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Detroit Edison

A DTE Energy Company

10CFR55.45(b)(5)(ii)

December 20, 2000
NRC-00-0099

U S Nuclear Regulatory Commission
Attention: Document Control Desk
Washington D C 20555

References: 1) Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

Subject: Fermi 2 Control Room Simulator Four Year Report

In accordance with 10CFR55.45(b)(5)(ii), Detroit Edison Company hereby submits to the Commission the Fermi 2 Control Room Simulator Four Year Report. This report includes NRC Form 474 for Fermi 2.

If additional information is required please contact Mr. Norman K. Peterson, Director-Nuclear Licensing, at (734) 586-4258.

Sincerely,

William T. O'Connor

Attachments

cc: D. S. Hood
M. A. Ring
NRC Resident Office
Regional Administrator, Region III
Supervisor, Electric Operators,
Michigan Public Service Commission

A001

NRC FORM 474 (8-1998) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0138 EXPIRES: 08/31/2001

Estimated burden per response to comply with this mandatory information collection request: 120 hours. This information is used to certify a simulation facility. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0138), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

SIMULATION FACILITY CERTIFICATION

INSTRUCTIONS: This form is to be filed for initial certification, recertification (if required), and for any change to a simulation facility performance testing plan made after initial submittal of such a plan. Provide the following information and check the appropriate box to indicate reason for submittal.

FACILITY: Fermi 2

DOCKET NUMBER: 50- 341

LICENSEE: The Detroit Edison Company

DATE: 12/07/00

This is to certify that:

1. The above named facility licensee is using a simulation facility consisting solely of a plant-referenced simulator that meets the requirements of 10 CFR 55.45.
2. Documentation is available for NRC review in accordance with 10 CFR 55.45(b).
3. This simulation facility meets the guidance contained in ANSI/ANS 3.5-1985 or ANSI/ANS 3.5-1993, as endorsed by NRC Regulatory Guide 1.149.

If there are any **EXCEPTIONS** to the certification of this item, **CHECK HERE** [X] and describe fully on additional pages as necessary. See attached report Section 4.0 B.

NAME *(or other identification)* AND LOCATION OF SIMULATION FACILITY:

Fermi 2 Nuclear Training Simulator
6400 N. Dixie Highway
Newport, Michigan 48166

[X] SIMULATION FACILITY PERFORMANCE TEST ABSTRACTS ATTACHED. *(For performance tests conducted in the period ending with the date of this certification.)*

DESCRIPTION OF PERFORMANCE TESTING COMPLETED. *(Attach additional pages as necessary and identify the item description being continued.)*

See attached Fermi 2 Control Room Simulator Four Year Report, Attachment 1.

[X] SIMULATION FACILITY PERFORMANCE TESTING SCHEDULE ATTACHED. *(For the conduct of approximately 25 percent of performance tests per year for the four-year period commencing with the date of this certification.)*

DESCRIPTION OF PERFORMANCE TESTING TO BE CONDUCTED. *(Attach additional pages as necessary and identify the item description being continued.)*

See attached Fermi 2 Control Room Simulator Four Year Report, Attachment 2.

[X] PERFORMANCE TESTING PLAN CHANGE. *(For any modification to a performance testing plan submitted on a previous certification.)*

DESCRIPTION OF PERFORMANCE TESTING PLAN CHANGE. *(Attach additional pages as necessary and identify the item description being continued.)*

See attached Fermi 2 Control Room Simulator Four Year Report for a description of tests deleted from the schedule due to obsolecense.

[ ] RECERTIFICATION. *(Describe corrective actions taken, attach results of completed performance testing in accordance with 10 CFR 55.45(b)(5)(v). (Attach additional pages as necessary and identify the item description being continued.)*

Any false statement or omission in this document, including attachments, may be subject to civil and criminal sanctions. I certify under penalty of perjury that the information in this document and attachments is true and correct.

