clears the entire malfunction tableau.

e. Backtrack - sets the simulator to step up or back to any point in time, within 60 minutes. This includes buttons to step up or back one minute at a time and to step forward or reverse.

f. Manual Malfunction Control - Used to increase or decrease the severity level of up to three (3) of the variable malfunctions.

g. Annunciator Silence - silences all annunciators.

h. Recorder Off - shuts off power to all chart recorders.

i. Test and Lamp Test - Testing and Troubleshooting.

j. Emergency Stop - Kills all power to computer and simulator.

k. Computer Alarm/Acknowledge - Warns of computer malfunctions.

l. Record and Replay - Controls the tape recorder in the Computer Room.

m. Fast Time/Slow Time - changes speed of simulator response.

7. Record/Replay

If so desired, a scenario can be recorded on magnetic tape for replay at a later date. This function is controlled from the instructor station.

D. Reference Plant Operating Procedures

The simulator is operated using the same procedures used to operate the plant. The operations department makes use of the simulator to help validate certain new procedures or procedural revisions. Procedure steps that cannot be performed on the simulator are conspicuously identified in the simulator copy in accordance with established Nuclear Training Department Instructions.

E. Changes Since Last Report

The following plant modifications have been incorporated into the simulator since the last report (March 1986):

78-04 CAD Valve N_2 Supply
78-24 Remove FW Level Programmer
78-27 MSIV Monitoring (add Process Computer points)
78-32 CAD Alarm State Changes
79-06 Change TIP Controls
79-24 APRM Rod Block Scope
80-38 Fuel Zone Level Indicator Changes
80-41 Add Emergency Cooling Vent to Torus
80-74 Add Torus Temperature Indicators
80-84 Diesel Generator Annunciator Addition
81-14 "E" Gate Digital
81-29 Emergency Vent Valve Change
82-30 Reactor Recirc. Pump Monitoring
82-69 Feedwater Pump Low Flow Control Valves and Recirc. Valves
82-71 Powerboards 102/103 Undervoltage Relays
82-80 Core Spray Valve Logic Changes/Emergency Cooling High Rad
82-93 TIP Changeout to Gamma Detectors
83-29 Control Room LED Displays
83-53 Scriba Sub-Station Retirement
83-58 Revisions to Integrated Cosmetic Package and SPD's
83-61 Control Room Ventilation
83-89 #13 IAC Cooling Water Changeover
84-58 Feedwater Pump Control
85-26 ADS Inhibit

II. SIMULATOR DESIGN DATA

The initial design data for the simulator is listed in the original database document on file in the simulator library and Simulator Configuration Management System. Plant modification design data for all modifications incorporated in the simulator prior to March 1986 are contained in the last annual report (March 1986). Documentation, data changes and test results for modification incorporated since March 1986 (see Part I, Section E) are contained in Attachment "H".

III. SIMULATOR TESTS (PERFORMANCE TESTING)

During the April - May 1987 time frame, testing was done to verify real time operation, steady state and normal operation, transient performance and malfunction response. Documentation of these tests is available in the simulator database and records under the title "Simulator Performance Test Data - May 1987".

A. Computer Real Time Tests

Simulator real time testing was performed by measuring individual model times during steady state and transient conditions. During this testing, no frame slippage or program overtimes occurred. The simulator contains safeguards which preclude operation outside of real time with the exception of two (2) instructor controlled functions. Slow time will slow all simulator responses to one-half real time. Fast time will step up response time to only three (3) functions, reactor xenon, condenser evacuation and turbine warming.

B. Steady State and Normal Operation

1. Simulator stability was verified by comparing heat balances (P-1's) and critical parameter printout from the start and finish of a sixty (60) minute steady-state run. The only deviation outside accceptable limits (±2%) existed in the calculated Core thermal Power printout on the heat balance obtained at the start of the run. This was attributed to an slight feedwater transient and the nature of the simulators PPC programs. This problem has been documented and corrected. The Core Thermal Power printout on the final P-1 and on both the initial and final Computer Point Printouts were within one (1) Megawatt thermal.

2. Fidelity in performance was verified by comparing heat balances (P-1) and Balance of Plant parameters from the plant and simulator at 25%, 55% 76% and 100% of rated power.

   a. 25% Power - one of the most significant differences was plant efficiency. Plant data shows 125 MWE at 467 MWT while the simulator shows 164 MWE at 484 MWT. This in 26.7% eff. vs 33.8% eff. Plant data shows mismatching flows between the five recirc. pumps which, on the simulator is exactly equal. Plant data also shows a mismatch between level columns 11 and 12, which are also exactly equal on the simulator. Plant data for total steam flow is significantly different from simulator data, but the plant data appears incorrect.
   b. 55% Power - The same problems with water level and plant efficiency were also evident at this power level. The plant was able to achieve the same power level with significantly less recirc. flow. The problem needs further investigation. The simulator is modeled for middle of cycle and the plant data is beginning of cycle. The difference in total steam flow also fall outside of tolerances and will need further investigation.

c. 76% Power - The same problems with plant efficiency and water level that were previously noted were also present at this power level. Again the plant achieved this power level with less recirc flow. As stated before, this will be further investigated. The APRM readings were also outside of the acceptable tolerances, but this is attributed to the differences in the gain adjustment factors.

d. 100% Power - The same problems with plant efficiency and water levels still exist. Recirc Pumps 12 and 14 flows were outside the tolerances. These flows differed $\pm$2% from the other three loops. The simulator shows all recirc. pump flows as being equal.

Except as noted above, all other parameters compared were within the acceptable tolerances. The problems with mismatching recirc. pump flows and water levels have no significnt training impact. The problems with plant efficiency and power to flow relationship are documented and will be corrected.

C. Transient Tests

1. The following transients are FSAR analyzed and were run on the simulator in real time.

   a. Simultaneous trip of all feedwater pumps (compared with FSAR transient "Feedwater Malfunction, Zero Flow). The FSAR shows an increase in recirc. flow due to changes in two-phase flow. The simulator doesn't model two-phase flow closely enough to produce this; therefore, it doesn't change. This discrepancy has no training impact and will not be discussed further.

   b. Simultaneous Closure of MSIV's - Consistent with FSAR.

c. Simultaneous Trip of all Recirc Pumps - Consistant with FSAR.

d. Single Recirc. Pump Trip - The simulator shows a much more pronounced decrease and recovery of recirc. flow than the FSAR. The other parameters responded as predicted with regards to recirc. flow. Reactor Pressure matches the FSAR analysis.

e. Design Bases Loss of Coolant - Simulator response was consistent with the FSAR with the exception of one parameter. Drywell pressure spiked at approximately 22 psig in 31 seconds on the simulator. The FSAR predicts a pressure spike of 33 psig in two seconds. A discrepancy report has been written and this problem will be addressed by the simulator support group.

f. Design Bases Main Steam Line Break - The simulator response was consistent with FSAR results.

2. The following transients are not analyzed in the FSAR but are required by the standard (ANSI 3.5-1985).

   a. Manual Reactor Scram - The simulator was consistent with predicted response.

   b. Turbine Trip at 40% Power (no scram) - The simulator was consistent with predicted response.

   c. Maximum Ramp of Power; 100% to 75%; 75% to 100% - The simulator was consistent to predicted response.

   d. MSIV closure with a stuck open ERC (No high pressure ECCS systems available) - Simulator was consistent with predicted response.

3. The following transients are not required by the standard (ANSI 3.5 - 1985) but were run because data exists in the FSAR.

   a. Turbine Trip without Bypass
   b. Recirc Pump Stall
   c. Inadvertant actuation of an ERV
   d. Safety Valve Actuation
   e. EPR/MPR Failure

In all cases, the simulator response was consistent with FSAR predictions.

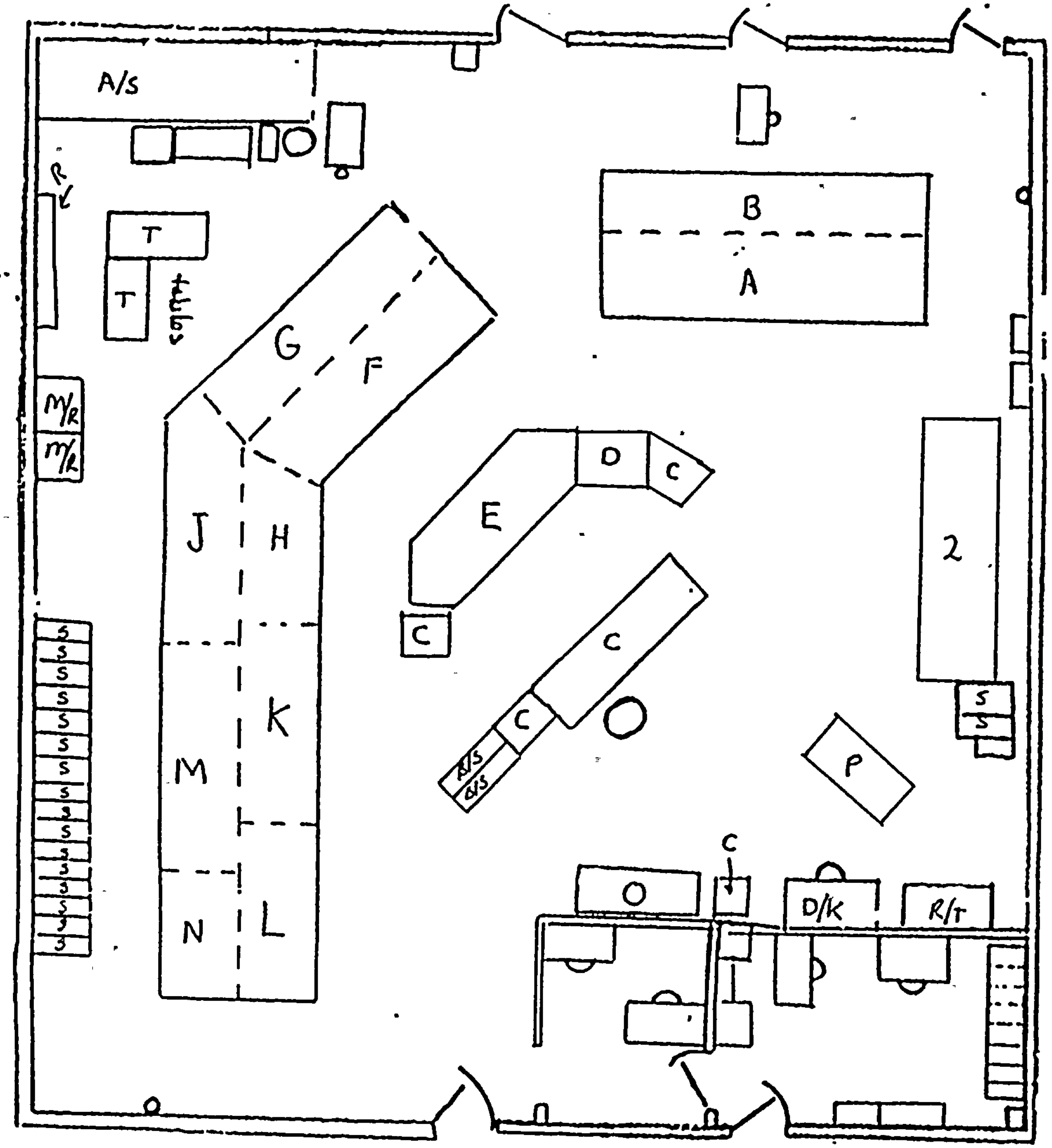
D. Malfunction Test

During the course of testing to prepare this report, 25% of the existing malfunctions listed in Attachment "E" were tested in addition to those needed to obtain the data in Section C of the report. The malfunctions tested are listed in Attachment "I". During the course of performance testing, the malfunction and evolutions required for operator training by 10CFR55, "Operator Licenses", were conducted at least once. Minor discrepancies were identified while performance testing malfunctions. None of these problems have any significant training impact and will be addressed in accordance with NTI 4.5.3, "Simulator Configuration Management".

IV. SIMULATOR CONFIGURATION MANAGEMENT (DISCREPANCY RESOLUTION AND UPGRADING)

Discrepancy resolution and modifications are handled in accordance with NTI 4.5.3 "Simulator Configuration Management". A personal computer has been set up as a terminal for Niagara Mohawk Power Corporation's Nuclear Divisions' Configuration Management System. This system tracks plant modifications and all plant documents. A special program has been set up in this system to document plant modifications that impact the simulator and track associated data base changes. In addition to the Configuration Management System, other computer programs exist for tracking discrepancy reports and simulator database changes (modifications). All discrepancies and modifications are evaluated for training impact.

NOTE: All data collected and analyzed to formulate this report are on file at the Nine Mile Point Nuclear Training Center and are available for review.

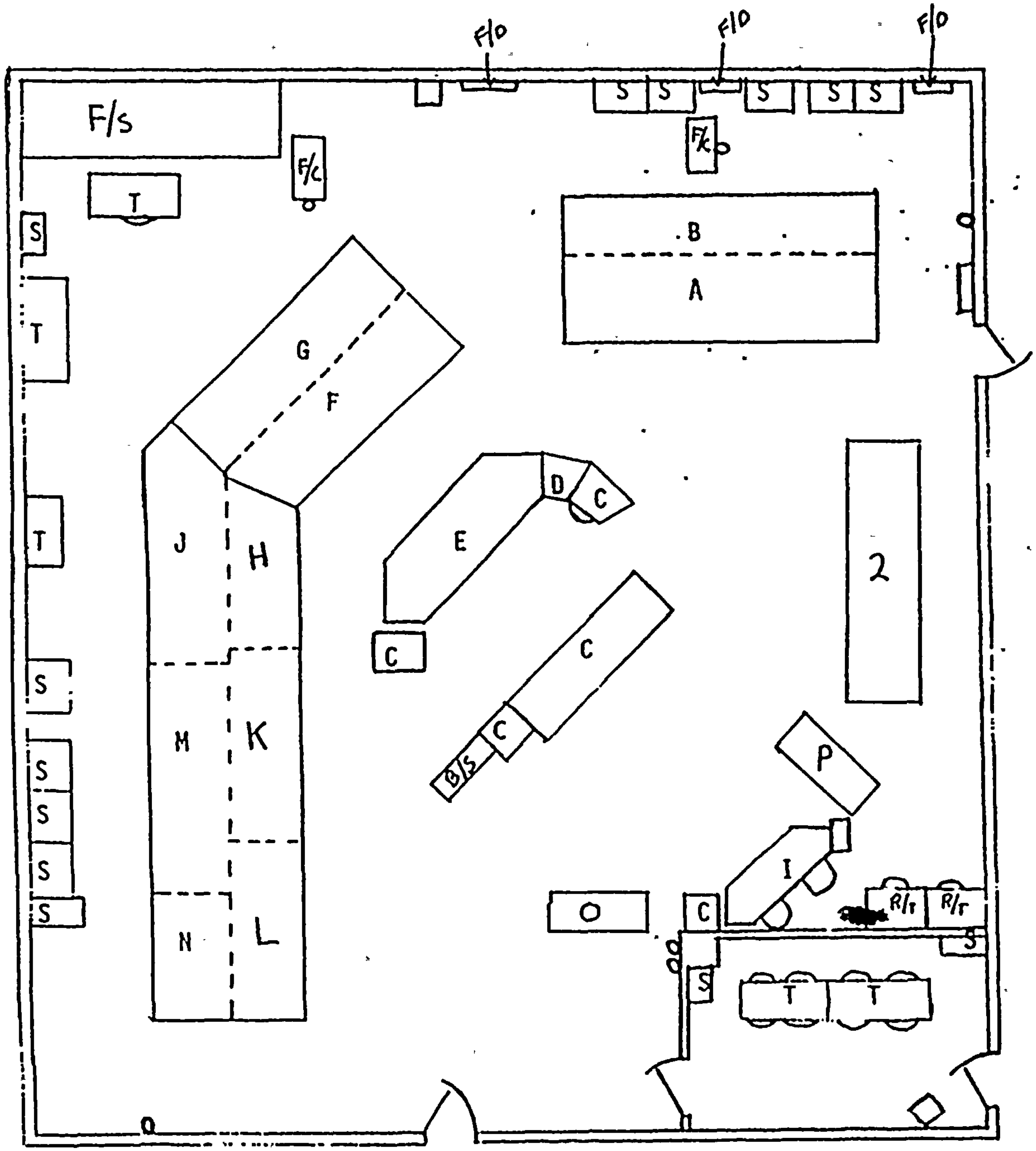


Legend

2	Main Fire Panel #2
A	Panel A Electric/Turbine Controls
B	Panel B Relays/Turbine Controls
C	Plant Process Computer Equipment
D	Chief Shift Operator Desk
E	E Panel Main Control Console
F	F Panel NSSS
G	G Panel Nuclear Instrumentation
H	H Panel Balance of Plant
I	Instructors Console
J	J Panel Radiation Monitoring
K	K Panel ECCS
L	L Panel Primary Containment
M	M Panel RPS
N	N Panel Turbine
P	Print Rack
S	Storage Cabinets
T	Tables
M/R	Meteorological Computer
R	Manual Dose Accessment Calculator
R/T	Radio/Telephone Equipment
O	Procedures
B/S	Bookshelf
D/K	Desk

ATTACHMENT A

Figure 1 - Nine Mile Point One Control Room



Legend

2 Main Fire Panel #2
A Panel A Electric/Turbine Controls
B Panel B Relays/Turbine Controls
C Plant Process Computer Equipment
D Chief Shift Operator Desk
E E Panel Main Control Console
F F Panel NSSS
G G Panel Nuclear Instrumentation
H H Panel Balance of Plant
I Instructors Console
J J Panel Radiation Monitoring
K K Panel ECCS
L L Panel Primary Containment
M M Panel RPS
N N Panel Turbine
P Print Rack
S Storage Cabinets
T Tables
O Procedures
B/S Bookshelf
F/C False Column
F/S False Stairway
F/D False Door
R/T Radio/Telephone Equipment

Figure 2 - Nine Mile Point Unit One Simulator Control Room

ATTACHMENT B

Attachment C

SYSTEMS FULLY SIMULATED

1. Nuclear Boiler and Instrumentation
2. Reactor Recirculation System
    a. Reactor Recirculation Loops
    b. Boiler Process Instrumentation
    c. Recirculation Flow Control
3. Control Rod Drive and Hydraulics System (CRDHS)
4. Reactor Manual Control System (RMCS)
5. Reactor Core (Physics and Thermodynamics)
    a. Reactor Core Neutron Kinetics
    b. Reactor Core Thermodynamics
6. Rod Worth Minimizer (RWM)
7. Main Steam Systems
    a. Main Steam and Main Steam Bypass Systems
    b. Moisture Separators - Reheaters
    c. Extraction Steam System
    d. Auxiliary Steam System
8. Reactor Water Cleanup System
9. Nuclear Instrumentation System
    a. Source Range Monitor (SRM) System
    b. Intermediate Range Monitor (IRM) System
    c. Local Power Range Monitoring (LPRM) System
    d. Average Power Range Monitoring (APRM) System
    e. Rod Block Monitor (RBM) System
    f. Traversing In-Core Probe (TIP) System
10. Reactor Protection System
11. Simulation of the Primary Containment and Isolation System
    a. Primary Containment
    b. Primary Containment Isolation System
12. Secondary Containment
13. Emergency Ventilation
    a. Reactor Building Ventilation
    b. Turbine Building Ventilation
    c. Building Ventilation
14. Primary Containment Atmosphere Control and Sampling System

15. Emergency Core Cooling Systems
    a. Automatic Depressurization and pressure Relief System
    b. Core Spray
    c. High Pressure Coolant Injection (HPCI) System
    d. Containment Spray
    e. Emergency Cooling System
16. Shutdown Cooling
17. Standby Liquid Control (SLC) System
18. Condensate and Feedwater System
    a. Condensate System
    b. Condensate Demineralizer System
    c. Feedwater System
    d. Condensate Storage and Transfer System
    e. Reactor Vessel Level Control System
    f. Feedwater Heaters, Vents and Drains
19. Off-Gas Recombiner and Condenser Air Removal
20. Main Condenser
21. Circulating Water System
22. Reactor Building Closed Loop Cooling
23. Turbine Building Closed Loop Cooling
24. Service Water System
25. Instrument, Service and Breathing Air
26. Area Radiation Monitoring System
27. Process Radiation Monitoring System
28. Ventilation Radiation Monitoring System
29. Main Turbine and Turbine Control
    a. Turbine Oil System
    b. Turbine Kinematics
    c. Turbine Mechanics
    d. Turbine Supervisory and Safety System
    e. Gland Seal System
    f. Low Pressure Hood Spray System
    g. Moisture Separator and Reheat System
    h. Main Turbine Electro-Hydraulic Control System

30. Plant Electrical System
    a. Main Generator and Auxiliary Systems
        1. Main Generator Synchronous Machine
        2. Excitation and Voltage Regulator System
        3. Synchroscope
        4. Hydrogen Cooling System
        5. Stator and Iso-Phase Duct Cooling System
        6. Hydrogen Seal Oil System
    b. Electrical Distribution System
        1. Buses and Transformers
        2. Breakers
        3. Currents, Voltages and Frequencies
        4. DC Electrical Distribution and Control
        5. Power System Electrical Grid
    c. Diesel Generators
31. Containment Atmosphere Dilution, Vent and Purge System
32. Radiation Waste Disposal System Containment Equipment and Floor Drain Sump
33. Plant Carbon Dioxide System
34. Diesel Fire Pump and Pressurized Water Fire System
35. Fire Control Ventilation Systems
36. Control Room Heating, Ventilation and Air Conditioning
37. Communication System
38. Plant Process Computer System
    a. Applicable Experience
39. Meteorological Experience
40. Plant Annunciators and Fire System Alarm

X

ATTACHMENT D

GUARDED INITIAL CONDITIONS

IC #	DESCRIPTION
1.	Cold Iron - Rx is S/D and C/D, all systems off-line but electrical distribution
2.	Cold Startup - All support systems on-line, ready to commence rod pull
3.	Cold Startup - 5 rods subcritical
4.	Heatup 140°F - Rx in heating range
5.	Heatup 280°F - Rx in heating range
6.	Heatup 900 psig - Rx in heating range
7.	NOP, NOT, 1% Power
8.	Shutdown - inserting Rod Group 76
9.	Shutdown - Mode Switch in S/U
10.	Shutdown - All Rods In
11.	Turbine Startup - Turbine Warm
12.	Feedwater Pump #13 Startup
13.	50% Power - Preconditioning
14.	100% Power - Middle of Cycle
15.	Full Power - End of Cycle
16.	-Reserved for Future Use
17.	-Reserved for Future Use
18.	-Reserved for Future Use
19.	Cooldown - 200 psig
20.	Cooldown - SDC in Service

ATTACHMENT E

NINE MILE POINT UNIT ONE MALFUNCTIONS

AD01	ADS FAILURE TO INITIATE - PRIMARY VALVES
AD02	ADS FAILURE TO INITIATE - COMPLETE
AD03	SOLENOID ACTUATED PRESSURE RELIEF VALVE (#111) FAILURE - SOLENOID
AD04	SOLENOID ACTUATED PRESSURE RELIEF VALVE (#111) FAILURE - VALVE LEAKS
AD05	SOLENOID ACTUATED PRESSURE RELIEF VALVE (#111) FAILURE - OPENS INADVERTENTLY
AD06	SOLENOID ACTUATED PRESSURE RELIEF VALVE (#111) FAILURE - STUCK OPEN
AN01	CONTROL ROOM ANNUNCIATOR SYSTEM FAILURE
CS01	CORE SPRAY PUMP TRIP (111, 112, 121, 122 OR ANY)
CS02	CORE SPRAY TOPPING PUMP TRIP (111, 112, 121, 122 OR ANY)
CS03	CORE SPRAY INBOARD INJECTION VALVE FAILURE TO OPEN (IV40-01, IV40-09, IV40-11, IV40-10 OR ANY)
CT01	CONTAINMENT SPRAY PUMP TRIP (111, 112, 121, 122 OR ANY)
CT02	CONTAINMENT SPRAY RAW WATER PUMP TRIP (111, 112, 121, 122 OR ANY)
CT03	CONTAINMENT SPRAY HEAT EXCHANGER (111, 112, OR BOTH) TUBE LEAK
CU01	COOLANT LEAKAGE INSIDE PRIMARY CONTAINMENT
CU02	REACTOR WATER CLEANUP PUMP TRIP (11, 12 OR BOTH)
CU03	REACTOR WATER CLEANUP REJECT FLOW CONTROL VALVE (FCV-ND22) FAILS OPEN
CU04	REACTOR WATER CLEANUP REJECT FLOW CONTROL VALVE (FCV-ND22) FAILS CLOSED
CU05	REACTOR WATER CLEANUP HIGH PRESSURE CONTROL VALVE (PCV 33-39) FAILS OPEN
CU06	REACTOR WATER CLEANUP HIGH PRESSURE CONTROL VALVE (PCV 33-39) FAILS CLOSED
CU07	REACTOR WATER CLEANUP LOW PRESSURE CONTROL VALVE (PCV-ND37) FAILS OPEN
CU08	REACTOR WATER CLEANUP LOW PRESSURE CONTROL VALVE (PCV-ND37) FAILS CLOSED
CU09	REACTOR WATER CLEANUP NON-REGENERATIVE HEAT EXCHANGER TUBE LEAK
CU10	REACTOR WATER CLEANUP DEMINERALIZER RESIN DEPLETION (11, 12 OR BOTH)
CU11	COOLANT LEAKAGE OUTSIDE PRIMARY CONTAINMENT
CW01	HIGH RADIATION IN SERVICE WATER
CW02	SERVICE WATER PUMP TRIP (11, 12 OR BOTH)

CW03	EMERGENCY SERVICE WATER PUMP TRIP (11, 12 OR BOTH)
CW04	REACTOR BUILDING CLOSED LOOP COOLING (11, 12, 13 OR ANY) PUMP TRIP
CW05	TURBINE BUILDING CLOSED LOOP COOLING PUMP TRIP (11, 12 OR BOTH)
CW06	CIRCULATING WATER PUMP TRIP (11, 12 OR :BOTH)
CW07	CIRCULATING WATER EXPANSION JOINT LEAKAGE
CW08	CIRCULATING WATER INTAKE STRUCTURE ICING
CW09	LOSS OF DRYWELL COOLING
CW10	MAIN CONDENSER TUBE LEAK
DG01	DIESEL GENERATOR FAILURE TO START (102, 103 OR BOTH)
DG02	DIESEL GENERATOR TRIP (102, 103 OR BOTH)
EC01	STEAM LEAKAGE INSIDE PRIMARY CONTAINMENT
EC02	STEAM LEAKAGE OUTSIDE PRIMARY CONTAINMENT
EC03	EMERGENCY COOLING SYSTEM RETURN VALVE FAILS OPEN (IV39-05, IV39-06 OR BOTH)
EC04	EMERGENCY COOLING SYSTEM RETURN VALVE FAILS TO OPEN (IV39-05, IV39-06 OR BOTH)
EC05	EMERGENCY COOLING SYSTEM EMERGENCY CONDENSER MAKEUP CONTROL VALVE FAILS CLOSED (LCV60-17, LCV60-18 OR BOTH)
EC06	EMERGENCY CONDENSER TUBE LEAK (111, 121 OR BOTH)
ED01	LOSS OF OFF-SITE 115 KV POWER SOURCES (LIGHTHOUSE HILL-JAF, OSWEGO STEAM, OR BOTH)
ED02	BATTERY CHARGER AND EMERGENCY LIGHTING SUPPLY MOTOR GENERATOR TRIPS (161, 171 OR BOTH)
ED03	COMPUTER POWER SUPPLY MOTOR GENERATOR TRIPS (167)
ED04	AC POWERBOARD ELECTRICAL FAULT (PB11)
ED05	AC POWERBOARD ELECTRICAL FAULT (PB12)
ED06	AC POWERBOARD ELECTRICAL FAULT (PB101)
ED07	AC POWERBOARD ELECTRICAL FAULT (PB102)
ED08	AC POWERBOARD ELECTRICAL FAULT (PB103)
ED09	AC POWERBOARD ELECTRICAL FAULT (PB13 SECTION A)
ED10	AC POWERBOARD ELECTRICAL FAULT (PB13 SECTION B)
ED11	AC POWERBOARD ELECTRICAL FAULT (PB13 SECTION C)
ED12	AC POWERBOARD ELECTRICAL FAULT (PB14 SECTION A)
ED13	AC POWERBOARD ELECTRICAL FAULT (PB14 SECTION B)
ED14	AC POWERBOARD ELECTRICAL FAULT (PB14 SECTION C)
ED15	AC POWERBOARD ELECTRICAL FAULT (PB15 SECTION A)
ED16	AC POWERBOARD ELECTRICAL FAULT (PB15 SECTION B)
ED17	AC POWERBOARD ELECTRICAL FAULT (PB15 SECTION C)

ED18	AC POWERBOARD ELECTRICAL FAULT (PB16 SECTION A)
ED19	AC POWERBOARD ELECTRICAL FAULT (PB16 SECTION B)
ED20	AC POWERBOARD ELECTRICAL FAULT (PB17 SECTION A)
ED21	AC POWERBOARD ELECTRICAL FAULT (PB18 SECTION B)
ED22	DC POWERBOARD ELECTRICAL FAULT (11, 12 OR BOTH)
ED23	LOSS OF POWER TO INSTRUMENT CONTROL BUS 130 - NORMAL
ED24	LOSS OF POWER TO INSTRUMENT CONTROL BUS 130 - ALTERNATE
ED25	LOSS OF POWER TO INSTRUMENT CONTROL BUS 130 - NORMAL AND ALTERNATE
EG01	MAIN GENERATOR TRIP - ELECTRICAL FAULT
EG02	GENERATOR AUTOMATIC VOLTAGE REGULATOR FAILS - INCREASE
EG03	GENERATOR AUTOMATIC VOLTAGE REGULATOR FAILS - DECREASE
EG04	MAIN GENERATOR CORE INTERNAL HEATING
EG05	MAIN TRANSFORMER LOSS OF COOLING
EG06	GENERATOR HYDROGEN COOLING SYSTEM LEAKAGE
EG07	GENERATOR HYDROGEN MAIN SEAL OIL PUMP FAILURE
EG08	GENERATOR HYDROGEN EMERGENCY SEAL OIL PUMP FAILURE
EG09	STATOR COOLING PUMP TRIP (11, 12 OR BOTH)
EG10	LOSS OF CONTROL AIR TO 345 KV BREAKER (R-915, R-925 OR BOTH)
EG11	POWER GRID NETWORK LOAD TRANSIENT - INCREASE
EG12	POWER GRID NETWORK LOAD TRANSIENT - DECREASE
EG13	STATOR WATER COOLING DEMINERALIZER RESIN DEPLETION
FP01	DIESEL FIRE PUMP FAILURE
FP02	ELECTRIC FIRE PUMP FAILURE
FP03	AC FOAM PUMP FAILURE
FP04	DC FOAM PUMP FAILURE
FP05	TURBINE ISLAND FIRE DETECTION (D-1195, D-1155, D-1165, D-1175, D-1061, D-1114, D-1131 OR ANY)
FP06	CONTROL ROOM FIRE DETECTION (FIRE PANEL 2, CONTROL CONSOLE, "L" PANEL, "K" PANEL, "H" PANEL, "F" PANEL, "A" PANEL OR ANY)
FP07	TURBINE BUILDING FIRE DETECTION (DA-22092MG, DA-2083M, DA-2081S, DA1092E, D-2102 OR ANY)
FP08	DIESEL ROOM FIRE DETECTION (DX-2113A, DX-2113B, DX-02141A, DA-2141, DX-2151B, DA-2151, D-2151 OR ANY)
FP09	AUXILIARY CONTROL ROOM/cable spreading room fire detection (d-3031PL, DX-3031A, DX-3111B, WD-8131, WD-8082 OR ANY)
FP10	REACTOR BUILDING FIRE DETECTION (DX-4217A, DA-4116W, DA-4076E, D-4207, D-4156, SP-4126, D-4086 OR ANY)

FW01	CONDENSATE PUMP TRIP (11, 12, 13 OR ANY)
FW02	FEEDWATER BOOSTER PUMP TRIP (11, 12, 13 OR ANY)
FW03	FEEDWATER PUMP TRIP (11, 12 OR BOTH)
FW04	SHAFT DRIVEN FEEDWATER PUMP 13 FAILURE
FW05	SHAFT DRIVEN FEEDWATER PUMP CLUTCH FAILURE TO ENGAGE
FW06	SHAFT DRIVEN FEEDWATER PUMP CLUTCH FAILURE TO DISENGAGE
FW07	FEEDWATER CONTROL VALVE 11 CONTROLLER FAILS HIGH
FW08	FEEDWATER CONTROL VALVE 11 CONTROLLER FAILS LOW
FW09	FEEDWATER CONTROL VALVE 12 CONTROLLER FAILS HIGH
FW10	FEEDWATER CONTROL VALVE 12 CONTROLLER FAILS LOW
FW11	FEEDWATER CONTROL VALVE 13 CONTROLLER FAILS HIGH
FW12	FEEDWATER CONTROL VALVE 13 CONTROLLER FAILS LOW
FW13	FEEDWATER CONTROL VALVE 13 CONTROLLER FAILS AS IS
FW14	FEEDWATER MASTER CONTROLLER FAILS HIGH
FW15	FEEDWATER MASTER CONTROLLER FAILS LOW
FW16	FEEDWATER MASTER CONTROLLER FAILS AS IS
FW17	CONDENSATE DEMINERALIZER DEPLETION
FW18	FEEDWATER CONDUCTIVITY INCREASE
FW19	CONDENSATE RECIRCULATION VALVE (FCV 50-24) FAILS OPEN
FW20	CONDENSATE RECIRCULATION VALVE (FCV 50-24) FAILS CLOSED
FW21	FEEDWATER BOOSTER PUMP RECIRCULATION VALVE FAILS OPEN (FCV 51-58, FCV 51-59, FCV 51-60 OR ANY)
FW22	FEEDWATER HEATER TUBE LEAK
FW23	FEEDWATER PUMP RECIRCULATION VALVES FAIL OPEN (11, 12, 13 OR ANY)
FW24	FEEDWATER CONTROL VALVE FAILS CLOSED (13A, 13B OR BOTH)
FW25	THREE MILE ISLAND ACCIDENT (BWR EQUIVALENT)
FW26	CONDENSATE BYPASS SPRAY TO MAIN CONDENSER FLOW CONTROL VALVE (FCV 50-22) FAILS CLOSED
FW27	LOSS OF COMPENSATION TO FEEDWATER FLOW TRANSMITTER
FW28	HPCI MODE FAILURE TO INITIATE (11, 12 OR BOTH)
FW29	HPCI MODE INADVERTANT INITIATION (11, 12 OR BOTH)
HV01	REACTOR BUILDING EXHAUST FAN TRIP (11, 12 OR BOTH)
HV02	EMERGENCY VENTILATION FAN TRIP (11, 12 OR BOTH)
IA01	LOSS OF INSTRUMENT AIR
LP01	LIQUID POISON PUMP TRIP (A, B OR BOTH)

MC01	MAIN CONDENSER AIR IN LEAKAGE
MC02	STEAM JET AIR EJECTOR STEAM SUPPLY VALVE FAILS CLOSED
MC03	HOTWELL LEVEL CONTROLLERS IN AUTO FAIL HIGH
MC04	HOTWELL LEVEL CONTROLLERS IN AUTO FAIL LOW
MC05	HOTWELL LEVEL CONTROLLERS IN AUTO FAIL AS IS
MC06	EXPLOSION IN AIR EJECTOR DISCHARGE PIPING
MS01	STEAM LEAK RUPTURE OUTSIDE PRIMARY CONTAINMENT (DESIGN BASIS)
MS02	MSIV DISC SEPARATES FROM STEM
MS03	ONE MSIV FAILS CLOSED (VALVE 122)
MS04	STEAM LINE RUPTURE INSIDE PRIMARY CONTAINMENT (DESIGN BASIS)
MS05	TURBINE STEAM SEAL REGULATOR FAILS CLOSED
MS06	MOISTURE SEPARATOR DRAIN TANK LEVEL CONTROL FAILS LOW
MS07	FIRST STAGE REHEATER 111 STEAM SUPPLY VALVE CLOSES
MS08	SECOND STAGE REHEATER 112 STEAM SUPPLY VALVE CLOSES
MS09	SECOND STAGE REHEATER 112 DRAIN TANK LEVEL CONTROL FAILS LOW
MS10	LOSS OF EXTRACTION STEAM TO HIGH PRESSURE FEEDWATER HEATER (115, 125, 135 OR ANY)
MS11	LOSS OF COMPENSATION TO STEAM FLOW TRANSMITTER
NM01	SRM CHANNEL (11, 12, 13, 14 OR ANY) FAILURE - UPSCALE
NM02	SRM CHANNEL (11, 12, 13, 14 OR ANY) FAILURE - DOWNSCALE
NM03	SRM CHANNEL RECORDER FAILURE (RED, BLACK OR BOTH PENS)
NM04	SRM CHANNEL (11, 12, 13, 14 OR ANY) FAILURE - INOPERATIVE
NM05	SRM CHANNEL (11, 12, 13, 14 OR ANY) FAILURE - UPSCALE, RECORDER INOPERATIVE
NM06	SRM CHANNEL (11, 12, 13, 14 OR ANY) FAILURE - DOWNSCALE
NM07	SRM CHANNEL (11, 12, 13, 14 OR ANY) FAILURE - RECORDER
NM08	SRM CHANNEL (11, 12, 13, 14 OR ANY) FAILURE - INOPERATIVE
NM09	SRM CHANNEL (11, 12, 13, 14 OR ANY) DETECTOR STUCK
NM10	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - UPSCALE
NM11	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - DOWNSCALE
NM12	IRM/APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - RECORDER
NM13	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - INOPERATIVE
NM14	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - UPSCALE

NM15	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - DOWNSCALE
NM16	IRM/APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - RECORDER
NM17	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) INOPERATIVE
NM18	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) DETECTOR STUCK
NM19	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - UPSCALE
NM20	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - DOWNSCALE
NM21	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - INOPERATIVE
NM22	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - UPSCALE
NM23	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - DOWNSCALE
NM24	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - INOPERATIVE
NM25	ANY LPRM (X-Y-J) FAILURE - UPSCALE
NM26	ANY LPRM (X-Y-J) FAILURE - UPSCALE
NM27	ANY LPRM (X-Y-J) FAILURE - UPSCALE
NM28	ANY LPRM (X-Y-J) FAILURE - DOWNSCALE
NM29	ANY LPRM (X-Y-J) FAILURE - DOWNSCALE
NM30	ANY LPRM (X-Y-J) FAILURE - DOWNSCALE
NM31	ANY LPRM (X-Y-J) FAILURE - DOWNSCALE
NM33	TIP DETECTOR STUCK IN CORE
NM34	ANY LPRM (X-Y-J) DRIFT +/- 25%
NM35	ANY LPRM (X-Y-J) DRIFT +/- 25%
NM36	RECIRC FLOW CONVERTER CHANNEL (11, 12 OR BOTH) FAILURE - UPSCALE
NM37	RECIRC FLOW CONVERTER CHANNEL (11, 12 OR BOTH) FAILURE - DOWNSCALE
NM38	RECIRC FLOW CONVERTER CHANNEL (11, 12 OR BOTH) FAILURE - AS IT
NM39	RECIRC FLOW CONVERTER CHANNEL (11, 12 OR BOTH) FAILURE - INOPERATIVE
NM40	RECIRC FLOW CONVERTER (11, 12 OR BOTH) FAILURE - COMPARATOR .
OG01	OFF-GAS RECOMBINER PREHEATER STEAM SUPPLY FAILS CLOSED
OG02	OFF-GAS RECOMBINER MIXING JET STEAM SUPPLY FAILS OPEN
OG03	OFF-GAS RECOMBINER MIXING JET STEAM SUPPLY FAILS CLOSED
OG04	OFF-GAS DISCHARGE TO STACK ISOLATION VALVE FAILS CLOSED
PC01	DRYWELL TORUS DIFFERENTIAL PRESSURE CONTROL FAILURE - INCREASE
PC02	DRYWELL TORUS DIFFERENTIAL PRESSURE CONTROL FAILURE - DECREASE
PC03	PRIMARY CONTAIN LEAKAGE