SIGNATURE — AUTHORIZED REPRESENTATIVE	TITLE	DATE
[signature]	Vice President, Nuclear Generation	12/20/00

In accordance with 10 CFR 55.5, Communications, this form shall be submitted to the NRC as follows:

BY MAIL ADDRESSED TO: DIRECTOR, OFFICE OF NUCLEAR REACTOR REGULATION, U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001

BY DELIVERY IN PERSON TO THE NRC OFFICE AT: ONE WHITE FLINT NORTH, 11555 ROCKVILLE PIKE, ROCKVILLE, MD

PRINTED ON RECYCLED PAPER

THE DETROIT EDISON COMPANY

FERMI 2 NUCLEAR POWER PLANT

CONTROL ROOM SIMULATOR FOUR YEAR REPORT

END OF YEAR 2000

TABLE OF CONTENTS

Section	Page
Simulator Certification Four Year Report	
1.0 Purpose	3
2.0 References	3
3.0 Requirements	3
4.0 Compliance With Requirements	
A. Uncorrected Performance Test Failures and Schedule for Correction	4
B. Exception to ANSI/ANS 3.5 -1985	5
C. Testing Performed In Last Four Year Period	
1) Computer Real Time Test	5
2) Steady State and Normal Operations Test	5
3) Normal Operations Test	6
4) Transient and Malfunction Testing	6
5) Initial Conditions Performance Test	7
D. Description of New Performance Tests to be Conducted During the Subsequent Four Year Period	7
E. Schedule for the Conduct of Performance Tests for the Subsequent Four Year Period	7
Simulator Certification Test Performance	Attachment 1
Simulator Certification Test Schedule	Attachment 2

THE DETROIT EDISON COMPANY
FERMI 2

SIMULATOR CERTIFICATION
FOUR YEAR REPORT

1.0 Purpose

The Fermi 2 Simulator is certified to meet the requirements of 10CFR55.45 as a valid tool for conducting the simulator portion of NRC license examinations, and for meeting the licensed operator initial, upgrade, and requalification training objectives of Fermi 2. In accordance with 10CFR55.45, every four years on the anniversary of the certification application, a report must be submitted to the Nuclear Regulatory Commission.

The purpose of this report is to satisfy this reporting requirement for the Fermi 2 Control Room Simulator.

2.0 References

A. Title 10, Code of Federal Regulations, Part 55, "Operator Licenses", Subpart E, Section 45.

B. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.149 "Nuclear Power Plant Simulation Facilities for Use In Operator License Examinations."

C. ANSI/ANS 3.5-1985, "Nuclear Power Plant Simulators for Use In Operator Training."

3.0 Requirements

A. 10CFR55.45 requires the following be contained within this report:

1) Subpart E, Section 55.45 (b)(5)(ii) - Identification of any uncorrected performance test failures and a schedule for correction of such performance failures.

2) Subpart E, Section 55.45 (b)(5)(vi) - A description of performance testing completed for the simulation facility.

3.0 Requirements (continued):

3) Subpart E, Section 55.45 (b)(5)(vi) - A description of the performance tests, if different, to be conducted on the simulation facility during the subsequent four year period.

4) Subpart E, Section 55.45 (b)(5)(vi) - A schedule for the conduct of approximately 25 percent of the performance tests per year for the subsequent four years.

4.0 Compliance with Requirements

A. Uncorrected Performance Test Failures and Schedule for Correction

1) Discrepancy Report (DR) 98-0663: Fuel clad failure response requires tuning. During Malfunction Event (MFE) 002, Fuel Clad Failure, a 5% failure ramped over 600 seconds is initiated. Radiation levels begin increasing, then peak when failure is at 2.5%.
Scheduled completion date for correction: June 30, 2001

2) DR 98-0648: Radiation levels did not increase during MFE064, Loss of Gland Seal Exhausters.
Scheduled completion date for correction: June 30, 2001

3) DR 99-0858: Not receiving annunciator 3D92, Rodworth Minimizer Blocking during MFE003, Main Turbine Trip.
Scheduled completion date for correction: March 30, 2001

4) DR 00-1362: Various valves did not meet stroke times during year 2000 Quadrennial Testing surveillance procedure tests.
Scheduled completion date for correction: March 30, 2001

5) DR 00-1365: During MFE056, MSIV Closure with Loss of High Pressure Feed, did not receive Reactor Core Isolation Cooling (RCIC) Isolation and associated alarms.
Scheduled completion date for correction: June 30, 2001

6) DR 00-1370: During MFE036, Main Condenser Level Control System Failure, the north hotwell level indicator lowered as expected. Upon reaching the bottom of the scale, the indicator began rising (even though level continued to lower).
Scheduled completion date for correction: September 30, 2001

B. Exception to ANSI/ANS 3.5 - 1985

1) During Steady State Testing, Turbine First Stage Pressure is measured versus Turbine Steam Flow.

C. Testing Performed In Last Four Year Period

ANS/ANSI 3.5-1985 Appendix A, section A.3 describes certification testing requirements. Four separate categories are identified, and tested as follows:

1) Computer Real Time Test

a. This test validates that the simulation is being presented in real time. In addition, the test validates that an alarm is received at the Instructor Station if the simulation is not being presented in real time. Verification of simulator spare computing capacity is also performed. The Real Time Test validates the functionality of real time monitoring by forcing the simulation out of real time and verifying actuation of the alarm.

b. This test also verifies that the simulator operating limits are being monitored, and that a warning (parameter over-range alarm) is actuated at the Instructor Station console to alert the instructor when any one of these limits is exceeded. Each of the monitored parameters is forced to its corresponding high and/or low limit and actuation of the alarm is verified.

Attachment 1 lists the specific date that computer real time testing was performed. This test is currently performed one time during the four year testing period.

2) Steady State Test

Steady state testing is composed of three separate activities:

a. Steady state performance testing is performed to evaluate and benchmark the degree of agreement between the simulator and the Fermi 2 plant for mass and energy balance parameters at three steady state power levels.

b. Stability performance is performed to evaluate and benchmark simulator dynamic stability (simulator drift) at 100% power.

c. Simulator instrument error is verified to be no greater than the Fermi 2 plant while operating at 100% power.

Attachment 1 lists the specific dates that steady state performance testing was performed.

3) Normal Operations Test

a. This testing validates the capability to perform the normal plant evolutions of ANSI/ANS-3.5-1985, Section 3.1.1 by performing the relevant General Operating Procedures, System Operating Procedures, and Surveillance Procedures (and/or procedure sections).

b. In addition, Emergency Operating, Abnormal Operating, and Alarm Response Procedures (or portions of those procedures) are performed as necessary to validate the capability for operators to respond to the specific malfunction events required by ANSI/ANS-3.5-1985, Section 3.1.2 and the transient events listed in ANSI/ANS-3.5-1985, Appendix B, Section B1.2.

c. Regulatory Guide 1.149, Revision 1, April 1987 requires that the normal plant evolutions of ANSI/ANS-3.5-1985, Section 3.1.1 be performed periodically (at the rate of approximately 25% per year) to verify continuing integrity of the simulator models.

Attachment 1 lists the dates that the specific Normal Operations Tests were performed.

4) Transient and Malfunction Testing

a. Testing is performed to evaluate agreement between the simulator response and predicted responses for malfunction events. The testing validates dynamic and logical fidelity for the event without regard to operator action.

b. The set of malfunctions events validated consists of the events of ANSI/ANS-3.5-1985, Section 3.1.2 and Appendix B, Section B1.2. This is performed periodically to meet the periodic testing requirements of ANSI/ANS-3.5-1985 and Regulatory Guide 1.149, Revision 1, April 1987.

Attachment 1 lists the dates that the specific Transient and Malfunction Tests were performed.

In addition to the four categories of certification testing required by ANS/ANSI 3.5-1985 Appendix A, Section A.3, the Initial Conditions Performance Test is also performed at Fermi 2.