PP01	FAILURE OF PLANT PROCESS COMPUTER
RD01	CONTROL ROD XX-YY FAILURE - DRIFT IN
RD02	CONTROL ROD XX-YY FAILURE - DRIFT OUT
RD03	CONTROL ROD XX-YY FAILURE - ACCUMULATOR STUCK
RD04	CONTROL ROD XX-YY FAILURE - STUCK
RD05	CONTROL ROD XX-YY FAILURE - UNCOUPLED
RD06	CONTROL ROD XX-YY FAILURE - SCRAMMED
RD07	CONTROL ROD XX-YY FAILURE - SLOW SCRAM TIME
RD08	CONTROL ROD XX-YY FAILURE - RPIS
RD09	CONTROL ROD XX-YY FAILURE - DRIFT IN
RD10	CONTROL ROD XX-YY FAILURE - DRIFT OUT
RD11	CONTROL ROD XX-YY FAILURE - ACCUMULATOR TROUBLE
RD12	CONTROL ROD XX-YY FAILURE - STUCK
RD13	CONTROL ROD XX-YY FAILURE - UNCOUPLED
RD14	CONTROL ROD XX-YY FAILURE - SCRAMMED
RD15	CONTROL ROD XX-YY FAILURE - SLOW SCRAM TIME
RD16	CONTROL ROD XX-YY FAILURE - RPIS
RD17	CONTROL ROD XX-YY FAILURE - DRIFT IN
RD18	CONTROL ROD XX-YY FAILURE - DRIFT OUT
RD19	CONTROL ROD XX-YY FAILURE - ACCUMULATOR TROUBLE
RD20	CONTROL ROD XX-YY FAILURE - STUCK
RD21	CONTROL ROD XX-YY FAILURE - UNCOUPLED
RD22	CONTROL ROD XX-YY FAILURE - SCRAMMED
RD23	CONTROL ROD XX-YY FAILURE - SLOW SCRAM TIME
RD24	CONTROL ROD XX-YY FAILURE - RPIS
RD25	CONTROL ROD XX-YY FAILURE - DRIFT IN
RD26	CONTROL ROD XX-YY FAILURE - DRIFT OUT
RD27	CONTROL ROD XX-YY FAILURE - ACCUMULATOR TROUBLE
RD28	CONTROL ROD XX-YY FAILURE - STUCK
RD29	CONTROL ROD XX-YY FAILURE - UNCOUPLED
RD30	CONTROL ROD XX-YY FAILURE - SCRAMMED
RD31	CONTROL ROD XX-YY FAILURE - SLOW SCRAM TIME
RD32	CONTROL ROD XX-YY FAILURE - RPIS
RD33	CONTROL ROD BANK FAILURE TO SCRAM (BANK I, II, III, IV, V OR :ANY)
RD34	LOSS OF CRD INSTRUMENT AIR PRESSURE
RD35	CRD HYDRAULIC PUMP TRIP (11, 12 OR BOTH)
RD36	CRD FLOW CONTROL VALVE FAILURE - CLOSED (11, 12 OR BOTH)

RD37	RPIS FAILURE - COMPLETE SYSTEM FAILURE
RD38	REACTOR MANUAL CONTROL SYSTEM TIMER MALFUNCTION - WITHDRAWN
RD39	REACTOR MANUAL CONTROL SYSTEM TIMER MALFUNCTION - INSERT
RD40	REACTOR MANUAL CONTROL SYSTEM TIMER MALFUNCTION - SETTLE
RD41	SCRAM DISCHARGE VOLUME RUPTURE
RM01	DRAWER INOPERATIVE FOR ANY PROCESS RADIATION MONITOR SIMULATED (INSTRUCTOR SELECT)
RM02	DRAWER DOWNSCALE FOR ANY AREA RADIATION MONITOR SIMULATED (INSTRUCTOR SELECT)
RM03	DRAWER UPSCALE FOR ANY AREA RADIATION MONITOR SIMULATED
RM04	DRAWER UPSCALE FOR ANY AREA RADIATION MONITOR SIMULATED
RM05	CONTINUOUS AIR MONITOR FAILURE (TURBINE BUILDING, REACTOR BUILDING, WASTE BUILDING, DRYWELL)
RM06	ANY PROCESS RADIATION MONITOR FAILURE
RP01	REACTOR TRIP POWER SUPPLY MOTOR GENERATOR (131, 141 OR BOTH)
RP02	CONTROL POWER SUPPLY BOTH MOTOR GENERATOR TRIPS (162, 172 OR BOTH)
RP03	REACTOR SCRAM
RP04	REACTOR PROTECTION SYSTEM FAILURE TO SCRAM - AUTOMATIC
RP05	REACTOR PROTECTION SYSTEM FAILURE TO SCRAM - COMPLETE
RP06	REACTOR VESSEL ISOLATION
RP07	PRIMARY CONTAINMENT ISOLATION
RP08	ANTICIPATED TRANSIENT WITHOUT SCRAM (ATWS)
RP09	EMERGENCY CONDENSER FAILS TO ISOLATE (11, 12 OR BOTH)
RR01	RECIRCULATION PUMP 11 DRIVE BREAKER TRIP
RR02	RECIRCULATION PUMP 11 FIELD BREAKER TRIP
RR03	RECIRCULATION PUMP 11 SEIZURE
RR04	RECIRCULATION PUMP 11 CONTROL SIGNAL FAILURE
RR05	RECIRCULATION PUMP 11 INCOMPLETE START SEQUENCE
RR06	RECIRCULATION PUMP 12 DRIVE BREAKER TRIP
RR07	RECIRCULATION PUMP 12 FIELD BREAKER TRIP
RR08	RECIRCULATION PUMP 12 SEIZURE
RR09	RECIRCULATION PUMP 12 CONTROL SIGNAL FAILURE
RR10	RECIRCULATION PUMP 12 INCOMPLETE START SEQUENCE
RR11	RECIRCULATION PUMP 13 DRIVE BREAKER TRIP
RR12	RECIRCULATION PUMP 13 FIELD BREAKER TRIP
RR13	RECIRCULATION PUMP 13 SEIZURE
RR14	RECIRCULATION PUMP 13 CONTROL SIGNAL FAILURE
RR15	RECIRCULATION PUMP 13 INCOMPLETE START SEQUENCE

RR17 RECIRCULATION PUMP 14 FIELD BREAKER TRIP

RR18 RECIRCULATION PUMP 14 SEIZURE

RR19 RECIRCULATION PUMP 14 CONTROL SIGNAL FAILURE

RR20 RECIRCULATION PUMP 14 INCOMPLETE START SEQUENCE

RR21 RECIRCULATION PUMP 15 DRIVE BREAKER TRIP

RR22 RECIRCULATION PUMP 15 FIELD BREAKER TRIP

RR23 RECIRCULATION PUMP 15 SEIZURE

RR24 RECIRCULATION PUMP 15 CONTROL SIGNAL FAILURE

RR25 RECIRCULATION PUMP 15 INCOMPLETE START SEQUENCE

RR26 MASTER RECIRCULATION FLOW CONTROLLER FAILURE - HIGH

RR27 MASTER RECIRCULATION FLOW CONTROLLER FAILURE - LOW

RR28 MASTER RECIRCULATION FLOW CONTROLLER FAILURE - AS IS

RR30 REACTOR VESSEL PRESSURE RECORDER FAILURE (ID77) - UPSCALE

RR31 REACTOR VESSEL PRESSURE RECORDER FAILURE (ID77) - DOWNSCALE

RR32 REACTOR VESSEL PRESSURE RECORDER FAILURE (ID77) - AS IS

RR33 RECIRCULATION PUMP LOWER (INNER) SEAL FAILURE - PUMP 11

RR34 RECIRCULATION PUMP UPPER (OUTER) SEAL FAILURE - PUMP 11

RR35 REACTOR VESSEL PRESSURE INDICATOR FAILURE (ID76C) - UPSCALE

RR36 REACTOR VESSEL PRESSURE INDICATOR FAILURE (ID76C) - DOWNSCALE

RR37 REACTOR VESSEL PRESSURE INDICATOR FAILURE (ID76C) - AS IS

RR38 REACTOR VESSEL LEVEL RECORDER FAILURE (ID14) - UPSCALE

RR39 REACTOR VESSEL LEVEL RECORDER FAILURE (ID14) - DOWNSCALE

RR40 REACTOR VESSEL LEVEL RECORDER FAILURE (ID14) - AS IS

RR41 REACTOR VESSEL LEVEL INDICATION (CONTROL SYSTEM) FAILURE - UPSCALE (ID59D)

RR42 REACTOR VESSEL LEVEL INDICATION (CONTROL SYSTEM) FAILURE - DOWNSCALE (ID59D)

RR43 REACTOR VESSEL LEVEL INDICATION (CONTROL SYSTEM) FAILURE - AS IS (ID59D)

RR44 REACTOR VESSEL LEVEL INDICATION (WIDE RANGE SAFETY SYSTEM) FAILURE - UPSCALE (LI 36-19, CH.12)

RR45 REACTOR VESSEL LEVEL INDICATION (WIDE RANGE SAFETY SYSTEM) FAILURE - DOWNSCALE (LI 36-19, CH.12)

RR46 REACTOR VESSEL LEVEL INDICATION (WIDE RANGE SAFETY SYSTEM) FAILURE - AS IS (LI 36-19, CH.12)

RR47 RECIRCULATION PUMP DISCHARGE VALVE STEM SEPARATES FROM VALVE GATE (11, 12, 13, 14, 15 OR ANY)

RR48 REACTOR VESSEL LEVEL INDICATION (FUEL ZONE SAFETY SYSTEM) FAILURE - UPSCALE

RR49 REACTOR VESSEL LEVEL INDICATION (FUEL ZONE SAFETY SYSTEM) FAILURE - DOWNSCALE

RR50 REACTOR VESSEL LEVEL INDICATION (FUEL ZONE SAFETY SYSTEM) FAILURE - AS IS

RR51 REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - HIGH

RR52 REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - LOW

RR53 REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - AS IS

RR54 REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - HIGH

RR55 REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - LOW

RR56 REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - AS IS

RR57 REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - HIGH

RR58 REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - LOW

RR59 REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - AS IS

RR60 REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - HIGH

RR61 REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - LOW

RR62 REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - AS IS

RR63 REACTOR RECIRCULATION PUMP 12 INNER SEAL FAILURE

RR64 REACTOR RECIRCULATION PUMP 12 OUTER SEAL FAILURE

RR65 REACTOR RECIRCULATION PUMP 15 TACHOMETER FAILS - HIGH

RR66 REACTOR RECIRCULATION PUMP 15 TACHOMETER FAILS - LOW

RR67 REACTOR RECIRCULATION PUMP 15 TACHOMETER FAILS - OSCILLATES

RR68 REACTOR RECIRCULATION PUMP M/A STATION FAILURE - INCREASE (11, 12, 13, 14, 15 OR ANY)

RR69	REACTOR RECIRCULATION PUMP M/A STATION FAILURE - DECREASE (11, 12, 13, 14, 15 OR ANY)
RR70	REACTOR RECIRCULATION PUMP M/A STATION FAILURE - AS IS (11, 12, 13, 14, 15 OR ANY)
RR71	REACTOR SAFETY VALVE INADVERTENTLY OPENS (PSV NR28A)
RR72	LOSS OF LEVEL COMPENSATION TO FEEDWATER CONTROL SYSTEM (GEMAC) LEVEL TRANSMITTER
RW01	ROD WORTH MINIMIZER FAILURE
RX01	FUEL CLADDING FAILURE
RX02	INCREASED ROD WORTH FOR ANY CONTROL ROD
SC01	SHUTDOWN COOLING PUMP TRIP (11, 12, 13 OR ANY)
SC02	SHUTDOWN COOLING HEAT EXCHANGER TUBE LEAK (11, 12, 13 OR ANY)
TC01	MAIN TURBINE TRIP
TC02	TURBINE GOVERNOR FAILS - HIGH
TC03	TURBINE GOVERNOR FAILS - LOW
TC04	ELECTRICAL PRESSURE REGULATOR FAILS - HIGH
TC05	ELECTRICAL PRESSURE REGULATOR FAILS - LOW
TC06	ELECTRICAL PRESSURE REGULATOR FAILS - OSCILLATES
TC07	MECHANICAL PRESSURE REGULATOR FAILS - HIGH
TC08	MECHANICAL PRESSURE REGULATOR FAILS - LOW
TC09	MECHANICAL PRESSURE REGULATOR FAILS - OSCILLATES
TC10	FIRST BYPASS VALVE STICKS OPEN
TC11	ALL BYPASS VALVES FAIL - OPEN
TC12	ALL BYPASS VALVES FAIL - CLOSED
TC13	TURBINE CONTROL VALVE FAILS CLOSED (11, 12, 13, 14 OR ANY)
TU01	EXHAUST HOOD SPRAY VALVE FAILS CLOSED
TU02	MAIN TURBINE HIGH VIBRATION BEARINGS #5 AND #6
TU03	MAIN TURBINE HIGH ECCENTRICITY
TU04	MAIN TURBINE BEARING OIL LOW PRESSURE
TU05	MAIN TURBINE BEARING HIGH TEMPERATURE
TU06	MAIN TURBINE THRUST BEARING WEAR

ATTACHMENT F

REMOTE FUNCTIONS

AD			
ADS	NONE		
AN			
ANNUNCIATOR SYSTEM	NONE		
CS			
CORE SPRAY	NONE		
CT			
CONTAINMENT SPRAY	RCT 1 80-43 TEST LINE TO TORUS BV	OPEN	CLOSE
	RCT 2 80-42 WASTE DISP MAN ISOLATION	OPEN	CLOSE
CU			
REACTOR CLEANUP	RCU1 CU-16 PCV ND37 MANUAL ISOLATION	OPEN	CLOSE
	RCU2 CU-19 FILTER BYPASS VALVE	OPEN	CLOSE
	RCU3 CU FILTER 11 INLET/OUTLET VALVE	OPEN	CLOSE
	RCU4 CU FILTER 12 INLET/OUTLET VALVE	OPEN	CLOSE
	RCU5 CU DEMIN 11 INLET/OUTLET VALVE	OPEN	CLOSE
	RCU6 CU DEMIN 12 INLET/OUTLET VALVE	OPEN	CLOSE
	RCU7 CU-20 DEMIN BYPASS VALVES	OPEN	CLOSE
CW1			
AUXILIARY WATER	RCW1 INTAKE WATER TEMPERATURE	32/80 DEG	75.00
	RCW2 INTAKE TUNNEL REVERSE FLOW	YES	NO
	RCW3 UPPER WIND SPEED	0.100 MPH	52.00
	RCW4 UPPER WIND SPED VARIATION	0/30 MPH	5.00
	RCW5 LOWER WIND SPEED	0/100 MPH	45.00
	RCW6 LOWER WIND SPEED VARIATION	0/30 MPH	5.00
	RCW7 UPPER WIND DIRECTION	0/360 MPH	5.00
	RCW8 UPPER WIND DIRECTION VARIATION	0/90 DEG	5.0
	RCW9 LOWER WIND DIRECTION	0/360 DEG	5.0
	RCW10 LOWER WIND DIRECTION VARIATION	0/90 DEG	5.00
	RCW11 AMBIENT AIR TEMPERATURE	-30/+120 DEG	90.00
	RCW12 DELTA TEMPERATURE	-10/+120 DEG	10.00
CW2			
AUXILIARY WATER	NONE		

DG

DIESEL GENERATOR	RDG1 DG 102 GOVERNOR SPEED DROOP	SET	RESET
	RDG2 DG 103 GOVERNOR SPEED DROOP	SET	RESET

EC

EMERGENCY COOLING	REC1 IV 39-05 VALVE POSITION LIMIT	0/100%	100.00
	REC2 IV 39-06 VALVE POSITION LIMIT	0/100%	100.00

ED1

ELECTRICAL DISTRIB	RED1 SOUTH OSWEGO 115 KV BKR R10	OPEN	CLOSE
	RED2 FITZ 115 KV BKR R40	OPEN	CLOSE
	RED3 PB 13 BUS TIE BKR SEC A-SEC B	OPEN	CLOSE
	RED4 PB 13 BUS TIE BKR SEC B-SEC C	OPEN	CLOSE
	RED5 PB 14 BUS TIE BKR SEC A-SEC B	OPEN	CLOSE
	RED6 PB 14 BUS TIE BKR SEC B-SEC B	OPEN	CLOSE
	RED7 PB 15 BUS TIE BKR SEC A-SEC B	OPEN	CLOSE
	RED8 PB 16 BUS TIE BKR SEC A-SEC C	OPEN	CLOSE
	RED9 MG-SET 167 AC POWER SELECT	PB16	PB17
	RED10 MG-SET 167 DC POWER SELECT	PB11	PB12
	RED11 COMPUTER POWER SUPPLY SELECT	NORM	EMER
	RED12 IC BUS 130 NORM BWR BKR	OPEN	CLOSE
	RED13 IC BUS 130 ALT PWR BKR	OPEN	CLOSE
	RED14 PB1671 BUS TIE BKR	OPEN	CLOSE
	RED15 PB131 CLOSE A-B, OPEN 13A SUPPLY	YES	NO
	RED16 PB131 CLOSE A-B, OPEN 13C SUPPLY	YES	NO
	RED17 PB141 CLOSE A-B, OPEN 14A SUPPLY	YES	NO
	RED18 PB141 CLOSE A-B, OPEN 14C SUPPLY	YES	NO

ED2

ELECTRICAL DISTRIB	RED19 PB151 CLOSE A-B, OPEN 15A SUPPLY	YES	NO
	RED20 PB151 CLOSE A-B, OPEN 15C SUPPLY	YES	NO
	RED21 PB176 CLOSE A-B, OPEN 17A SUPPLY	YES	NO
	RED22 PB176 CLOSE A-B, OPEN 16A SUPPLY	YES	NO
	RED23 BAT BD11 EQUIP SW TO ALT	BB11	BB12
	RED24 BAT BD12 EQUIP SW TO ALT	BB12	11
	RED25 PB143 FEEDER BREAKER	14A	14C

ED3

ELECTRICAL DISTRIB NONE

<u>EG1</u>			
MAIN GENERATOR	REG1 345 KV BKR 100 42	OPEN	CLOSE
	REG2 345 KV MAN DISC 917	OPEN	CLOSE
	REG3 345 KV MAN DISC 926, 927	OPEN	CLOSE
	REG4 345 KV MOD SW 18	OPEN	CLOSE
	REG5 345 KV BKR R915/10	OPEN	CLOSE
	REG6 345 KV BKR R925/20	OPEN	CLOSE
	REG7 MAIN SEAL OIL PMP STATUS	START	NEUT
	REG8 EMER SEAL OIL PMP STATUS	START	NEUT
	REG9 EMER SEAL OIL PMP STATUS	TRIP	AUTO
	REG10 GEN STATOR COOLING PMP 11	START	NEUT
	REG11 GEN STATOR COOLING PMP 11	TRIP	AUTO
	REG12 GEN STATOR COOLING PMP 12	START	NEUT
	REG13 GEN STATOR COOLING PMP 12	TRIP	AUTO
	REG14 GENERATOR OUTPUT LINKS	OPEN	CLOSE
	REG15 GEN HYDROGEN SUPPLY VALVE	OPEN	CLOSE
	REG16 BACKFEED INTERLOCKS	ON	OFF
<u>EG2</u>			
MAIN GENERATOR	NONE		
<u>FP</u>			
FIRE PROTECTION	RFP1 CITY WATER SUPPLY TO FP HDR	OPEN	CLOSE
	RFP2 SUPPLY TO EMER COOL MU TANK 11	OPEN	CLOSE
	RFP3 SUPPLY TO EMER COOL MU TANK 12	OPEN	CLOSE
	RFP4 SUPPLY TO FEEDWATER SYSTEM	OPEN	CLOSE
	RFP5 DIESEL FIRE PUMP STATUS	OFF	AUTO