5) Initial Conditions Performance Test

a. Initial conditions performance testing is performed to validate that the administratively controlled simulator initial conditions (ICs) satisfy their intended use in support of simulator training. This test also validates the ANSI/ANS-3.5-1985 requirement that a minimum of ten IC's are operational which include a variety of plant operating conditions, fission product poison concentrations, and various times in core life.

Attachment 1 lists the dates that the specific Initial Conditions Performance Tests were performed.

D. Description of Performance Tests, if different, to be Conducted During the Subsequent Four Year Period

1) No new tests have been added to the performance test schedule to be performed during the next four-year period.

2) Tests being deleted from those contained on the previous test schedule:

a. Surveillance Test 24.610.02 – RPS-Mode Switch In Shutdown Functional Test. This procedure has been cancelled.

b. Malfunction Event 006 – Recirc Pump Speed Increase Upon Automatic Reset of Speed Limiter #1. This event is no longer credible following installation of the Distributed Control System (DCS).

c. Malfunction Event 016 – Rx Recirc Pump "A" Runaway. This event is no longer credible following installation of the DCS.

d. Malfunction Event 131 – Recirc Pump Speed Increase Upon Scoop Tube Lock Reset. This event is no longer credible following installation of the DCS.

E. Schedule for the Conduct of Performance Tests for the Subsequent Four Year Period

1) Attachment 2 provides the schedule for certification testing to be performed over the next four-year period. Approximately 25% of all malfunction testing is performed annually.

ATTACHMENT 1

SIMULATOR CERTIFICATION TEST PERFORMANCE

This attachment provides information relative to certification performance testing of the Fermi 2 Control Room Simulator. This testing has been performed in accordance with requirements as stated in ANS/ANSI 3.5-1985 and Regulatory Guide 1.149 Revision 1, April 1987.

Deviations From Original Certification Test Schedule
There were no deviations from the test schedule submitted in the original certification report.

1. **COMPUTER REAL TIME TEST** - This test is performed as described in the applicable Simulator Certification Maintenance Procedure, SCM 5 - Operating Limit and Real Time Test. The test was collectively completed on the following date:

   Test Completion: November 1997 (This test is performed only once during the four year cycle.)

2. **STEADY STATE TEST** - This test is performed as described in the applicable Simulator Certification Maintenance Procedure, SCM 6 - Steady State Operations Performance Test. This test encompasses the following:

   A. Low Power Data Comparison
   B. Mid Power Data Comparison
   C. Full Power Data Comparison
   D. Full Power Stability Verification
   E. Full Power Panel Indicator Verification

   Test Completion:
   1997 – December 9, 1997
   1998 – November 6, 1998
   1999 – November 13, 1999
   2000 – November 20, 2000

3. **NORMAL OPERATIONS TEST** - This test is performed as described in the applicable Simulator Certification Maintenance Procedure, SCM 7 - Operations Procedures Performance Test:

1997 Normal Operations Test
Test Completion: December 1997

This test consisted of:

A. 1997 Normal Plant Evolutions:
   1) Startup From Cold Shutdown to Hot Standby –General Operating Procedure 22.000.02 "Plant Startup to 25% Power", through completion of "Reactor Pressure and Temperature Monitoring During Heatup/Cooldown" (with the MSIVs closed).