<u>FW1</u>			
FEEDWATER	RFW1 50-10 COND PUMP 11 DISCH VLV	OPEN	CLOSE
	RFW2 50-11 COND PUMP 12 DISCH VLV	OPEN	CLOSE
	RFW3 50-12 COND PUMP 13 DISCH VLV	OPEN	CLOSE
	RFW4 50-31 COND DEMIN BYPASS VLV	OPEN	CLOSE
	RFW5 COND DEMIN 11 INLET/OUTLET VLV	OPEN	CLOSE
	RFW6 COND DEMIN 12 INLET/OUTLET VLV	OPEN	CLOSE
	RFW7 COND DEMIN 13 INLET/OUTLET VLV	OPEN	CLOSE
	RFW8 COND DEMIN 14 INLET/OUTLET VLV	OPEN	CLOSE
	RFW9 COND DEMIN 15 INLET/OUTLET VLV	OPEN	CLOSE
	RFW10 COND DEMIN 16 INLET/OUTLET VLV	OPEN	CLOSE
	RFW11 50-20 SJAE BYPASS FCB	0/100%	50.00
	RFW12 50-40 BOOSTER PUMP 11 SUCTION V	OPEN	CLOSE
	RFW13 50-39 BOOSTER PUMP 12 SUCTION V	OPEN	CLOSE
	RFW14 50-38 BOOSTER PUMP 13 SUCTION V	OPEN	CLOSE
	RFW15 FW HEATER STRING 11 ISOL VLVS	OPEN	CLOSE
	RFW17 FW HEATER STRING 12 ISOL VLVS	OPEN	CLOSE
	RFW18 DEMIN WATER STORAGE TANK REFILL	OPEN	CLOSE
<u>FW2</u>			
FEEDWATER	RFW19 50-16 BYPASS AROUND FCV 50-22	OPEN	CLOSE
	RFW20 MANUAL OPERATION OF LCV50-15	0/100%	0.00
	RFW21 MANUAL OPERATION OF LCV50-07,08	0/100%	0.00
	RFW22 FW HEATER 135 ISOL VALVES	OPEN	CLOSE
	RFW23 HOTWELL LEVEL CONTROL	MAN	AUTO
<u>FW3</u>			
FEEDWATER	NONE		
<u>HV</u>			
HVAC	NONE		
<u>IA</u>			
INSTRUMENT AIR	RIA1 INST AIR SUP TO BREATHING AIR	OPEN	CLOSE
	RIA2 BRW-G-6 WASTE DISPOSAL XTIE	OPEN	CLOSE
	RIA3 94-42 CONT SPRAY AIR RCVR ISOL	OPEN	CLOSE
	RIA4 SERV AIR TO INST AIR BV	TRIP	RESET

<u>LP</u>			
LIQUID POISON	RLP1 LIQ POISON PMP 11 LOCAL START	ON	OFF
	RLP2 LIQ POISON PUMP 12 LOCAL START	ON	OFF
	RLP3 DEMIN WATER TO LP PUMPS	OPEN	CLOSE
<u>MC</u>			
CONDENSER	RMC1 OG-1,2 PRIM JET VAP SUCT VALVES	OPEN	CLOSE
	RMC2 OG-3,4 PRIM JET VAP SUCT VALVES	OPEN	CLOSE
	RMC3 MS 114,15 PRIM JET STEAM VALVES	OPEN	CLOSE
	RMC4 MS-16,1 PRIM JET STEAM VALVES	OPEN	CLOSE
	RMC5 OG-9,10 SEC JET VAPOR SUCT VALVES	OPEN	CLOSE
	RMC6 MS-19,20 SEC JET STEAM VALVES	OPEN	CLOSE
	RMC7 MS-12 SJAE PCV BYPASS	OPEN	CLOSE
<u>MS1</u>			
MAIN STEAM	RMS1 HP FW HTR 115 RESET	TRIP	RESET
	RMS2 HP FW HTR 125 RESET	TRIP	RESET
	RMS3 HP FW HTR 135 RESET	TRIP	RESET
	RMS4 HP FW HTR STRING 11 RESET	TRIP	RESET
	RMS5 HP FW HTR STRING 12 RESET	TRIP	RESET
	RMS6 HP FW HTR STRING 13 RESET	TRIP	RESET
	RMS7 MS-8 MAIN STEAM LINE ISOL	OPEN	CLOSE
	RMS8 SPE 11 SUCTION VALVE	OPEN	CLOSE
	RMS9 SPE 12 SUCTION VALVE	OPEN	CLOSE
	RMS10 TRIP ALL FW HTR EXTR NRVS	TRIP	RESET
<u>MS1</u>			
MAIN STEAM	NONE		
<u>NM1</u>			
NEUTRON MONITOR	RNM1 APRM 11 GAIN	0/100%	2.43
	RNM2 APRM 12 GAIN	0/100%	2.38
	RNM3 APRM 13 GAIN	0/100%	2.36
	RNM4 APRM 14 GAIN	0/100%	2.39
	RNM5 APRM 15 GAIN	0/100%	2.20
	RNM6 APRM 16 GAIN	0/100%	2.18
	RNM7 APRM 17 GAIN	0/100%	2.16
	RNM8 APRM 18 GAIN	0/100%	2.17
<u>NM2</u>			
NEUTRON MONITOR	NONE		
<u>NM3</u>			
NEUTRON MONITOR.	NONE		

OD			
ON DEMAND	NON-FUNCTIONAL		
PC			
CONTAINMENT	RPC1 NITROGEN FROM VAPORIZER	YES	NO
	RPC2 201.7-13 DW CAM ISOL VLV 11	OPEN	CLOSE
	RPC3 201.7-29 DW CAM ISOL VLV 12	OPEN	CLOSE
	RPC4 201.40,41 DW, TORUS TO VENT SYSTEM	OPEN	CLOSE
	RPC5 201.44, 46 DW, TORUS TO ATMOS	OPEN	CLOSE
	RPC6 BV201.2-135,136 INTERLOCK DEFEAT	YES	NO
	RPC7 IV201-31,32 ISOLATION DEFEAT	YES	NO
PP			
PROCESS COMPUTER	RPP01 MEMORY PROTECT PLAN	NORM	REMOVD
RD1			
CONTROL RODS	RRD1 301.2A CRD PUMP 11 DISCH VLV	OPEN	CLOSE
	RRD2 301.2B CRD PUMP 12 DISCH VLV	OPEN	CLOSE
	RRD3 301-8A CRD PUMP 11 HEAD SPRAY ISOL	OPEN	CLOSE
	RRD4 301-8B CRD PUMP 12 HEAD SPRAY ISOL	OPEN	CLOSE
	RRD5 301.8B CRD FLOW CONTROL VLV ISOL	NC30A	NC30B
RD2			
CONTROL RODS	NONE		
RD3			
CONTROL RODS	NONE		
RM1			
RAD MONITOR	NONE		
RP			
RPS	RRP1 RX TRIP BUS 131 PWR SOURCE	NORM	EMER
	RRP2 RX TRIP BUS 141 PWR SOURCE	NORM	EMER
	RRP3 RPS BUS 11 PWR SOURCE	NORM	EMER
	RRP4 BUS 12 PWR SOURCE	NORM	EMER

RR1

REACTOR RECIRC	RRR1 RECIRC MG-SETS 11 LOCKOUT RELAY	TRIP	RESET
	RRR2 RECIRC MG-SETS 12 LOCKOUT RELAY	TRIP	RESET
	RRR3 RECIRC MG-SETS 13 LOCKOUT RELAY	TRIP	RESET
	RRR4 RECIRC MG-SETS 14 LOCKOUT RELAY	TRIP	RESET
	RRR5 RECIRC MG-SETS 15 LOCKOUT RELAY	TRIP	RESET

RR2

REACTOR RECIRC NONE

RR3

REACTOR RECIRC NONE

RR4

REACTOR RECIRC NONE

RW

ROD WORTH MINIMIZER	RRW1 CONTROL ROD SEQUENCE SELECT	B	A

RX

REACTOR CORE NONE

SC

SHUTDOWN COOLING NONE

TC

TURBINE CONTROL	RTC1 REACTOR FLOW LIMIT	0-120%	120.00
	RTC2 CONTROL VALVE LIMIT	0-120%	100.00

TU

MAIN TURBINE NONE

ATTACHMENT "G"

MONITORED PARAMETERS

1. CORE REACTIVITY DK/K
2. CORE THERMAL POWER, %
3. CORE FLOW, LBM/HR
4. CORE PLATE DIFFERENTIAL PRESSURE, PSIG
5. CORE BORON CONCENTRATION, PPM
6. CORE AVERAGE VOID FRACTION, %
7. CORE MINIMUM CRITICAL POWER RATIO
8. CORE MAXIMUM LINEAR HEAT GENERATION, KW/FT
9. CORE INLET SUB COOLING, BTU/LBM
10. CORE AVERAGE FUEL TEMPERATURE, DEG F
11. CORE AVERAGE CLADDING TEMPERATURE, DEG F
12. CORE AVERAGE EXIT QUALITY, %
13. (SPARE)
14. (SPARE)
15. REACTOR COOLANT ACTIVITY, UCI/ML
16. REACTOR COOLANT CONDUCTIVITY, UMHO/CM
17. REACTOR HEATUP/COOLDOWN RATE, DEG F/HR
18. REACTOR LEVEL-NARROW RANGE, INCHES
19. REACTOR LEVEL-WIDE RANGE, FEET
20. REACTOR PRESSURE, PSIG
21. RECIRCULATION LOOP 11 FLOW, LBM/HR
22. RECIRCULATION LOOP 12 FLOW, LBM/HR
23. RECIRCULATION LOOP 13 FLOW, LBM/HR
24. RECIRCULATION LOOP 14 FLOW, LBM/HR
25. RECIRCULATION LOOP 15 FLOW, LBM/HR
26. RECIRCULATION LOOP 11 SUCTION TEMPERATURE, DEG F
27. RECIRCULATION LOOP 12 SUCTION TEMPERATURE, DEG F
28. RECIRCULATION LOOP 13 SUCTION TEMPERATURE, DEG F
29. CRD SYSTEM FLOW, LBM/HR
30. DRYWELL PRESSURE, PSIG
31. DRYWELL AVERAGE TEMPERATURE, DEG F
32. DRYWELL HYDROGEN CONCENTRATION, %
33. DRYWELL OXYGEN CONCENTRATION, %

34. SUPPRESSION CHAMBER PRESSURE, PSIG
35. SUPPRESSION POOL WATER TEMPERATURE, DEG F
36. SUPPRESSION POOL WATER LEVEL, FEET
37. SRM COUNT RATE, CPS
38. SRM PERIOD, SEC
39. APRM POWER LEVEL, %
40. CORE XENON CONCENTRATION, % OF FULL POWER EQU
41. RWCU SYSTEM PRESSURE, SPIG
42. RWCU SYSTEM FLOW, LBM/HR
43. RWCU NON-REGEN HEAT EXCHAN OUTLET TEMPERATURE, DEG F
44. RWCU DUMP FLOW, LBM/HR
45. TOTAL MAIN STEAM LINE FLOW, LBM/HR
46. MAIN STEAM TUNNEL TEMPERATURE, DEG F
47. MAIN STEAM LINE RADIATION LEVEL, MR/HR
48. TOTAL MAIN STEAM RELIEF VALVE FLOW, LBM/HR
49. TURBINE SPEED, RPM
50. TURBINE INLET PRESSURE, PSIG
5.1 TURBINE STEAM FLOW, LBM/HR
52. TURBINE BYPASS VALVE STEAM FLOW, LBM/HR
53. TURBINE FIRST STAGE PRESSURE, PSIG
54. TURBINE EXHAUST HOOD TEMPERATURE, DEG F
55. SECOND STAGE REHEATER OUTLET PRESSURE, PSIG
56. SECOND STAGE REHEATER OUTLET TEMPERATURE, DEG F
57. CONDENSER VACUUM, IN HG V
58. CONDENSER HOTWELL LEVEL, INCHES
59. CONDENSER HOTWELL CONDUCTIVITY, UMHO/CM
60. CONDENSER VACUUM MAKEUP FLOW, LBM/HR
61. CONDENSER HOTWELL REJECT FLOW, LBM/HR
62. CONDENSATE DEPRESSION, BTU/LBM
63. CIRCULATING WATER INLET TEMPERATURE, DEG F
64. CIRCULATING WATER OUTLET TEMPERATURE, DEG F
65 .TOTAL CIRCULATING WATER FLOW, GPM
66. CONDENSATE DEMINERA OUTLET CONDUC, UMHO/CM
67. TOTAL FEEDWATER SYSTEM FLOW, LBM/HR
68. FEEDWATER TEMPERATURE TO REACTOR, DEG F
69. GENERATOR LOAD, MWE
70. GENERATOR REACTIVE LOAD, MVAR

71. GENERATOR STATOR AMPS, AMP
72. GENERATOR TERMINAL VOLTS, VOLT
73. GENERATOR HYDROGEN PRESSURE, PSIG
74. DIESEL GENERATOR 102 LOAD, KWE
75. DIESEL GENERATOR 103 LOAD, KWE
76. OFF-GAS SYSTEM INLET FLOW, CFW
77. OFF-GAS SYSTEM OUTLET FLOW, CFW
78. OFF-GAS RECOMBINER INLET HYDROGEN CONCENTRATION, %
79. OFF-GAS RECOMBINER OUTLET HYDROGEN CONCENTRATION, %
80. OFF-GAS SYSTEM RADIATION LEVEL, MR/HR
81. CORE SPRAY LOOP 11 PRESSURE, PSIG
82. CORE SPRAY LOOP 12 PRESSURE, PSIG
83. CORE SPRAY LOOP 11, FLOW, LBM/HR
84. CORE SPRAY LOOP 12 FLOW, LBM/HR
85. EMERGENCY CONDENSER LOOP 11 FLOW, LBM/HR
86. EMERGENCY CONDENSER LOOP 12 FLOW, LBM/HR
87. EMERGENCY CONDENSER LOOP 11 RETURN TEMPERATURE, DEG F
88. EMERGENCY CONDENSER LOOP 12 RETURN TEMPERATURE, DEG F
89. EMERGENCY CONDENSER LOOP 11 VENT RAD LEVEL, MR/HR
90. EMERGENCY CONDENSER LOOP 12 VENT RAD LEVEL, MR/HR

X

ATTACHMENT H

SIMULATOR MODIFICATION DATA BASE CHANGES AND TEST RESULTS

A. All the modifications listed in Part I, Section E of this report were operationally reverified on 27 May 1987. All modifications were functionally correct with the exception of:
   1. 78-27 MSIV Monitoring - MSIV repositioning will initiate alarm printouts, but not the right ones.
   2. 83-61 Control Room Emergency Vents - Only the hardware portion of this modification is presently incorporated.
   3. 84-58 Feedwater Pump Control - Low Flow Bypass valves fail to close on HPCI initiation.

B. Below is a list of Data Base changes by Modification Number:

Mod #	Document #	Section	To Rev #
N1-7804	C-180140C	3	5
"	C-35628-C	4	9
"	C-35674-C	-	1
"	C-27120-C	-	2
"	A-22110-C	36	2
"	"	23	3
"	B-22111-C	1	5
"	C-18014-C	1	1
"	"	2	20
"	C-22136-C	-	8
"	C-22137-C	-	10
"	C-18349-C	2	3
"	C-26990-C	2	2
"	C-22101-C	4A	1
N1-7824	No Document Changes		
N1-7827	C-19859-C	11	17
"	C-22374-C	1	28
"	C-22380-C	2	12
"	C-23088-C	1	16
"	C-22376-C	4	8
"	C-22025-C	3	6
"	C-220374C	5	8
"	"	7	18
"	C-22020-C	13	3
"	"	14	2
"	C-19859-C	4	21
"	"	7	21
"	C-19437-C	7	18
N1-7832	C-19859-C	14	18
"	"	21	6
N1-7906	C-22379-C	6	10
N1-7924	N1-ST-W6	-	6

X

MOD #	PLACED ON DATABASE	SHEET #	TO REV #
N1-8038	C-19954-C	2	8
	"	3	5
	"	5	5
	"	8	7
	C-19859-C	4	21
	"	7	21
	"	8	32
	"	9	16
	"	10	19
	"	11	17
	"	12	21
	"	13	20
	"	14	21
	C-22374-C	1	28
	"	2	6
	"	3	19
	"	4	32
	C-22382-C	1	18
	"	2	8
	"	3	18
	"	4	1
	"	5	2
	C-19440-C	11	3
	C-19438-C	9	0
	C-19437-C	10	3
	C-34854-C	1	0
	"	2	0
	"	3	0
	"	4	1
	"	5	0
	"	6	0
	C-34853-C	1	0
	"	2	0
	"	3	0
	"	4	0
	"	5	0
	"	6	0
	"	6	0
	C-22374-C	5	8
	C-19859-C	10A	5
	C-19440-C	6	14
		7	16
		10	6
	C-19438-C	8	1
	C-19437-C	6	14
	"	7	18
	"	9	12
	C-23146-C	9	7
	"	11	5
	"	15	1
	C-23145-C	3	7
	C-22025-C	3	6
	C-19957-C	1	22

X

MOD #	PLACED ON DATABASE	SHEET #	TO REV #
N1-8038	C-19866-C	0	5
	C-19425-C	6	22
	C-19424-C	5	20
	C-19423-C	5	20
	C-18015-C	0	16
	C-19951-C	8	13
	"	9	4
	C-19854-C	3	10
N1-8041	C-18017-C	-	14
	C-18006-C	2	5
	C-18055-C	-	14
	C-18355-C	1	15
	C-18357-C	-	16
	B-34028-C	2	1
	C-19913-C	4	42
	"	5	41
	"	7	75
	"	8	79
	"	9	60
	"	10	76
	"	11	61
	"	12	73
	C-19914-C	7	29
	C-19474-C	1	26
	C-22442-C	2	11
	"	3	16
	"	4	12
	C-23213-C	4	9
	"	11	14
	C-23214-C	10	8
	"	11	5
	"	18	3
	"	12	4
	"	13	4
	"	25	12
	"	26	5
	C-23273-C	1	2
	"	2	2
	C-22381-C	10	12
	"	8	18
	"	11	1
	C-34185-C		
	C-18006-C	1	7
	C-19437-C	9	8
	C-19440-C	10	3
	C-19859-C	9	11
	C-19951-C	9	1
	C-22381-C	5	12
	"	11	New
	C-22373-C	2	12
		3	7
	C-22381-C	2	12
		4	10
		10	10

MOD #	PLACED ON DATABASE	SHEET #	TO REV #
N1-8041	C-22383-C	1	14
	C-22387-C	2	11
	C-23046-C	2	9
	C-23093-C	1	10
	C-23100-C	-	6
	C-26982-C	1	2
	"	2	2
	C-26992-C	-	4
	C-26993-C	1	3
	C-26997-C	-	4
	C-26998-C	-	3
	C-23109-C	3	6
	C-18355-C	2	1
	C-18672-C	-	12
	C-18103-C	-	3
	C-34185-C	-	0
	A-22110-C	29	1
	A-22110-C	39	1
	C-22141-C	-	3
	C-22140-C	-	3
	C-22105-C	-	3
	C-26726-C	2	11
	B-19741-C	12	A
	"	13	-
	"	14	-
	B-19758-C	2	C
	"	3	E
	B-34027-C	2	4
	"	2	2
	C-19468-C	1	38
	C-19472-C	-	34
	C-19473-C	2	10
	C-19476-C	-	12
	C-19478-C	-	16
	C-19909-C	1	56
	"	2	50
	"	3	48
	"	4	57
	"	5	52
	C-19818-C	-	2
	C-19408-C	10	6
	C-19438-C	1	8
	C-22302-C	2	7
	"	8	2
	C-23107-C	2	6
	C-19910-C	10	21
	"	12	27
	C-19450-C	4	46
	C-19859-C	9	12
	C-22020-C	4	4
	"	5	4
	C-22383-C	1	16
	"	4	16
	"	8	10