B. 1997 Surveillance Test Procedures for Safety Related Equipment
   1) 24.000.02 Shiftly, Daily and Weekly Required Surveillances
   2) 24.106.02 CRD Coupling Integrity Verification
   3) 24.107.03 SBFW Pump and Valve Operability and Lineup Verification Test
   4) 24.129.01 Station and Control Air System Valve Operability and Position Indication Verification Test
   5) 24.137.15 MSIV Leakage Control System Functional Test
   6) 24.138.04 Recirculation Sample System Isolation Valve Operability Test
   7) 24.202.02 HPCI Flow Rate Test at 165 PSIG Reactor Steam Pressure
   8) 24.203.04 Core Spray Valve Operability and Position Verification Test
   9) 24.204.06 Div 2 LPCI and Suppression Pool Cooling/Spray Pump and Valve Operability Test
   10) 24.205.08 Div 1 RHR Cooling Tower Fan Operability and RHRSW, EESW Valve Line-up Verification
   11) 24.206.04 RCIC System Automatic Actuation and Flow Test
   12) 24.207.07 EECW/EESW Actuation Functional Test-Division 2
   13) 24.402.01 Drywell and Suppression Chamber Vacuum Breaker Operability Test
   14) 24.404.04 Division 2 SGTS Filter and Secondary Containment Isolation Damper Operability Test
   15) 24.409.02 Division I Post LOCA Thermal Recombiner System Valve Operability Test
   16) 24.603.02 SRM/IRM/APRM Overlap Verification
   17) 24.623 Reactor Manual Control/Reactor Mode Switch/Refueling Platform – Refueling Interlocks
   18) 24.707.01 Reactor Water Cleanup (RWCU) Valve Operability Test

1997 Normal Operations Test continued:

C. 1997 Plant Malfunctions and Transients - Procedures used to respond to these events were validated.
   1) 001 Loss of FW Flow Signal "A"
   2) 005 Spurious Main Steam Isolation
   3) 006 Recirc Pump Speed Increase upon Automatic Reset of Speed Limiter #1
   4) 008 Reactor Manual Scram
   5) 011 HPCI System Spurious Initiation
   6) 013 Recirc Pump "A" Trip
   7) 014 Loss of Both Recirculation Pumps
   8) 017 Spurious Scram
   9) 023 Earthquake
   10) 028 Control Rod Drift In
   11) 033 Loss of 4160 Volt Bus 69J
   12) 037 Loss of Offsite Power
   13) 043 Feed Pump Min. Flow Recirc. Valve Fails Open
   14) 045 Steam Line Rupture in the Drywell
   15) 048 LPRM 16-49-1D Fails Fullscale
   16) 052 Loss of Feed
   17) 053 Main Turbine Trip at 25%
   18) 054 Master Flow Control Transient
   19) 055 Recirc Loop Rupture With Loss of Offsite Power
   20) 056 MSIV Closure with Stuck Open SRV, Failed Closed SULCV and Failure of HPCI/RCIC
   21) 059 Reactor Power Oscillations
   22) 063 Off Gas Explosion
   23) 067 RPS/NSSS Drywell Pressure Transmitter Failure
   24) 107 Turbine Trip With Failure of Bypass Valves
   25) 121 Reactor Scram Subsequent to Resetting a Scram Due to Failure to Bypass High Scram Discharge Volume Level Scram

1998 Normal Operations Test
Test Completion: November 1998

This test consisted of:
A. 1998 Normal Plant Evolutions:
   Startup from Hot Standby to Rated Power, including General Operating Procedures:
   1) 22.000.02 "Plant Startup to 25% Power", Section 5 beginning with the step "opening MSIV's" (includes Section 8.0).
   2) 22.000.02 "Plant Startup to 25% Power", Section 6 "RPV Pressurization".
   3) 22.000.02 "Plant Startup to 25% Power", Section 7.0 "Main Turbine Startup and Power Increase to 25%".

1998 Normal Operations Test continued:

4) 22.000.03 "Power Operation 25% to 100% to 25%", Section 4.0 "Power Increase".
5) Demonstrated ability to operate above the 100% load line.
6) Demonstrated ability to operate in single Recirc. Loop Operation.