MOD #	PLACED ON DATABASE	SHEET #	TO REV #
N1-8041	C-22383-C	1	16
	"	1	14
	"	8	10
	C-23046-C	2	10
	C-19440-C	6	13
	C-19409-C	10	14
	C-19859-C	10	19
	"	10A	5
	"	8	32
	"	17	10
	C-19954-C	2	8
	"	3	5
	"	5	5
N1-8074	C-34829-C	1	2
	C-34831-C	1	0
	"	2	0
	C-18014-C	1	35
	"	2	26
	C-19957-C	1	22
	C-22020-C	2	7
	"	12	3
	"	16	0
	C-22382-C	1	18
	"	3	18
	C-23146-C	8	7
	"	11	5
	"	15	1
	C-26726-C	2	16
	C-34853-C	1	0
	"	4	1
	"	5	0
	"	6	0
	C-34854-C	1	0
	"	4	1
	"	5	0
	"	6	0
N1-8084	C-19410-C	10	7
	C-19425-C	3	12
	C-22239-C	1	15
	C-22239-C	7	12
	C-23145-C	4	5
	"	5	5
N1-8114	No Additions		
N1-8129	No Additions		
N1-8230	C-22374-C	4	19
	C-23042-C	1	6
	"	2	5
	"	4	6
	C-19423-C	5	19
	"	6	10
	C-19424-C	5	19
	C-19425-C	6	21
	C-22364-C		13

MOD #	PLACED ON DATABASE	SHEET #	TO REV #
N1-8230	C-22365-C	-	14
	C-22366-C	-	14
	C-22367-C	-	15
	C-22368-C	-	12
N1-8269	C-19473-C	9	1
	C-99424-C	7	12
	C-23076-C		
	C-19897-C	2	2
	C-19423-C	8	3
	C-19424-C	6	4
	"	3	13
	C-22374-C	5	4
	C-23077-C	3	7
	"	4	8
	"	5	6
	C-22386-C	2	6
	"	1	7
	C-22372-C	2	7
	"	1	11
	C-22030-C	3	5
	C-22004-C	5	5
	C-19954-C	4	7
	C-19859-C	2	23
	"	5	23
	C-26726-C	3	9
	C-23077-C	5	6
	C-18005-C	1	10
	"	2	10
	C-26727-C	1	2
	C-26726-C	4	17
	C-19423-C	3	15
	C-23077-C	1	10
	"	2	6
N1-8271	C-23145-C	5	12
	"	4	11
	C-19409-C	3	17
	C-19410-C	1	15
	"	2	16
	"	3	14
	"	4	15
	"	5	14
	"	6	15
	"	10	14
	"	11	4
	"	12	4
N1-8280	C-22005-C	11	5
	"	12	4
	"	14	6
	C-22374-C	2	6
	"	3	16
	C-22382-C	1	16
	"	3	14
	C-22356-C	1	7
	"	2	6

MOD #	PLACED ON DATABASE	SHEET #	TO REV #
N1-8280	C-19437-C	10	3
	"	2	23
	C-19440-C	11	3
	C-22005-C	2	6
	"	6	6
	"	5	6
	"	8	7
	"	9	6
	C-19859-C	3	24
	"	6	24
	"	8A	11
	"	8	5
	C-19437-C	10	3
	C-19438-C	3	9
	C-19842-C	2	4
	C-19845-C	7	1
	C-19859-C	2	24
	"	5	24
	"	10	16
	"	10A	3
	"	18	9
	C-19440-C	2	22
	"	6	10
	"	10	6
N1-8293	C-22380-C	3	2
	"	4	1
N1-8329	No Additions		
N1-8353	A-22217-C	20	4
	"	47	4
	C-22238-C	1	16
	"	2	23
	C-22239-C	7	18
	C-23305-C	-	5
	C-23311-C	-	4
	C-19940-C	1	22
	C-19411-C	1	8
	C-19415-C	1	19
	"	2	18
	C-19417-C	1	16
	"	2	5
	C-19418-C	1	14
	"	2	19
	"	3	10
	"	4	16
N1-8358	C-26726-C	1	16
	"	2	16
	"	3	10
	"	4	21
	C-19859-C	18	11
	"	18A	1
	C-22105-C	2	8
N1-8361	C-22387-C	5	3
	C-22388-C	1	6
	"	3	2

X

MOD #	PLACED ON DATABASE	SHEET #	TO REV #
N1-8361	C-22387-C	1	7
	C-26726-C	6	8
N1-8384	C-18022-C	1	15
	"	2	8
	C-18022-C	1	1
	"	2	18
	C-18027-C	2	5
N1-8458	C-19951-C	3	13
	C-22004-C	2	11
	"	5	7
	C-23077-C	4	8
	C-23146-C	7	9
N1-8526	C-19859-C	18	11
	"	18A	1
	C-22373-C	11	9
	"	12	17
	"	13	19
	C-22374-C	4	28
	"	4	32
	"	5	8
	C-26726-C	4	21

ATTACHMENT I

MALFUNCTIONS TESTED IN 1987

FW14
FW18
FW22
FW26
HV01
MC01
MC05
MS03
MS06
MS11
NM04
NM12
NM20
NM33
NM38
OG02
RD02
RD06
RD34
RD38
RM01
RM06
RP02
RP06
RR02
RR06
~~RA10~~ RR10
RR14
RR18
RR22
RR29
RR33

RR37
RR41
RR45
RR49
RR53
RR57
RR61
RR65
RR69
RW01
SC02
~~RC04~~ TC04
TC08
TC12
TU03
AD02
AD06
CS03
CU01
~~CU04~~ CU09
CW02
CW06
CW10
EC02
EC06
ED03
ED07
ED11
ED15
ED19
ED23
EG02

EG06
EG10
EG14
FP04
FP08
FW02
FW06
FW10

NINE MILE POINT NUCLEAR STATION

UNIT 1 PLANT REFERENCED SIMULATOR

ANNUAL REPORT: ANSI 3.5 - 1985

FOR THE YEAR

1988

Testing Conducted April - May 1988

Report Prepared June 1988

Prepared By: George Roarick

Reviewed By:

Supervisor, Unit #1 Operations Training	10/5/88 Date
Asst. Superintendent of Training	10/5/88 Date
Superintendent of Training	10/6/88 Date

I. SIMULATOR INFORMATION

The purpose of this section is to provide familiarization with the Nine Mile Point Unit 1 Plant Referenced Simulator and its applicability as an operator training device.

A. General

1. The simulator is owned by the General Physics Niagara Corporation and is a wholly owned subsidiary of the General Physics Corporation. It is used jointly by General Physics Corporation and Niagara Mohawk Power Corporation instructors. It is maintained and modified by the General Physics Corporation under the direction of Niagara Mohawk Power Corporation. The simulator was built by Singer/Link.
2. The simulator is a full scope control room simulator that simulates the Nine Mile Unit #1 plant. The plant is an 1850 Megawatt Thermal, BWR-2 plant with an electrical output of 620 Megawatts. The plant uses a GE BWR Mark I Primary Containment.
3. The simulator was declared ready for training on September 1, 1984.
4. The initial report on the simulator was prepared in March of 1986. The first annual report was completed in June of 1987.
5. In addition to training, the simulator has been used by the Operations Department to validate procedures prior to their implementation.

B. Control Room (Physical Fidelity)

1. The physical layout of the referenced plant's Control Room is shown in Attachment "A". The physical layout of the simulator is shown in Attachment "B". A comparison of these diagrams shows a high degree of similarity between the two rooms. The following differences exist:

   a. The instructor's console in the simulator uses the same area occupied by the Control Room Clerk's Office in the reference plant's Control Room.
   b. A manual dose assessment calculator is mounted on the wall next to the stairwell in the referenced plant's control room. A meteorological computer is located next to it. This equipment does not exist in the simulator.
   c. A video camera is mounted on the wall above the NSSS typer. There are no video cameras permanently mounted in the simulator.
   d. There are some minor differences in the amount and type of furniture in both rooms.

2. Panels and Equipment

   The simulator contains all of the panels that are in the referenced plant's Control Room. All front panels and the "E" console are fully simulated. The back panels are fully simulated with the exception of the following:

   a. RPS relays are installed but are not functional.
   b. Electrical protective relaying is cosmetically simulated by photos in the relay enclosures.
   c. Only one of the four Transversing In-Core Probe panels is functional.
   d. Seismic Monitors are not functional.

3. Systems

All systems that are operable from the referenced plant's Control Room are simulated. See Attachment "C" for a list of these systems.

4. Simulator Control Room Environment

The Simulator Control Room was specifically designed to duplicate as nearly as possible the referenced plant's Control Room. Other than the discrepancies noted in Section 1 of this part, the following differences exist:

a. Even though the lighting is identical to that at the referenced plant, the lighting system is not functionally interfaced with the simulator. Plans to interface the lights and the simulator are being evaluated.
b. The ambient noise level of the referenced plant's Control Room is not simulated. The hardware in place to do this is installed but is not functional. Plans to do this are being evaluated.

C. Instructor Interface (Control Capabilities)

1. Initial Conditions

The instructor has the capability to initialize the simulator to any one of fifty (50) sets of initial conditions. The first twenty of these sets of conditions are guarded and can only be changed by the proper code. The "guarded" initial conditions are the foundation for approximately 95% of the training. These twenty sets of initial conditions are listed in Attachment "D". The remaining thirty sets of initial conditions can be set at any time by the instructor.

2. Malfunctions

Malfunctions vary from a discrete nature (i.e. pump trip) to ones of varying degrees of severity (i.e. leaks). Attachment "E" is a complete list of malfunctions.

3. Remote Functions

The instructor has the capability to simulate most of the inplant operations needed to backup a Control Room evolution. Attachment "F" is a complete list of remote functions.

4. Instructor Override

The I/O function gives the instructor at the console the ability to override all switches, energize or deenergize any light or alarm, and drive all meters. A few problems exist in the I/O program, but are being documented for evaluation and repair as they are identified.

5. Monitoring

The instructor can monitor on the console, up to sixteen (16) of ninety (90) parameters. In addition, the instructor can set up a line plotter to any of these same ninety (90) parameters. Attachment "G" is a list of these monitored parameters.

6. Instructor Station Controls

Consists of three (3) keyboard/CRT's, two (2) are for performing simulator functions, one (1) is for minor trouble shooting and correction of the computer system. There are also various buttons which perform the following:

a. Freeze - stops (freezes) simulation at any point or restarts it.
b. Reset/Ready - initializes the simulator to a selected set of initial conditions. This button turns green when all controls are properly positioned.
c. Snapshot - records and stores a set of conditions into any "IC".
d. Malfunction Clear - clears the entire malfunction tableau.

e. Backtrack - sets the simulator to step up or back to any point in time, within sixty 60 minutes. This includes buttons to step in one minute intervals and to step forward or reverse.

f. Manual Malfunction Control - used to increase or decrease the severity of up to three (3) variable malfunctions.

g. Annunciator Silence - silences, but does not acknowledge, all annunciators.

h. Recorder Off - shuts off power to all chart recorders.

i. Test and Lamp Test - testing and troubleshooting.

j. Emergency Stop - kills all power to the computer and simulator.

k. Computer Alarm/Acknowledge - warns of computer malfunctions.

l. Program Overtime - warns of computers inability to complete a calculation within an allotted time frame. Depressing the button resets the timer.

m. Record and Replay - starts and stops the tape recorder in the Computer Room when it is set put to record an exercise.

n. Slow Time - slows simulator response to where two (2) real time seconds equal one (1) problem time second.

o. Fast Time - speeds up response time of Xenon, condenser evacuation, and turbine warming.

7. Record/Replay

If so desired, a scenario can be recorded on magnetic tape for replay at a later date. This function is controlled from the instructor station.

D. Reference Plant Operating Procedures

The simulator is operated using the same procedures used to operate the plant. The Operations Department has used the simulator to validate new procedures or revisions.

E. Changes Since Last Report (June 1987)

1. Plant Modifications as of June 15, 1988

   a. J-Panel Upgrades - Installation of RSSB ARM meters (non-functional) and installation of new digital (Kaman) radiation monitoring panels for Control Room Ventilation, Service Water discharge, Rad Waste discharge. (Functional)
   b. N1Y86M057 Rod Worth Minimizer - Added new process computer points for RWM failures.
   c. Mod #N1-80-072, Alternate Rod Injection (ARI) - Alternate Rod insertion is a redundant method of rod injection, utilizing two one inch DC solenoid valves in series with the Control Rod Scram Air Header System. Initiation signal to operate these valves will be ATWS LoLo water level and ATWS high reactor pressure.
   d. Mod #N1-85-098, Containment Isolation on High Radiation - Shuts N_2 & Air Vent & Purge valves on High Stack activity.

2. Physical Layout

   a. The instructor's station was moved onto a twenty inch (20") platform adjacent to the SSS's office. (This area at the plant is occupied by the ASSS/STA office - see Attachment "A").
   b. A direct phone link between the instructor's station and the CSO's desk was installed to simulate the direct phone link to the Energy Management Center an the NRC/state.

II. SIMULATOR DESIGN DATA

The current design data base for the simulator is on file at the Training Center. A current listing of the design data base is available on the plant's Configuration Management System in the simulator data file. Changes to the design data base since June 1987 are listed in Attachment "H".

III. SIMULATOR TESTS (PERFORMANCE TESTING)

During May of 1988, testing was done to verify real time operation, steady state and normal operation, transient performance and malfunction response. Documentation of these tests is on file and available at the Training Center.

A. Computer Real Time Tests

Simulator real time testing was performed by measuring individual model times during steady state and transient conditions. During this testing, no frame slippage or program overtimes occurred. The simulator contains safeguards that preclude operation outside of real time with the exception of two (2) instructor controlled functions described in Section I.C.6 of this report (Fast Time/Slow Time).

B. Steady State and Normal Operation

1. Simulator stability was verified by comparing heat balances (P-1 edits) and printouts of selected "critical" parameters from the start and finish of a sixty (60) minute steady state run. There was no deviation outside of acceptable limits in regards to the "critical" parameters. There is, however, a problem with rising exhaust hood temperatures. This problem was found to be generic to all power operating conditions and was documented for correction.

2. Fidelity in performance was verified by comparing heat balances and "critical" parameters from the plant at various power levels.

   a. Generic Problems

      1) Reactor Physics - Simulator was not able to duplicate the power to flow relationship from a cold startup configuration, even with all rods out.

      2) Plant Efficiency - Even though the simulator was within tolerances at full power, during power ascension, the calculated efficiency was as much as five percent (5%) lower than that of the plant for a similar configuration.

      3) Off-Gas System - During start up and power ascension, the Off-Gas System could not be operated in accordance with the procedure or ATP. The mechanical vacuum pumps were unable to achieve the vacuum they could at the plant within the actual time frame seen at the plant. Post recombine flow was erratic and too high and both the off-gas vacuum pumps were unable to maintain pressure. (It normally requires only one pump at the plant.)

      4) Recirculation Pump Flows - Individual pump flows at the plant vary as much as 100,000 lbm/hr. On the simulator, they are almost equal.

      5) Narrow Range GEMAC Level - At the plant, it runs about a two inch (2") difference in channel #11 and #12 NR GEMAC's. In the simulator, they are equal.

      Of the generic problems noted, items 1, 2, and 3 were documented for correction and assigned immediate priority. Items 4 and 5 have very little if any training impact and will not be addressed any further.

   b. 25% Power - Plant data for total steam flow is significantly different than that from the simulator, but the plant data appears to be incorrect based on the rest of the data. There were no other problems other than the generic ones listed above.

c. 50% Power - Simulator data compared favorably with the plant data except for the generic problems listed above. One OG vacuum pump can handle the volume but flow is still too high and the slightest change causes off-gas to respond significantly.

d. 75% Power - Simulator data compared favorably with plant data except for the generic problems listed above. OG system behavior was consistent to that experienced at 50% power.

e. 100% Power - Simulator data compared favorably with plant data except for the generic problems noted above. OG system behavior was consistent to that at 50% and 75% power.

C. Transient Tests

1. The following transients are analyzed in the FSAR and were run on the simulator in real time.

   a. Simultaneous Trip of all Feedwater Pumps - (Feedwater Malfunction, Zero Flow). The FSAR shows an increase in recirculation control due to changes in two-phase flow. The simulator does not model two-phase flow closely enough to produce this; therefore, it does not change. This discrepancy has little or no training impact and will not be further addressed.

   b. Simultaneous Closure of MSIV's - Consistent with FSAR.

   c. Simultaneous Trip of all Recirculation Pumps - consistent with FSAR.

   d. Single Recirculation Pump Trip - The simulator shows a much more pronounced decrease and recovery of recirculation flow than the FSAR. Parameters effected by flow respondent likewise.

e. Loss of Coolant with a Loss of A/C Power - At time + 3.5 seconds, Drywell pressured spiked to 10 psig then dropped to 8 psig with an increasing trend to a maximum pressure of about 22 psig over a period of 30 seconds. This is inconsistent with the FSAR which shows a pressure spike to 33 psig in 2 seconds. This inconsistency was identified and documented last year.

2. The following transients are not analyzed in the FSAR but are required by ANSI 3.5 - 1985.

   a. Main Steam Line Break Inside the Drywell - Drywell pressure in the first 3 seconds of the transient spiked to 11 psig. During the next second, it decreased to 8 psig before starting a steady increase to about 15 psig. This problem is documented for further evaluation and resolution. Otherwise, the simulator was consistent with predicted response.

   b. Turbine Trip at less than 40% Power - The simulator was consistent with predicted response.

   c. Power Change; 100 and 75% - 100% (Maximum Ramp) - The simulator was consistent with predicted response.

   d. MSIV closure with a stuck open ERV and no high pressure ECCS available.

      The simulator was consistent with predicted response.

3. The following transients are not required for the report by the standard but were conducted and compared to data from the FSAR.

   a. Turbine Trip without Bypass

   b. Inadvertent Actuation of an ERV

   c. Safety Valve Actuation

   d. EPR/MPR Failures

In all cases, the simulator response was consistent to the FSAR.

D. Malfunction Testing

In addition to the malfunctions used to create the transient tests above 25% of the available malfunctions (Attachment "E") were tested in accordance with the ATP. Attachment "I" is a list of the malfunctions tested. Operations Department personnel were on hand to help validate the response of the simulator to the malfunctions. A number of problems were documented. They will be handled in accordance with NTI-4.5.3 "Simulator Configuration Management".

IV. SIMULATOR CONFIGURATION MANAGEMENT

Discrepancy resolution and modifications are handled in accordance with NTI-4.5.3 "Simulator Configuration Management". This is a computer based tracking system. The system has identified seven modifications that fall outside the implementation guidelines of ANSI 3.5 - 1985. Attachment "J" provides a list of these modifications and the status of each at the writing of this report.