B. 1998 Surveillance Test Procedures for Safety Related Equipment:

1) 24.000.03 Mode 5 Shiftly, Daily, and Weekly Surveillances
2) 24.106.04 Scram Discharge Volume Vent and Drain Valve Operability Test
3) 27.109.01 Turbine Steam Valves Test
4) 24.137.01 Main Steam Line Isolation Channel Functional Test
5) 24.137.16 MSIV Leakage Control System Monthly Operability Test
6) 24.138.06 Jet Pump Operability Test
7) 24.202.05 HPCI System Cold Shutdown Valve Operability Test
8) 24.204.01 Div 1 LPCI and Suppression Pool Cooling/Spray Pump and Valve Operability Test
9) 24.204.08 Non-Divisional RHR Local Valve Position Indication Verification Test
10) 24.205.10 Div 2 RHR Cooling Tower Fan Operability and RHRSW, EESW Valve Line-up Verification
11) 24.207.04 RBCCW/EECW Miscellaneous Valve Operability Test
12) 24.208.02 Division 1 EESW Pump and Valve Operability Test
13) 24.402.07 Drywell to Suppression Chamber Vacuum Breaker Closed Verification Test
14) 24.406.01 Nitrogen Inerting System Valve Operability Test
15) 24.409.03 Division II Post LOCA Thermal Recombiner System Valve Operability Test
16) 24.608 Rod Worth Minimizer Functional Test
17) 24.630 Remote Shutdown Instrument Channel Checks
18) 24.800.04 Alternate Coolant Circulation and Decay Heat Removal Standby Lineup Operability Verification.

C. 1998 Plant Malfunctions and Transients - Procedures used to respond to these events were validated:

1) 002 Fuel Cladding Failure
2) 005 Spurious Main Steam Isolation
3) 007 Loss of Normal Feedwater with Failure of HPCI, RCIC, and SBFW
4) 008 Reactor Manual Scram
5) 012 Spurious Main Steam Isolation With Failure of RPS Auto Scram Logic
6) 013 Recirc Pump "A" Trip
7) 014 Loss of Both Recirculation Pumps
8) 018 Main Generator Trip
9) 024 120V AC Bus Trip H11-P900
10) 029 Control Rod Drop

1998 Normal Operations Test continued:

11) 034 Condenser Air Leak
12) 038 Loss of 4160 Volt ESF Bus 64C
13) 044 Loss of RPS Channel
14) 045 Steam Line Rupture in the Drywell
15) 050 Annunciator Failure
16) 052 Loss of Feed
17) 053 Main Turbine Trip at 25%
18) 054 Master Flow Control Transient
19) 055 Recirc Loop Rupture with Loss of Offsite Power
20) 056 MSIV Closure with Stuck Open SRV, Failed Closed SULCV, and Failure of HPCI/RCIC
21) 060 Loss of 4160 Volt ESF Bus 64B
22) 064 Loss of Gland Seal Exhausters
23) 071 SRM Channel Failure
24) 111 General Service Water Pump Trip
25) 131 Recirc Pump Speed Increase Upon Scoop Tube Lock Reset

1999 Normal Operations Test
Test Completion: December 1999

This test consisted of:

A. 1999 Normal Plant Evolutions:
Plant Shutdown from Rated Power to Hot Standby, and Cooldown to Cold Shutdown Conditions, including General Operating Procedures:
1) 22.000.03 "Power Operation 25% to 100% to 25%", Section 5.0 "Power Decrease".
2) 22.000.04 "Plant Shutdown From 25% Power", Section 4.0 "Load Reduction".
3) 22.000.04 "Plant Shutdown From 25% Power", Section 5.0 "Reactor Shutdown, Cooldown, and Depressurization (MSIV's Open)".
4) 22.000.04 "Plant Shutdown From 25% Power", Section 7.0 "Reactor Cooldown With Shutdown Cooling".

B. 1999 Surveillance Test Procedures for Safety Related Equipment
1) 24.000.05 Monthly Continuity Light and Channel Check
2) 24.106.06 Scram Discharge Volume Vent and Drain Valves Scram Operability Test
3) 24.109.02 Turbine Bypass Valve Operability Test
4) 24.137.03 Main Steam Line Valve Operability Test
5) 24.137.18 Main Steam Line Drain Isolation Valve Operability Test
6) 24.144.01 TWMS Valve Operability and Valve Position Indication Verification Test