In 1987 the Plant's Configuration Management System was implemented to track and maintain the plant's data base, this system also contains a program for tracking, maintaining, and generating reports on the simulator's data base. Once an audit of the hard copy is complete and a more complete list is available, this information will be inputed on the system.

```
***************************************************
*                   FINAL NOTE                    *
*                                                 *
* All data used to compile this report as well    *
* as NTI-4.5.3 are on file and available for      *
* inspection.                                     *
***************************************************
```

ATTACHMENT A

Legend

2	Main Fire Panel #2
A	Panel A Electric/ Turbine Controls
B	Panel B Relays/ Turbine Controls
C	Plant Process Computer Equipment
D	Chief Shift Operator Desk
E	E Panel Main Control Console
F	F Panel NSSS
G	G Panel Nuclear Instrumentation
H	H Panel Balance of Plant
I	Instructors Console
J	J Panel Radiation Monitoring
K	K Panel ECCS
L	L Panel Primary Containment
M	M Panel RPS
N	N Panel Turbine
P	Print Rack
S	Storage Cabinets
T	Tables
M/R	Meteorological Computer
R	Manual Dose Assessment Calculator
R/T	Radio/Telephone Equipment
O	Procedures
B/S	Bookshelf
D/K	Desk

Figure 1 - Nine Mile Point Unit 1 Control Room

ATTACHMENT B

Legend

2	Main Fire Panel #2
A	Panel A Electric/ Turbine Controls
B	Panel B Relays/ Turbine Controls
C	Plant Process Computer Equipment
D	Chief Shift Operator Desk
E	E Panel Main Control Console
F	F Panel NSSS
G	G Panel Nuclear Instrumentation
H	H Panel Balance of Plant
I	Instructors Console
J	J Panel Radiation Monitoring
K	K Panel ECCS
L	L Panel Primary Containment
M	M Panel RPS
N	N Panel Turbine
P	Print Rack
S	Storage Cabinets
T	Tables
O	Procedures
B/S	Bookshelf
F/C	False Column
F/S	False Stairway
F/D	False Door
R/T	Radio/Telephone Equipment

Figure 2 - Nine Mile Point Unit 1 Simulator Control Room

Attachment C

SYSTEMS FULLY SIMULATED

1. Nuclear Boiler and Instrumentation
2. Reactor Recirculation System
   a. Reactor Recirculation Loops
   b. Boiler Process Instrumentation
   c. Recirculation Flow Control
3. Control Rod Drive and Hydraulics System (CRDHS)
4. Reactor Manual Control System (RMCS)
5. Reactor Core (Physics and Thermodynamics)
   a. Reactor Core Neutron Kinetics
   b. Reactor Core Thermodynamics
6. Rod Worth Minimizer (RWM)
7. Main Steam Systems
   a. Main Steam and Main Steam Bypass Systems
   b. Moisture Separators - Reheaters
   c. Extraction Steam System
   d. Auxiliary Steam System
8. Reactor Water Cleanup System
9. Nuclear Instrumentation System
   a. Source Range Monitor (SRM) System
   b. Intermediate Range Monitor (IRM) System
   c. Local Power Range Monitoring (LPRM) System
   d. Average Power Range Monitoring (APRM) System
   e. Rod Block Monitor (RBM) System
   f. Traversing In-Core Probe (TIP) System
10. Reactor Protection System
11. Simulation of the Primary Containment and Isolation System
   a. Primary Containment
   b. Primary Containment Isolation System
12. Secondary Containment
13. Emergency Ventilation
   a. Reactor Building Ventilation
   b. Turbine Building Ventilation
   c. Building Ventilation
14. Primary Containment Atmosphere Control and Sampling System

15. Emergency Core Cooling Systems
    a. Automatic Depressurization and pressure Relief System
    b. Core Spray
    c. High Pressure Coolant Injection (HPCI) System
    d. Containment Spray
    e. Emergency Cooling System
16. Shutdown Cooling
17. Standby Liquid Control (SLC) System
18. Condensate and Feedwater System
    a. Condensate System
    b. Condensate Demineralizer System
    c. Feedwater System
    d. Condensate Storage and Transfer System
    e. Reactor Vessel Level Control System
    f. Feedwater Heaters, Vents and Drains
19. Off-Gas Recombiner and Condenser Air Removal
20. Main Condenser
21. Circulating Water System
22. Reactor Building Closed Loop Cooling
23. Turbine Building Closed Loop Cooling
24. Service Water System
25. Instrument, Service and Breathing Air
26. Area Radiation Monitoring System
27. Process Radiation Monitoring System
28. Ventilation Radiation Monitoring System
29. Main Turbine and Turbine Control
    a. Turbine Oil System
    b. Turbine Kinematics
    c. Turbine Mechanics
    d. Turbine Supervisory and Safety System
    e. Gland Seal System
    f. Low Pressure Hood Spray System
    g. Moisture Separator and Reheat System
    h. Main Turbine Electro-Hydraulic Control System

30. Plant Electrical System
    a. Main Generator and Auxiliary Systems
        1. Main Generator Synchronous Machine
        2. Excitation and Voltage Regulator System
        3. Synchroscope
        4. Hydrogen Cooling System
        5. Stator and Iso-Phase Duct Cooling System
        6. Hydrogen Seal Oil System
    b. Electrical Distribution System
        1. Buses and Transformers
        2. Breakers
        3. Currents, Voltages and Frequencies
        4. DC Electrical Distribution and Control
        5. Power System Electrical Grid
    c. Diesel Generators
31. Containment Atmosphere Dilution, Vent and Purge System
32. Radiation Waste Disposal System Containment Equipment and Floor Drain Sump
33. Plant Carbon Dioxide System
34. Diesel Fire Pump and Pressurized Water Fire System
35. Fire Control Ventilation Systems
36. Control Room Heating, Ventilation and Air Conditioning
37. Communication System
38. Plant Process Computer System
    a. Applicable Experience
39. Meteorological Experience
40. Plant Annunciators and Fire System Alarm

ATTACHMENT D

GUARDED INITIAL CONDITIONS

IC #	DESCRIPTION
1.	Cold Iron - All systems are off line with the exception of Service Water and Electrical Distribution. This is not an approved plant lineup but is used to provide training in system startups in the Control Room.
2.	Cold Startup - Shutdown Cooling in service with all systems needed for startup of the reactor on line and ready to pull rods. (After securing SDC.)
3.	Cold Startup - 5-10 rods subcritical, pulling in Group 4.
4.	Heatup 100# - Pulling Group 9
5.	Heatup 250# - Pulling Group 11
6.	Heatup 950# - Pulling Group 23
7.	Shutdown 80% Flow - Start of controlled plant shutdown per OP-43
8.	Shutdown Min Flow - Inserting Group 76
9.	Shutdown Min Flow - Mode Switch to "Shutdown", Inserting Group 33
10.	Shutdown Min Flow - All rods in
11.	Turbine Startup - 3.5 Bypass Valves Open, Turbine Warmed
12.	Feedwater Pump #13 Startup - 210 MWE, on two electric FWP's
13.	50% Power - Power accent to threshold and preconditioning
14.	100% Power - Normal full power configuration
15.	Coastdown - All rods out at end of cycle
16.	Startup - Rods at 100% target pattern, 30% flow
17.	Reserved for Future Use
18.	Reserved for Future Use
19.	Cooldown 200# - Plant Cooldown
20.	Cooldown 80# - Shutdown Cooling In Service

ATTACHMENT E

NINE MILE POINT UNIT ONE MALFUNCTIONS

AD01	ADS FAILURE TO INITIATE - PRIMARY VALVES
AD02	ADS FAILURE TO INITIATE - COMPLETE
AD03	SOLENOID ACTUATED PRESSURE RELIEF VALVE (#111) FAILURE - SOLENOID
AD04	SOLENOID ACTUATED PRESSURE RELIEF VALVE (#111) FAILURE - VALVE LEAKS
AD05	SOLENOID ACTUATED PRESSURE RELIEF VALVE (#111) FAILURE - OPENS INADVERTENTLY
AD06	SOLENOID ACTUATED PRESSURE RELIEF VALVE (#111) FAILURE - STUCK OPEN
AN01	CONTROL ROOM ANNUNCIATOR SYSTEM FAILURE
CS01	CORE SPRAY PUMP TRIP (111, 112, 121, 122 OR ANY)
CS02	CORE SPRAY TOPPING PUMP TRIP (111, 112, 121, 122 OR ANY)
CS03	CORE SPRAY INBOARD INJECTION VALVE FAILURE TO OPEN (IV40-01, IV40-09, IV40-11, IV40-10 OR ANY)
CT01	CONTAINMENT SPRAY PUMP TRIP (111, 112, 121, 122 OR ANY)
CT02	CONTAINMENT SPRAY RAW WATER PUMP TRIP (111, 112, 121, 122 OR ANY)
CT03	CONTAINMENT SPRAY HEAT EXCHANGER (111, 112, OR BOTH) TUBE LEAK
CU01	COOLANT LEAKAGE INSIDE PRIMARY CONTAINMENT
CU02	REACTOR WATER CLEANUP PUMP TRIP (11, 12 OR BOTH)
CU03	REACTOR WATER CLEANUP REJECT FLOW CONTROL VALVE (FCV-ND22) FAILS OPEN
CU04	REACTOR WATER CLEANUP REJECT FLOW CONTROL VALVE (FCV-ND22) FAILS CLOSED
CU05	REACTOR WATER CLEANUP HIGH PRESSURE CONTROL VALVE (PCV 33-39) FAILS OPEN
CU06	REACTOR WATER CLEANUP HIGH PRESSURE CONTROL VALVE (PCV 33-39) FAILS CLOSED
CU07	REACTOR WATER CLEANUP LOW PRESSURE CONTROL VALVE (PCV-ND37) FAILS OPEN
CU08	REACTOR WATER CLEANUP LOW PRESSURE CONTROL VALVE (PCV-ND37) FAILS CLOSED
CU09	REACTOR WATER CLEANUP NON-REGENERATIVE HEAT EXCHANGER TUBE LEAK
CU10	REACTOR WATER CLEANUP DEMINERALIZER RESIN DEPLETION (11, 12 OR BOTH)
CU11	COOLANT LEAKAGE OUTSIDE PRIMARY CONTAINMENT
CW01	HIGH RADIATION IN SERVICE WATER
CW02	SERVICE WATER PUMP TRIP (11, 12 OR BOTH)

CW03 EMERGENCY SERVICE WATER PUMP TRIP (11, 12 OR BOTH)
CW04 REACTOR BUILDING CLOSED LOOP COOLING (11, 12, 13 OR ANY) PUMP TRIP
CW05 TURBINE BUILDING CLOSED LOOP COOLING PUMP TRIP (11, 12 OR BOTH)
CW06 CIRCULATING WATER PUMP TRIP (11, 12 OR BOTH)
CW07 CIRCULATING WATER EXPANSION JOINT LEAKAGE
CW08 CIRCULATING WATER INTAKE STRUCTURE ICING
CW09 LOSS OF DRYWELL COOLING
CW10 MAIN CONDENSER TUBE LEAK
DG01 DIESEL GENERATOR FAILURE TO START (102, 103 OR BOTH)
DG02 DIESEL GENERATOR TRIP (102, 103 OR BOTH)
EC01 STEAM LEAKAGE INSIDE PRIMARY CONTAINMENT
EC02 STEAM LEAKAGE OUTSIDE PRIMARY CONTAINMENT
EC03 EMERGENCY COOLING SYSTEM RETURN VALVE FAILS OPEN (IV39-05, IV39-06 OR BOTH)
EC04 EMERGENCY COOLING SYSTEM RETURN VALVE FAILS TO OPEN (IV39-05, IV39-06 OR BOTH)
EC05 EMERGENCY COOLING SYSTEM EMERGENCY CONDENSER MAKEUP CONTROL VALVE FAILS CLOSED (LCV60-17, LCV60-18 OR BOTH)
EC06 EMERGENCY CONDENSER TUBE LEAK (111, 121 OR BOTH)
ED01 LOSS OF OFF-SITE 115 KV POWER SOURCES (LIGHTHOUSE HILL-JAF, OSWEGO STEAM, OR BOTH)
ED02 BATTERY CHARGER AND EMERGENCY LIGHTING SUPPLY MOTOR GENERATOR TRIPS (161, 171 OR BOTH)
ED03 COMPUTER POWER SUPPLY MOTOR GENERATOR TRIPS (167)
ED04 AC POWERBOARD ELECTRICAL FAULT (PB11)
ED05 AC POWERBOARD ELECTRICAL FAULT (PB12)
ED06 AC POWERBOARD ELECTRICAL FAULT (PB101)
ED07 AC POWERBOARD ELECTRICAL FAULT (PB102)
ED08 AC POWERBOARD ELECTRICAL FAULT (PB103)
ED09 AC POWERBOARD ELECTRICAL FAULT (PB13 SECTION A)
ED10 AC POWERBOARD ELECTRICAL FAULT (PB13 SECTION B)
ED11 AC POWERBOARD ELECTRICAL FAULT (PB13 SECTION C)
ED12 AC POWERBOARD ELECTRICAL FAULT (PB14 SECTION A)
ED13 AC POWERBOARD ELECTRICAL FAULT (PB14 SECTION B)
ED14 AC POWERBOARD ELECTRICAL FAULT (PB14 SECTION C)
ED15 AC POWERBOARD ELECTRICAL FAULT (PB15 SECTION A)
ED16 AC POWERBOARD ELECTRICAL FAULT (PB15 SECTION B)
ED17 AC POWERBOARD ELECTRICAL FAULT (PB15 SECTION C)

ED18 AC POWERBOARD ELECTRICAL FAULT (PB16 SECTION A)

ED19 AC POWERBOARD ELECTRICAL FAULT (PB16 SECTION B)

ED20 AC POWERBOARD ELECTRICAL FAULT (PB17 SECTION A)

ED21 AC POWERBOARD ELECTRICAL FAULT (PB18 SECTION B)

ED22 DC POWERBOARD ELECTRICAL FAULT J(11, 12 OR BOTH)

ED23 LOSS OF POWER TO INSTRUMENT CONTROL BUS 130 - NORMAL

ED24 LOSS OF POWER TO INSTRUMENT CONTROL BUS 130 - ALTERNATE

ED25 LOSS OF POWER TO INSTRUMENT CONTROL BUS 130 - NORMAL AND ALTERNATE

EG01 MAIN GENERATOR TRIP - ELECTRICAL FAULT

EG02 GENERATOR AUTOMATIC VOLTAGE REGULATOR FAILS - INCREASE

EG03 GENERATOR AUTOMATIC VOLTAGE REGULATOR FAILS - DECREASE

EG04 MAIN GENERATOR CORE INTERNAL HEATING

EG05 MAIN TRANSFORMER LOSS OF COOLING

EG06 GENERATOR HYDROGEN COOLING SYSTEM LEAKAGE

EG07 GENERATOR HYDROGEN MAIN SEAL OIL PUMP FAILURE

EG08 GENERATOR HYDROGEN EMERGENCY SEAL OIL PUMP FAILURE

EG09 STATOR COOLING PUMP TRIP (11, 12 OR BOTH)

EG10 LOSS OF CONTROL AIR TO 345 KV BREAKER (R-915, R-925 OR BOTH)

EG11 POWER GRID NETWORK LOAD TRANSIENT - INCREASE

EG12 POWER GRID NETWORK LOAD TRANSIENT - DECREASE

EG13 STATOR WATER COOLING DEMINERALIZER RESIN DEPLETION

FP01 DIESEL FIRE PUMP FAILURE

FP02 ELECTRIC FIRE PUMP FAILURE

FP03 AC FOAM PUMP FAILURE

FP04 DC FOAM PUMP FAILURE

FP05 TURBINE ISLAND FIRE DETECTION (D-1195, D-1155, D-1165, D-1175, D-1061, D-1114, D-1131 OR ANY)

FP06 CONTROL ROOM FIRE DETECTION (FIRE PANEL 2, CONTROL CONSOLE, "L" PANEL, "K" PANEL, "H" PANEL, "F" PANEL, "A" PANEL OR ANY)

FP07 TURBINE BUILDING FIRE DETECTION (DA-22092MG, DA-2083M, DA-2081S, DA1092E, D-2102 OR ANY)

FP08 DIESEL ROOM FIRE DETECTION (DX-2113A, DX-2113B, DX-02141A, DA-2141, DX-2151B, DA-2151, D-2151 OR ANY)

FP09 AUXILIARY CONTROL ROOM/cable spreading room fire detection (d-3031PL, DX-3031A, DX-3111B, WD-8131, WD-8082 OR ANY)

FP10 REACTOR BUILDING FIRE DETECTION (DX-4217A, DA-4116W, DA-4076E, D-4207, D-4156, SP-4126, D-4086 OR ANY)

FW01	CONDENSATE PUMP TRIP (11, 12, 13 OR ANY)
FW02	FEEDWATER BOOSTER PUMP TRIP (11, 12, 13 OR ANY)
FW03	FEEDWATER PUMP TRIP (11, 12 OR BOTH)
FW04	SHAFT DRIVEN FEEDWATER PUMP 13 FAILURE
FW05	SHAFT DRIVEN FEEDWATER PUMP CLUTCH FAILURE TO ENGAGE
FW06	SHAFT DRIVEN FEEDWATER PUMP CLUTCH FAILURE TO DISENGAGE
FW07	FEEDWATER CONTROL VALVE 11 CONTROLLER FAILS HIGH
FW08	FEEDWATER CONTROL VALVE 11 CONTROLLER FAILS LOW
FW09	FEEDWATER CONTROL VALVE 12 CONTROLLER FAILS HIGH
FW10	FEEDWATER CONTROL VALVE 12 CONTROLLER FAILS LOW
FW11	FEEDWATER CONTROL VALVE 13 CONTROLLER FAILS HIGH
FW12	FEEDWATER CONTROL VALVE 13 CONTROLLER FAILS LOW
FW13	FEEDWATER CONTROL VALVE 13 CONTROLLER FAILS AS IS
FW14	FEEDWATER MASTER CONTROLLER FAILS HIGH
FW15	FEEDWATER MASTER CONTROLLER FAILS LOW
FW16	FEEDWATER MASTER CONTROLLER FAILS AS IS
FW17	CONDENSATE DEMINERALIZER DEPLETION
FW18	FEEDWATER CONDUCTIVITY INCREASE
FW19	CONDENSATE RECIRCULATION VALVE (FCV 50-24) FAILS OPEN
FW20	CONDENSATE RECIRCULATION VALVE (FCV 50-24) FAILS CLOSED
FW21	FEEDWATER BOOSTER PUMP RECIRCULATION VALVE FAILS OPEN (FCV 51-58, FCV 51-59, FCV 51-60 OR ANY)
FW22	FEEDWATER HEATER TUBE LEAK
FW23	FEEDWATER PUMP RECIRCULATION VALVES FAIL OPEN (11, 12, 13 OR ANY)
FW24	FEEDWATER CONTROL VALVE FAILS CLOSED (13A, 13B OR BOTH)
FW25	THREE MILE ISLAND ACCIDENT (BWR EQUIVALENT)
FW26	CONDENSATE BYPASS SPRAY TO MAIN CONDENSER FLOW CONTROL VALVE (FCV 50-22) FAILS CLOSED
FW27	LOSS OF COMPENSATION TO FEEDWATER FLOW TRANSMITTER
FW28	HPCI MODE FAILURE TO INITIATE (11, 12 OR BOTH)
FW29	HPCI MODE Inadvertent INITIATION (11, 12 OR BOTH)
HV01	REACTOR BUILDING EXHAUST FAN TRIP (11, 12 OR BOTH)
HV02	EMERGENCY VENTILATION FAN TRIP (11, 12 OR BOTH)
IA01	LOSS OF INSTRUMENT AIR
LP01	LIQUID POISON PUMP TRIP (A, B OR BOTH)

MC01	MAIN CONDENSER AIR IN LEAKAGE
MC02	STEAM JET AIR EJECTOR STEAM SUPPLY VALVE FAILS CLOSED
MC03	HOTWELL LEVEL CONTROLLERS IN AUTO FAIL HIGH
MC04	HOTWELL LEVEL CONTROLLERS IN AUTO FAIL LOW
MC05	HOTWELL LEVEL CONTROLLERS IN AUTO FAIL AS IS
MC06	EXPLOSION IN AIR EJECTOR DISCHARGE PIPING
MS01	STEAM LEAK RUPTURE OUTSIDE PRIMARY CONTAINMENT (DESIGN BASIS)
MS02	MSIV DISC SEPARATES FROM STEM
MS03	ONE MSIV FAILS CLOSED (VALVE 122)
MS04	STEAM LINE RUPTURE INSIDE PRIMARY CONTAINMENT (DESIGN BASIS)
MS05	TURBINE STEAM SEAL REGULATOR FAILS CLOSED
MS06	MOISTURE SEPARATOR DRAIN TANK LEVEL CONTROL FAILS LOW
MS07	FIRST STAGE REHEATER 111 STEAM SUPPLY VALVE CLOSES
MS08	SECOND STAGE REHEATER 112 STEAM SUPPLY VALVE CLOSES
MS09	SECOND STAGE REHEATER 112 DRAIN TANK LEVEL CONTROL FAILS LOW
MS10	LOSS OF EXTRACTION STEAM TO HIGH PRESSURE FEEDWATER HEATER (115, 125, 135 OR ANY)
MS11	LOSS OF COMPENSATION TO STEAM FLOW TRANSMITTER
NM01	SRM CHANNEL (11, 12, 13, 14 OR ANY) FAILURE - UPSCALE
NM02	SRM CHANNEL (11, 12, 13, 14 OR ANY) FAILURE - DOWNSCALE
NM03	SRM CHANNEL RECORDER FAILURE (RED, BLACK OR BOTH PENS)
NM04	SRM CHANNEL (11, 12, 13, 14 OR ANY) FAILURE - INOPERATIVE
NM05	SRM CHANNEL (11, 12, 13, 14 OR ANY) FAILURE - UPSCALE, RECORDER INOPERATIVE
NM06	SRM CHANNEL (11, 12, 13, 14 OR ANY) FAILURE - DOWNSCALE
NM07	SRM CHANNEL (11, 12, 13, 14 OR ANY) FAILURE - RECORDER
NM08	SRM CHANNEL (11, 12, 13, 14 OR ANY) FAILURE - INOPERATIVE
NM09	SRM CHANNEL (11, 12, 13, 14 OR ANY) DETECTOR STUCK
NM10	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - UPSCALE
NM11	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - DOWNSCALE
NM12	IRM/APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - RECORDER
NM13	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - INOPERATIVE
NM14	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - UPSCALE

NM15	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - DOWNSCALE
NM16	IRM/APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - RECORDER
NM17	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) INOPERATIVE
NM18	IRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) DETECTOR STUCK
NM19	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - UPSCALE
NM20	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - DOWNSCALE
NM21	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - INOPERATIVE
NM22	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - UPSCALE
NM23	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - DOWNSCALE
NM24	APRM CHANNEL (11, 12, 13, 14, 15, 16, 17, 18 OR ANY) FAILURE - INOPERATIVE
NM25	ANY LPRM (X-Y-J) FAILURE - UPSCALE
NM26	ANY LPRM (X-Y-J) FAILURE - UPSCALE
NM27	ANY LPRM (X-Y-J) FAILURE - UPSCALE
NM28	ANY LPRM (X-Y-J) FAILURE - DOWNSCALE
NM29	ANY LPRM (X-Y-J) FAILURE - DOWNSCALE
NM30	ANY LPRM (X-Y-J) FAILURE - DOWNSCALE
NM31	ANY LPRM (X-Y-J) FAILURE - DOWNSCALE
NM33	TIP DETECTOR STUCK IN CORE
NM34	ANY LPRM (X-Y-J) DRIFT +/- 25%
NM35	ANY LPRM (X-Y-J) DRIFT +/- 25%
NM36	RECIRC FLOW CONVERTER CHANNEL (11, 12 OR BOTH) FAILURE - UPSCALE
NM37	RECIRC FLOW CONVERTER CHANNEL (11, 12 OR BOTH) FAILURE - DOWNSCALE
NM38	RECIRC FLOW CONVERTER CHANNEL (11, 12 OR BOTH) FAILURE - AS IT
NM39	RECIRC FLOW CONVERTER CHANNEL (11, 12 OR BOTH) FAILURE - INOPERATIVE
NM40	RECIRC FLOW CONVERTER (11, 12 OR BOTH) FAILURE - COMPARATOR
OG01	OFF-GAS RECOMBINER PREHEATER STEAM SUPPLY FAILS CLOSED
OG02	OFF-GAS RECOMBINER MIXING JET STEAM SUPPLY FAILS OPEN
OG03	OFF-GAS RECOMBINER MIXING JET STEAM SUPPLY FAILS CLOSED
OG04	OFF-GAS DISCHARGE TO STACK ISOLATION VALVE FAILS CLOSED
PC01	DRYWELL TORUS DIFFERENTIAL PRESSURE CONTROL FAILURE - INCREASE
PC02	DRYWELL TORUS DIFFERENTIAL PRESSURE CONTROL FAILURE - DECREASE
PC03	PRIMARY CONTAIN. LEAKAGE

PP01	FAILURE OF PLANT PROCESS COMPUTER
RD01	CONTROL ROD XX-YY FAILURE - DRIFT IN
RD02	CONTROL ROD XX-YY FAILURE - DRIFT OUT
RD03	CONTROL ROD XX-YY FAILURE - ACCUMULATOR STUCK
RD04	CONTROL ROD XX-YY FAILURE - STUCK
RD05	CONTROL ROD XX-YY FAILURE - UNCOUPLED
RD06	CONTROL ROD XX-YY FAILURE - SCRAMMED
RD07	CONTROL ROD XX-YY FAILURE - SLOW SCRAM TIME
RD08	CONTROL ROD XX-YY FAILURE - RPIS
RD09	CONTROL ROD XX-YY FAILURE - DRIFT IN
RD10	CONTROL ROD XX-YY FAILURE - DRIFT OUT
RD11	CONTROL ROD XX-YY FAILURE - ACCUMULATOR TROUBLE
RD12	CONTROL ROD XX-YY FAILURE - STUCK
RD13	CONTROL ROD XX-YY FAILURE - UNCOUPLED
RD14	CONTROL ROD XX-YY FAILURE - SCRAMMED
RD15	CONTROL ROD XX-YY FAILURE - SLOW SCRAM TIME
RD16	CONTROL ROD XX-YY FAILURE - RPIS
RD17	CONTROL ROD XX-YY FAILURE - DRIFT IN
RD18	CONTROL ROD XX-YY FAILURE - DRIFT OUT
RD19	CONTROL ROD XX-YY FAILURE - ACCUMULATOR TROUBLE
RD20	CONTROL ROD XX-YY FAILURE - STUCK
RD21	CONTROL ROD XX-YY FAILURE - UNCOUPLED
RD22	CONTROL ROD XX-YY FAILURE - SCRAMMED
RD23	CONTROL ROD XX-YY FAILURE - SLOW SCRAM TIME
RD24	CONTROL ROD XX-YY FAILURE - RPIS
RD25	CONTROL ROD XX-YY FAILURE - DRIFT IN
RD26	CONTROL ROD XX-YY FAILURE - DRIFT OUT
RD27	CONTROL ROD XX-YY FAILURE - ACCUMULATOR TROUBLE
RD28	CONTROL ROD XX-YY FAILURE - STUCK
RD29	CONTROL ROD XX-YY FAILURE - UNCOUPLED
RD30	CONTROL ROD XX-YY FAILURE - SCRAMMED
RD31	CONTROL ROD XX-YY FAILURE - SLOW SCRAM TIME
RD32	CONTROL ROD XX-YY FAILURE - RPIS
RD33	CONTROL ROD BANK FAILURE TO SCRAM (BANK I, II, III, IV, V OR :ANY)
RD34	LOSS OF CRD INSTRUMENT AIR PRESSURE
RD35	CRD HYDRAULIC PUMP TRIP (11, 12 OR BOTH)
RD36	CRD FLOW CONTROL VALVE FAILURE - CLOSED (11, 12 OR BOTH)

RD37	RPIS FAILURE - COMPLETE SYSTEM FAILURE
RD38	REACTOR MANUAL CONTROL SYSTEM TIMER MALFUNCTION - WITHDRAWN
RD39	REACTOR MANUAL CONTROL SYSTEM TIMER MALFUNCTION - INSERT
RD40	REACTOR MANUAL CONTROL SYSTEM TIMER MALFUNCTION - SETTLE
RD41	SCRAM DISCHARGE VOLUME RUPTURE
RM01	DRAWER INOPERATIVE FOR ANY PROCESS RADIATION MONITOR SIMULATED (INSTRUCTOR SELECT)
RM02	DRAWER DOWNSCALE FOR ANY AREA RADIATION MONITOR SIMULATED (INSTRUCTOR SELECT)
RM03	DRAWER UPSCALE FOR ANY AREA RADIATION MONITOR SIMULATED
RM04	DRAWER UPSCALE FOR ANY AREA RADIATION MONITOR SIMULATED
RM05	CONTINUOUS AIR MONITOR FAILURE (TURBINE BUILDING, REACTOR BUILDING, WASTE BUILDING, DRYWELL)
RM06	ANY PROCESS RADIATION MONITOR FAILURE
RP01	REACTOR TRIP POWER SUPPLY MOTOR GENERATOR (131, 141 OR BOTH)
RP02	CONTROL POWER SUPPLY BOTH MOTOR GENERATOR TRIPS (162, 172 OR BOTH)
RP03	REACTOR SCRAM
RP04	REACTOR PROTECTION SYSTEM FAILURE TO SCRAM - AUTOMATIC
RP05	REACTOR PROTECTION SYSTEM FAILURE TO SCRAM - COMPLETE
RP06	REACTOR VESSEL ISOLATION
RP07	PRIMARY CONTAINMENT ISOLATION
RP08	ANTICIPATED TRANSIENT WITHOUT SCRAM (ATWS)
RP09	EMERGENCY CONDENSER FAILS TO ISOLATE (11, 12 OR BOTH)
RR01	RECIRCULATION PUMP 11 DRIVE BREAKER TRIP
RR02	RECIRCULATION PUMP 11 FIELD BREAKER TRIP
RR03	RECIRCULATION PUMP 11 SEIZURE
RR04	RECIRCULATION PUMP 11 CONTROL SIGNAL FAILURE
RR05	RECIRCULATION PUMP 11 INCOMPLETE START SEQUENCE
RR06	RECIRCULATION PUMP 12 DRIVE BREAKER TRIP
RR07	RECIRCULATION PUMP 12 FIELD BREAKER TRIP
RR08	RECIRCULATION PUMP 12 SEIZURE
RR09	RECIRCULATION PUMP 12 CONTROL SIGNAL FAILURE
RR10	RECIRCULATION PUMP 12 INCOMPLETE START SEQUENCE
RR11	RECIRCULATION PUMP 13 DRIVE BREAKER TRIP
RR12	RECIRCULATION PUMP 13 FIELD BREAKER TRIP
RR13	RECIRCULATION PUMP 13 SEIZURE
RR14	RECIRCULATION PUMP 13 CONTROL SIGNAL FAILURE
RR15	RECIRCULATION PUMP 13 INCOMPLETE START SEQUENCE

RR17 RECIRCULATION PUMP 14 FIELD BREAKER TRIP

RR18 RECIRCULATION PUMP 14 SEIZURE

RR19 RECIRCULATION PUMP 14 CONTROL SIGNAL FAILURE

RR20 RECIRCULATION PUMP 14 INCOMPLETE START SEQUENCE

RR21 RECIRCULATION PUMP 15 DRIVE BREAKER TRIP

RR22 RECIRCULATION PUMP 15 FIELD BREAKER TRIP

RR23 RECIRCULATION PUMP 15 SEIZURE

RR24 RECIRCULATION PUMP 15 CONTROL SIGNAL FAILURE

RR25 RECIRCULATION PUMP 15 INCOMPLETE START SEQUENCE

RR26 MASTER RECIRCULATION FLOW CONTROLLER FAILURE - HIGH

RR27 MASTER RECIRCULATION FLOW CONTROLLER FAILURE - LOW

RR28 MASTER RECIRCULATION FLOW CONTROLLER FAILURE - AS IS

RR30 REACTOR VESSEL PRESSURE RECORDER FAILURE (ID77) - UPSCALE

RR31 REACTOR VESSEL PRESSURE RECORDER FAILURE (ID77) - DOWNSCALE

RR32 REACTOR VESSEL PRESSURE RECORDER FAILURE (ID77) - AS IS

RR33 RECIRCULATION PUMP LOWER (INNER) SEAL FAILURE - PUMP 11

RR34 RECIRCULATION PUMP UPPER (OUTER) SEAL FAILURE - PUMP 11

RR35 REACTOR VESSEL PRESSURE INDICATOR FAILURE (ID76C) - UPSCALE

RR36 REACTOR VESSEL PRESSURE INDICATOR FAILURE (ID76C) - DOWNSCALE

RR37 REACTOR VESSEL PRESSURE INDICATOR FAILURE (ID76C) - AS IS

RR38 REACTOR VESSEL LEVEL RECORDER FAILURE (ID14) - UPSCALE

RR39 REACTOR VESSEL LEVEL RECORDER FAILURE (ID14) - DOWNSCALE

RR40 REACTOR VESSEL LEVEL RECORDER FAILURE (ID14) - AS IS

RR41 REACTOR VESSEL LEVEL INDICATION (CONTROL SYSTEM) FAILURE - UPSCALE (ID59D)

RR42 REACTOR VESSEL LEVEL INDICATION (CONTROL SYSTEM) FAILURE - DOWNSCALE (ID59D)

RR43 REACTOR VESSEL LEVEL INDICATION (CONTROL SYSTEM) FAILURE - AS IS (ID59D)

RR44 REACTOR VESSEL LEVEL INDICATION (WIDE RANGE SAFETY SYSTEM) FAILURE - UPSCALE (LI 36-19, CH.12)

RR45 REACTOR VESSEL LEVEL INDICATION (WIDE RANGE SAFETY SYSTEM) FAILURE - DOWNSCALE (LI 36-19, CH.12)

RR46 REACTOR VESSEL LEVEL INDICATION (WIDE RANGE SAFETY SYSTEM) FAILURE - AS IS (LI 36-19, CH.12)

RR47 RECIRCULATION PUMP DISCHARGE VALVE STEM SEPARATES FROM VALVE GATE (11, 12, 13, 14, 15 OR ANY)

RR48 REACTOR VESSEL LEVEL INDICATION (FUEL ZONE SAFETY SYSTEM) FAILURE - UPSCALE

RR49 REACTOR VESSEL LEVEL INDICATION (FUEL ZONE SAFETY SYSTEM) FAILURE - DOWNSCALE

RR50 REACTOR VESSEL LEVEL INDICATION (FUEL ZONE SAFETY SYSTEM) FAILURE - AS IS

RR51 REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - HIGH

RR52 REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - LOW

RR53 REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - AS IS

RR54 REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - HIGH

RR55 REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - LOW

RR56 REACTOR VESSEL LEVEL TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - AS IS

RR57 REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - HIGH

RR58 REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - LOW

RR59 REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-REACTOR PROTECTION SYSTEM INPUT) FAILS - AS IS

RR60 REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - HIGH

RR61 REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - LOW

RR62 REACTOR VESSEL PRESSURE TRANSMITTER (LOCAL-CONTROL SYSTEM INPUT) FAILS - AS IS

RR63 REACTOR RECIRCULATION PUMP 12 INNER SEAL FAILURE

RR64 REACTOR RECIRCULATION PUMP 12 OUTER SEAL FAILURE

RR65 REACTOR RECIRCULATION PUMP 15 TACHOMETER FAILS - HIGH

RR66 REACTOR RECIRCULATION PUMP 15 TACHOMETER FAILS - LOW

RR67 REACTOR RECIRCULATION PUMP 15 TACHOMETER FAILS - OSCILLATES

RR68 REACTOR RECIRCULATION PUMP M/A STATION FAILURE - INCREASE (11, 12, 13, 14, 15 OR ANY)

RR69	REACTOR RECIRCULATION PUMP M/A STATION FAILURE - DECREASE (11, 12, 13, 14, 15 OR ANY)
RR70	REACTOR RECIRCULATION PUMP M/A STATION FAILURE - AS IS (11, 12, 13, 14, 15 OR ANY)
RR71	REACTOR SAFETY VALVE INADVERTENTLY OPENS (PSV NR28A)
RR72	LOSS OF LEVEL COMPENSATION TO FEEDWATER CONTROL SYSTEM (GEMAC) LEVEL TRANSMITTER
RW01	ROD WORTH MINIMIZER FAILURE
RX01	FUEL CLADDING FAILURE
RX02	INCREASED ROD WORTH FOR ANY CONTROL ROD
SC01	SHUTDOWN COOLING PUMP TRIP (11, 12, 13 OR ANY)
SC02	SHUTDOWN COOLING HEAT EXCHANGER TUBE LEAK (11, 12, 13 OR ANY)
TC01	MAIN TURBINE TRIP
TC02	TURBINE GOVERNOR FAILS - HIGH
TC03	TURBINE GOVERNOR FAILS - LOW
TC04	ELECTRICAL PRESSURE REGULATOR FAILS - HIGH
TC05	ELECTRICAL PRESSURE REGULATOR FAILS - LOW
TC06	ELECTRICAL PRESSURE REGULATOR FAILS - OSCILLATES
TC07	MECHANICAL PRESSURE REGULATOR FAILS - HIGH
TC08	MECHANICAL PRESSURE REGULATOR FAILS - LOW
TC09	MECHANICAL PRESSURE REGULATOR FAILS - OSCILLATES
TC10	FIRST BYPASS VALVE STICKS OPEN
TC11	ALL BYPASS VALVES FAIL - OPEN
TC12	ALL BYPASS VALVES FAIL - CLOSED
TC13	TURBINE CONTROL VALVE FAILS CLOSED (11, 12, 13, 14 OR ANY)
TU01	EXHAUST HOOD SPRAY VALVE FAILS CLOSED
TU02	MAIN TURBINE HIGH VIBRATION BEARINGS #5 AND #6
TU03	MAIN TURBINE HIGH ECCENTRICITY
TU04	MAIN TURBINE BEARING OIL LOW PRESSURE
TU05	MAIN TURBINE BEARING HIGH TEMPERATURE
TU06	MAIN TURBINE THRUST BEARING WEAR

ATTACHMENT F

REMOTE FUNCTIONS

AD			
ADS	NONE		
AN			
ANNUNCIATOR SYSTEM	NONE		
CS			
CORE SPRAY	NONE		
CT			
CONTAINMENT SPRAY	RCT 1 80-43 TEST LINE TO TORUS BV	OPEN	CLOSE
	RCT 2 80-42 WASTE DISP MAN ISOLATION	OPEN	CLOSE
CU			
REACTOR CLEANUP	RCU1 CU-16 PCV ND37 MANUAL ISOLATION	OPEN	CLOSE
	RCU2 CU-19 FILTER BYPASS VALVE	OPEN	CLOSE
	RCU3 CU FILTER 11 INLET/OUTLET VALVE	OPEN	CLOSE
	RCU4 CU FILTER 12 INLET/OUTLET VALVE	OPEN	CLOSE
	RCU5 CU DEMIN 11 INLET/OUTLET VALVE	OPEN	CLOSE
	RCU6 CU DEMIN 12 INLET/OUTLET VALVE	OPEN	CLOSE
	RCU7 CU-20 DEMIN BYPASS VALVES	OPEN	CLOSE
CW1			
AUXILIARY WATER	RCW1 INTAKE WATER TEMPERATURE	32/80 DEG	75.00
	RCW2 INTAKE TUNNEL REVERSE FLOW	YES	NO
	RCW3 UPPER WIND SPEED	0.100 MPH	52.00
	RCW4 UPPER WIND SPED VARIATION	0/30 MPH	5.00
	RCW5 LOWER WIND SPEED	0/100 MPH	45.00
	RCW6 LOWER WIND SPEED VARIATION	0/30 MPH	5.00
	RCW7 UPPER WIND DIRECTION	0/360 MPH	5.00
	RCW8 UPPER WIND DIRECTION VARIATION	0/90 DEG	5.0
	RCW9 LOWER WIND DIRECTION	0/360 DEG	5.0
	RCW10 LOWER WIND DIRECTION VARIATION	0/90 DEG	5.00
	RCW11 AMBIENT AIR TEMPERATURE	-30/+120 DEG	90.00
	RCW12 DELTA TEMPERATURE	-10/+120 DEG	10.00
CW2			
AUXILIARY WATER	NONE		

DG			
DIESEL GENERATOR	RDG1 DG 102 GOVERNOR SPEED DROOP	SET	RESET
	RDG2 DG 103 GOVERNOR SPEED DROOP	SET	RESET
EC			
EMERGENCY COOLING	REC1 IV 39-05 VALVE POSITION LIMIT	0/100%	100.00
	REC2 IV 39-06 VALVE POSITION LIMIT	0/100%	100.00
ED1			
ELECTRICAL DISTRIB	RED1 SOUTH OSWEGO 115 KV BKR R10	OPEN	CLOSE
	RED2 FITZ 115 KV BKR R40	OPEN	CLOSE
	RED3 PB 13 BUS TIE BKR SEC A-SEC B	OPEN	CLOSE
	RED4 PB 13 BUS TIE BKR SEC B-SEC C	OPEN	CLOSE
	RED5 PB 14 BUS TIE BKR SEC A-SEC B	OPEN	CLOSE
	RED6 PB 14 BUS TIE BKR SEC B-SEC B	OPEN	CLOSE
	RED7 PB 15 BUS TIE BKR SEC A-SEC B	OPEN	CLOSE
	RED8 PB 16 BUS TIE BKR SEC A-SEC C	OPEN	CLOSE
	RED9 MG-SET 167 AC POWER SELECT	PB16	17
	RED10 MG-SET 167 DC POWER SELECT	PB11	12
	RED11 COMPUTER POWER SUPPLY SELECT	NORM	EMER
	RED12 IC BUS 130 NORM PWR BKR	OPEN	CLOSE
	RED13 IC BUS 130 ALT PWR BKR	OPEN	CLOSE
	RED14 PB1671 BUS TIE BKR	OPEN	CLOSE
	RED15 PB131 CLOSE A-B, OPEN 13A SUPPLY	YES	NO
	RED16 PB131 CLOSE A-B, OPEN 13C SUPPLY	YES	NO
	RED17 PB141 CLOSE A-B, OPEN 14A SUPPLY	YES	NO
	RED18 PB141 CLOSE A-B, OPEN 14C SUPPLY	YES	NO
ED2			
ELECTRICAL DISTRIB	RED19 PB151 CLOSE A-B, OPEN 15A SUPPLY	YES	NO
	RED20 PB151 CLOSE A-B, OPEN 15C SUPPLY	YES	NO
	RED21 PB176 CLOSE A-B, OPEN 17A SUPPLY	YES	NO
	RED22 PB176 CLOSE A-B, OPEN 16A SUPPLY	YES	NO
	RED23 BAT BD11 EQUIP SW TO ALT	BB11	BB12
	RED24 BAT BD12 EQUIP SW TO ALT	BB12	11
	RED25 PB143 FEEDER BREAKER	14A	14C
ED3			
ELECTRICAL DISTRIB	NONE		