1999 Normal Operations Test continued:

7) 24.203.02 Division 1 CSS Pump and Valve Operability, and Automatic Actuation
8) 24.204.02 RHR Valve Lineup and System Filled Verification
9) 24.205.05 Division 1 RHRSW Pump and Valve Operability Test
10) 24.206.01 RCIC System Pump and Valve Operability Test
11) 24.207.05 EECW Valve Operability Test
12) 24.208.03 Division 2 EESW Pump and Valve Operability Test
13) 24.404.02 Division 1 SGTS Filter and Secondary Containment Isolation Damper Operability Test
14) 24.408.03 Division 1 Primary Containment Monitoring System Valve Operability and Position Indication Verification Test
15) 24.413.03 Control Room Emergency Filter Monthly Operability Test
16) 24.610.01 RPS-Manual Scram Functional Test
17) 24.630.01 Remote Shutdown Panel Control Circuit and Switch Test

C. 1999 Plant Malfunctions and Transients – Malfunction Events used to respond to these events were validated:

1) 003 Main Turbine Trip
2) 005 Spurious Main Steam Isolation
3) 008 Reactor Manual Scram
4) 009 Main Steam Line Rupture in the Steam Tunnel
5) 013 Recirc Pump "A" Trip
6) 014 Loss of Both Recirculation Pumps
7) 015 RPV Lvl Xmtr Fail - Floodup B21-N027
8) 019 Recirculation Loop Rupture "A" Large
9) 026 Control Rod (XX-YY) Uncoupled
10) 031 CRD Flow Control Valve "A" Fails Shut
11) 035 Stator Water Cooling High Temperature
12) 040 Recirculation Loop Rupture A (Small)
13) 045 Steam Line Rupture in the Drywell
14) 046 Excessive Cooldown Rate During Shutdown Cooling
15) 052 Loss of Feed
16) 053 Main Turbine Trip at 25%
17) 054 Master Flow Control Transient
18) 055 Recirc Loop Rupture With Loss of Offsite Power
19) 056 MSIV Closure With Stuck Open SRV, Failed Closed SULCV and Failure of HPCI/RCIC
20) 057 Station Blackout
21) 061 Loss of 4160 Volt ESF Bus 65E
22) 065 RPV Reference Leg Sensing Line Rupture
23) 088 RHR Service Water Pump Trip
24) 118 Interruptible Air Header Rupture
25) 135 Reactor Scram with Gland Seal System in Manual

2000 Normal Operations Test
Test Completion: November 2000

This test consisted of:

A. 2000 Normal Plant Evolutions:
Reactor Trip Followed by Recovery to Rated Power, including Abnormal and General Operating Procedures:
1) 20.000.21 "Reactor Scram".
2) 22.000.02 "Plant Startup to 25% Power", Section 4.0 "Precriticality".
3) 22.000.02 "Plant Startup to 25% Power", Section 5.0 "Reactor Startup/Heatup".
4) 22.000.02 "Plant Startup to 25% Power", Section 6.0 "RPV Pressurization".
5) 22.000.02 "Plant Startup to 25% Power", Section 7.0, "Main Turbine Startup and Power Increase to 25%".
6) 22.000.03 "Power Operation 25% to 100% to 25%", Section 4.0 "Power Increase" up to 100% power.

B. 2000 Surveillance Test Procedures for Safety Related Equipment
1) 24.106.01 Operable Control Rod Check
2) 24.107.01 Feedwater Reverse Flow Check Valve Operability and Position Indication Verification Test
3) 24.110.05 RPS-Turbine Control and Stop Valve Functional Test
4) 24.137.11 Safety Relief Valve (SRV) Operability Test
5) 24.138.02 Reactor Recirculation Pumps Valve Operability Test
6) 24.202.01 HPCI Pump Time Response and Operability Test at 1025 PSI
7) 24.203.03 Division 2 CSS Pump and Valve Operability, and Automatic Actuation
8) 24.204.04 RHR Shutdown Cooling Valve Operability
9) 24.205.06 Division 2 RHRSW Pump and Valve Operability Test
10) 24.206.02 RCIC Valve Operability Test
11) 24.207.06 EECW/EESW Actuation Functional Test-Division 1
12) 24.324.01 Combustion Turbine Generator 11 Unit 1 Monthly Operability Check
13) 24.404.03 Standby Gas Treatment System Valve Operability Test
14) 24.408.04 Division 2 Primary Containment Monitoring System Valve Operability and Position Indication Verification Test
15) 24.415 Drywell Cooling Fan 1 and 2 Operability Test
16) 24.610.02 RPS-Mode Switch in Shutdown Functional Test
17) 24.702.01 Miscellaneous Systems Valve Operability Test