EG1

MAIN GENERATOR	REG1 345 KV BKR 100 42	OPEN	CLOSE
	REG2 345 KV MAN DISC 917	OPEN	CLOSE
	REG3 345 KV MAN DISC 926, 927	OPEN	CLOSE
	REG4 345 KV MOD SW 18	OPEN	CLOSE
	REG5 345 KV BKR R915/10	OPEN	CLOSE
	REG6 345 KV BKR R925/20	OPEN	CLOSE
	REG7 MAIN SEAL OIL PMP STATUS	START	NEUT
	REG8 EMER SEAL OIL PMP STATUS	START	NEUT
	REG9 EMER SEAL OIL PMP STATUS	TRIP	AUTO
	REG10 GEN STATOR COOLING PMP 11	START	NEUT
	REG11 GEN STATOR COOLING PMP 11	TRIP	AUTO
	REG12 GEN STATOR COOLING PMP 12	START	NEUT
	REG13 GEN STATOR COOLING PMP 12	TRIP	AUTO
	REG14 GENERATOR OUTPUT LINKS	OPEN	CLOSE
	REG15 GEN HYDROGEN SUPPLY VALVE	OPEN	CLOSE
	REG16 BACKFEED INTERLOCKS	ON	OFF

EG2

MAIN GENERATOR	NONE

FP

FIRE PROTECTION	RFP1 CITY WATER SUPPLY TO FP HDR	OPEN	CLOSE
	RFP2 SUPPLY TO EMER COOL MU TANK 11	OPEN	CLOSE
	RFP3 SUPPLY TO EMER COOL MU TANK 12	OPEN	CLOSE
	RFP4 SUPPLY TO FEEDWATER SYSTEM	OPEN	CLOSE
	RFP5 DIESEL FIRE PUMP STATUS	OFF	AUTO

<u>FW1</u>			
FEEDWATER	RFW1 50-10 COND PUMP 11 DISCH VLV	OPEN	CLOSE
	RFW2 50-11 COND PUMP 12 DISCH VLV	OPEN	CLOSE
	RFW3 50-12 COND PUMP 13 DISCH VLV	OPEN	CLOSE
	RFW4 50-31 COND DEMIN BYPASS VLV	OPEN	CLOSE
	RFW5 COND DEMIN 11 INLET/OUTLET VLV	OPEN	CLOSE
	RFW6 COND DEMIN 12 INLET/OUTLET VLV	OPEN	CLOSE
	RFW7 COND DEMIN 13 INLET/OUTLET VLV	OPEN	CLOSE
	RFW8 COND DEMIN 14 INLET/OUTLET VLV	OPEN	CLOSE
	RFW9 COND DEMIN 15 INLET/OUTLET VLV	OPEN	CLOSE
	RFW10 COND DEMIN 16 INLET/OUTLET VLV	OPEN	CLOSE
	RFW11 50-20 SJAE BYPASS FCB	0/100%	50.00
	RFW12 50-40 BOOSTER PUMP 11 SUCTION V	OPEN	CLOSE
	RFW13 50-39 BOOSTER PUMP 12 SUCTION V	OPEN	CLOSE
	RFW14 50-38 BOOSTER PUMP 13 SUCTION V	OPEN	CLOSE
	RFW15 FW HEATER STRING 11 ISOL VLVS	OPEN	CLOSE
	RFW17 FW HEATER STRING 12 ISOL VLVS	OPEN	CLOSE
	RFW18 DEMIN WATER STORAGE TANK REFILL	OPEN	CLOSE
<u>FW2</u>			
FEEDWATER	RFW19 50-16 BYPASS AROUND FCV 50-22	OPEN	CLOSE
	RFW20 MANUAL OPERATION OF LCV50-15	0/100%	0.00
	RFW21 MANUAL OPERATION OF LCV50-07,08	0/100%	0.00
	RFW22 FW HEATER 135 ISOL VALVES	OPEN	CLOSE
	RFW23 HOTWELL LEVEL CONTROL	MAN	AUTO
<u>FW3</u>			
FEEDWATER	NONE		
<u>HV</u>			
HVAC	NONE		
<u>IA</u>			
INSTRUMENT AIR	RIA1 INST AIR SUP TO BREATHING AIR	OPEN	CLOSE
	RIA2 BRW-G-6 WASTE DISPOSAL XTIE	OPEN	CLOSE
	RIA3 94-42 CONT SPRAY AIR RCVR ISOL	OPEN	CLOSE
	RIA4 SERV AIR TO INST AIR BV	TRIP	RESET

LP			
LIQUID POISON	RLP1 LIQ POISON PMP 11 LOCAL START	ON	OFF
	RLP2 LIQ POISON PUMP 12 LOCAL START	ON	OFF
	RLP3 DEMIN WATER TO LP PUMPS	OPEN	CLOSE
MC			
CONDENSER	RMC1 OG-1,2 PRIM JET VAP SUCT VALVES	OPEN	CLOSE
	RMC2 OG-3,4 PRIM JET VAP SUCT VALVES	OPEN	CLOSE
	RMC3 MS 114,15 PRIM JET STEAM VALVES	OPEN	CLOSE
	RMC4 MS-16,1 PRIM JET STEAM VALVES	OPEN	CLOSE
	RMC5 OG-9,10 SEC JET VAPOR SUCT VALVES	OPEN	CLOSE
	RMC6 MS-19,20 SEC JET STEAM VALVES	OPEN	CLOSE
	RMC7 MS-12 SJAE PCV BYPASS	OPEN	CLOSE
MS1			
MAIN STEAM	RMS1 HP FW HTR 115 RESET	TRIP	RESET
	RMS2 HP FW HTR 125 RESET	TRIP	RESET
	RMS3 HP FW HTR 135 RESET	TRIP	RESET
	RMS4 HP FW HTR STRING 11 RESET	TRIP	RESET
	RMS5 HP FW HTR STRING 12 RESET	TRIP	RESET
	RMS6 HP FW HTR STRING 13 RESET	TRIP	RESET
	RMS7 MS-8 MAIN STEAM LINE ISOL	OPEN	CLOSE
	RMS8 SPE 11 SUCTION VALVE	OPEN	CLOSE
	RMS9 SPE 12 SUCTION VALVE	OPEN	CLOSE
	RMS10 TRIP ALL FW HTR EXTR NRVS	TRIP	RESET
MS1			
MAIN STEAM	NONE		
NM1			
NEUTRON MONITOR	RNM1 APRM 11 GAIN	0/100%	2.43
	RNM2 APRM 12 GAIN	0/100%	2.38
	RNM3 APRM 13 GAIN	0/100%	2.36
	RNM4 APRM 14 GAIN	0/100%	2.39
	RNM5 APRM 15 GAIN	0/100%	2.20
	RNM6 APRM 16 GAIN	0/100%	2.18
	RNM7 APRM 17 GAIN	0/100%	2.16
	RNM8 APRM 18 GAIN	0/100%	2.17
NM2			
NEUTRON MONITOR	NONE		
NM3			
NEUTRON MONITOR	NONE		

OD

ON DEMAND	NON-FUNCTIONAL		

PC

CONTAINMENT	RPC1 NITROGEN FROM VAPORIZER	YES	NO
	RPC2 201.7-13 DW CAM ISOL VLV 11	OPEN	CLOSE
	RPC3 201.7-29 DW CAM ISOL VLV 12	OPEN	CLOSE
	RPC4 201.40,41 DW, TORUS TO VENT SYSTEM	OPEN	CLOSE
	RPC5 201.44, 46 DW, TORUS TO ATMOS	OPEN	CLOSE
	RPC6 BV201.2-135,136 INTERLOCK DEFEAT	YES	NO
	RPC7 IV201-31,32 ISOLATION DEFEAT	YES	NO

PP

PROCESS COMPUTER	RPP01 MEMORY PROTECT PLAN	NORM	REMOVD

RD1

CONTROL RODS	RRD1 301.2A CRD PUMP 11 DISCH VLV	OPEN	CLOSE
	RRD2 301.2B CRD PUMP 12 DISCH VLV	OPEN	CLOSE
	RRD3 301-8A CRD PUMP 11 HEAD SPRAY ISOL	OPEN	CLOSE
	RRD4 301-8B CRD PUMP 12 HEAD SPRAY ISOL	OPEN	CLOSE
	RRD5 301.8B CRD FLOW CONTROL VLV ISOL	NC30A	NC30B

RD2

CONTROL RODS	NONE		

RD3

CONTROL RODS	NONE		

RM1

RAD MONITOR	NONE		

RP

RPS	RRP1 RX TRIP BUS 131 PWR SOURCE	NORM	EMER
	RRP2 RX TRIP BUS 141 PWR SOURCE	NORM	EMER
	RRP3 RPS BUS 11 PWR SOURCE	NORM	EMER
	RRP4 BUS 12 PWR SOURCE	NORM	EMER

RR1			
REACTOR RECIRC	RRR1 RECIRC MG-SETS 11 LOCKOUT RELAY	TRIP	RESET
	RRR2 RECIRC MG-SETS 12 LOCKOUT RELAY	TRIP	RESET
	RRR3 RECIRC MG-SETS 13 LOCKOUT RELAY	TRIP	RESET
	RRR4 RECIRC MG-SETS 14 LOCKOUT RELAY	TRIP	RESET
	RRR5 RECIRC MG-SETS 15 LOCKOUT RELAY	TRIP	RESET
RR2			
REACTOR RECIRC	NONE		
RR3			
REACTOR RECIRC	NONE		
RR4			
REACTOR RECIRC	NONE		
RW			
ROD WORTH MINIMIZER	RRW1 CONTROL ROD SEQUENCE SELECT	B	A
RX			
REACTOR CORE	NONE		
SC			
SHUTDOWN COOLING	NONE		
TC			
TURBINE CONTROL	RTC1 REACTOR FLOW LIMIT	0-120%	120.00
	RTC2 CONTROL VALVE LIMIT	0-120%	100.00
TU			
MAIN TURBINE	NONE		

ATTACHMENT "G"

MONITORED PARAMETERS

1. CORE REACTIVITY DK/K
2. CORE THERMAL POWER, %
3. CORE FLOW, LBM/HR
4. CORE PLATE DIFFERENTIAL PRESSURE, PSIG
5. CORE BORON CONCENTRATION, PPM
6. CORE AVERAGE VOID FRACTION, %
7. CORE MINIMUM CRITICAL POWER RATIO
8. CORE MAXIMUM LINEAR HEAT GENERATION, KW/FT
9. CORE INLET SUB COOLING, BTU/LBM
10. CORE AVERAGE FUEL TEMPERATURE, DEG F
11. CORE AVERAGE CLADDING TEMPERATURE, DEG F
12. CORE AVERAGE EXIT QUALITY, %
13. (SPARE)
14. (SPARE)
15. REACTOR COOLANT ACTIVITY, UCI/ML
16. REACTOR COOLANT CONDUCTIVITY, UMHO/CM
17. REACTOR HEATUP/COOLDOWN RATE, DEG F/HR
18. REACTOR LEVEL-NARROW RANGE, INCHES
19. REACTOR LEVEL-WIDE RANGE, FEET
20. REACTOR PRESSURE, PSIG
21. RECIRCULATION LOOP 11 FLOW, LBM/HR
22. RECIRCULATION LOOP 12 FLOW, LBM/HR
23. RECIRCULATION LOOP 13 FLOW, LBM/HR
24. RECIRCULATION LOOP 14 FLOW, LBM/HR
25. RECIRCULATION LOOP 15 FLOW, LBM/HR
26. RECIRCULATION LOOP 11 SUCTION TEMPERATURE, DEG F
27. RECIRCULATION LOOP 12 SUCTION TEMPERATURE, DEG F
28. RECIRCULATION LOOP 13 SUCTION TEMPERATURE, DEG F
29. CRD SYSTEM FLOW, LBM/HR
30. DRYWELL PRESSURE, PSIG
31. DRYWELL AVERAGE TEMPERATURE, DEG F
32. DRYWELL HYDROGEN CONCENTRATION, %
33. DRYWELL OXYGEN CONCENTRATION, %

34. SUPPRESSION CHAMBER PRESSURE, PSIG
35. SUPPRESSION POOL WATER TEMPERATURE, DEG F
36. SUPPRESSION POOL WATER LEVEL, FEET
37. SRM COUNT RATE, CPS
38. SRM PERIOD, SEC
39. APRM POWER LEVEL, %
40. CORE XENON CONCENTRATION, % OF FULL POWER EQU
41. RWCU SYSTEM PRESSURE, SPIG
42. RWCU SYSTEM FLOW, LBM/HR
43. RWCU NON-REGEN HEAT EXCHAN OUTLET TEMPERATURE, DEG F
44. RWCU DUMP FLOW, LBM/HR
45. TOTAL MAIN STEAM LINE FLOW, LBM/HR
46. MAIN STEAM TUNNEL TEMPERATURE, DEG F
47. MAIN STEAM LINE RADIATION LEVEL, MR/HR
48. TOTAL MAIN STEAM RELIEF VALVE FLOW, LBM/HR
49. TURBINE SPEED, RPM
50. TURBINE INLET PRESSURE, PSIG
5.1 TURBINE STEAM FLOW, LBM/HR
52. TURBINE BYPASS VALVE STEAM FLOW, LBM/HR
53. TURBINE FIRST STAGE PRESSURE, PSIG
54. TURBINE EXHAUST HOOD TEMPERATURE, DEG F
55. SECOND STAGE REHEATER OUTLET PRESSURE, PSIG
56. SECOND STAGE REHEATER OUTLET TEMPERATURE, DEG F
57. CONDENSER VACUUM, IN HG V
58. CONDENSER HOTWELL LEVEL, INCHES
59. CONDENSER HOTWELL CONDUCTIVITY, UMHO/CM
60. CONDENSER VACUUM MAKEUP FLOW, LBM/HR
61. CONDENSER HOTWELL REJECT FLOW, LBM/HR
62. CONDENSATE DEPRESSION, BTU/LBM
63. CIRCULATING WATER INLET TEMPERATURE, DEG F
64. CIRCULATING WATER OUTLET TEMPERATURE, DEG F
65 TOTAL CIRCULATING WATER FLOW, GPM
66. CONDENSATE DEMINERA OUTLET CONDUC, UMHO/CM
67. TOTAL FEEDWATER SYSTEM FLOW, LBM/HR
68. FEEDWATER TEMPERATURE TO REACTOR, DEG F
69. GENERATOR LOAD, MWE
70. GENERATOR REACTIVE LOAD, MVAR

71. GENERATOR STATOR AMPS, AMP
72. GENERATOR TERMINAL VOLTS, VOLT
73. GENERATOR HYDROGEN PRESSURE, PSIG
74. DIESEL GENERATOR 102 LOAD, KWE
75. DIESEL GENERATOR 103 LOAD, KWE
76. OFF-GAS SYSTEM INLET FLOW, CFM
77. OFF-GAS SYSTEM OUTLET FLOW, CFM
78. OFF-GAS RECOMBINER INLET HYDROGEN CONCENTRATION, %
79. OFF-GAS RECOMBINER OUTLET HYDROGEN CONCENTRATION, %
80. OFF-GAS SYSTEM RADIATION LEVEL, MR/HR
81. CORE SPRAY LOOP 11 PRESSURE, PSIG
82. CORE SPRAY LOOP 12 PRESSURE, PSIG
83. CORE SPRAY LOOP 11, FLOW, LBM/HR
84. CORE SPRAY LOOP 12 FLOW, LBM/HR
85. EMERGENCY CONDENSER LOOP 11 FLOW, LBM/HR
86. EMERGENCY CONDENSER LOOP 12 FLOW, LBM/HR
87. EMERGENCY CONDENSER LOOP 11 RETURN TEMPERATURE, DEG F
88. EMERGENCY CONDENSER LOOP 12 RETURN TEMPERATURE, DEG F
89. EMERGENCY CONDENSER LOOP 11 VENT RAD LEVEL, MR/HR
90. EMERGENCY CONDENSER LOOP 12 VENT RAD LEVEL, MR/HR

ATTACHMENT H

SIMULATOR MODIFICATION DATA BASE CHANGES AND TEST RESULTS

A. N1-86-057 RWM Inoperability

1) Test Results - Satisfactory
2) Data Base Changes

RWM Drawings: N1Y86M057

PRINT	SHEET	REV	INDEX
C-22032-C	1	3	E21.2
C-22032-C	2	3	E21.2
C-22032-C	3	2	E21.2
C-22032-C	4	2	E21.2
C-22032-C	5	5	E21.2
C-22032-C	6	4	E21.2
C-22032-C	7	3	E21.2
C-22032-C	8	2	E21.2

B. N1-80-072 Alternate Rod Insertion

1) Test Results - Satisfactory
2) Data Base Changes

ARI Prints: N1-80-072

DWG	SHEET	REV	INDEX
C-34128-C	1	8	
C-34128-C	2	8	
C-34128-C	3	8	
C-18016-C	2		
C-22374-C	1	33	E9
C-22374-C	2	7	E9
C-22374-C	3	24	E9
C-22374-C	4	37	E9
C-22374-C	5	13	E9

SIMULATOR MODIFICATION DATA BASE CHANGES AND TEST RESULTS

C. N1-85-098 Containment Isolation on High Radiation

1) Test Results Satisfactory
2) Data Base Changes

Simulator Modification Data Base Changes and Test Results

(.2)

DWG	SHEET	REV	INDEX
C-22025-C	4	7	E21
C-22379-C	3	23	E21
C-22383-C	2	17	E21
C-22383-C	6	16	E21
C-22383-C	7	13	E21
C-22385-C	1	30	E21
C-22385-C	2	21	E21
C-22385-C	3	21	E21
C-22385-C	3A	1	E21
C-22385-C	8	26	E21
C-22385-C	10	22	E21

ATTACHMENT I

MALFUNCTIONS TESTED IN 1988

AD03	EG11	NM13	RR26
AN01	FP01	NM21	RR30
CT01	FP05	NM34	RR34
CU02	FP09	NM39	RR38
CU06	FW03	OG03	RR42
CU10	FW07	PC03	RR46
CW03	FW11	RD03	RR50
CW07	FW15	RD07	RR54
DG01	FW19	RD35	RR58
EC03	FW23	RD39	RR62
EC07	FW27	RM02	RR66
ED04	HV02	RP03	RR70
ED08	MC02	RP07	RX01
ED12	MC06	RR03	TC01
ED16	MS04	RR07	TC05
ED20	MS08	RR11	TC09
ED24	NM01	RR15	TC13
EG03	NM05	RR19	TU04
EG07	NM09	RR23	

ATTACHMENT J

LATE MODIFICATION STATUS

N1-81-029	Emergency Ventilation	Ready for Testing
N1-81-038	Drywell Cooling	Awaiting Data and Evaluation
N1-83-061	Control Room HVAC Upgrade	Ready for Testing
N1-84-013	Replace IA 222/223	Ready for Testing
N1-85-016	Scriba Substation Phase II	Awaiting Data & Evaluation
N1-85-017	Scriba Substation Phase III	In Progress
N1-85-022	Electric and Diesel Fire Pumps	Ready for Testing

Reflects modification status as of July 1, 1988