2000 Normal Operations Test continued:

C. 2000 Plant Malfunctions and Transients – Malfunction Events used to respond to these events were validated:

1) 004 Feedwater Line Rupture in the Steam Tunnel
2) 005 Spurious Main Steam Isolation
3) 008 Reactor Manual Scram
4) 010 Main Steam SRV "K" Fails Open
5) 013 Recirc Pump "A" Trip
6) 014 Loss of Both Recirculation Pumps
7) 016 Rx Recirc Pump "A" Runaway
8) 022 Loss of DC Dist Cabinet 2IA1-3
9) 027 Control Rod (XX-YY) Blade Stuck
10) 032 Pressure Regulator "A" Fails High
11) 036 Main Condenser Level Control System Failure
12) 042 Loss of Shutdown Cooling
13) 045 Steam Line Rupture in the Drywell
14) 047 Feed Line Rupture in the Drywell
15) 052 Loss of Feed
16) 053 Main Turbine Trip at 25%
17) 054 Master Flow Control Transient
18) 055 Recirc Loop Rupture With Loss of Offsite Power
19) 056 MSIV Closure With Stuck Open SRV, Failed Closed SULCV and Failure of HPCI/RCIC
20) 058 Spurious Single Control Rod Scram
21) 062 Loss of 4160 Volt ESF Bus 65F
22) 066 RPV Wide Range Variable Leg Sensing Line Rupture
23) 093 HPCI Steamline Break in Reactor Building
24) 120 Loss of 4160 Volt Bus 65D
25) 136 Loss of Feedwater Due to False L8 Signal

4. **TRANSIENT AND MALFUNCTION TESTING** - This test is performed as described in the applicable Simulator Certification Maintenance Procedure, SCM 8 - Malfunction Event Performance Test.

1997 Transient and Malfunction Testing
Test Completion: December 1997

This test consisted of Malfunction Events:

A. 001 Loss of FW Flow Signal "A"
B. 005 Spurious Main Steam Isolation
C. 006 Recirc Pump Speed Increase upon Automatic Reset of Speed Limiter #1
D. 008 Reactor Manual Scram

1997 Transient and Malfunction Testing continued:

E. 011 HPCI System Spurious Initiation
F. 013 Recirc Pump "A" Trip
G. 014 Loss of Both Recirculation Pumps
H. 017 Spurious Scram
I. 023 Earthquake
J. 028 Control Rod Drift In
K. 033 Loss of 4160 Volt Bus 69J
L. 037 Loss of Offsite Power
M. 043 Feed Pump Min. Flow Recirc. Valve Fails Open
N. 045 Steam Line Rupture in the Drywell
O. 048 LPRM 16-49-1D Fails Fullscale
P. 052 Loss of Feed
Q. 053 Main Turbine Trip at 25%
R. 054 Master Flow Control Transient
S. 055 Recirc Loop Rupture With Loss of Offsite Power
T. 056 MSIV Closure with Stuck Open SRV, Failed Closed SULCV and Failure of HPCI/RCIC
U. 059 Reactor Power Oscillations
V. 063 Off Gas Explosion
W. 067 RPS/NSSS Drywell Pressure Transmitter Failure
X. 107 Turbine Trip With Failure of Bypass Valves
Y 121 Reactor Scram Subsequent to Resetting a Scram Due to Failure to Bypass High Scram Discharge Volume Level Scram

1998 Transient and Malfunction Testing
Test Completion: November 1998

This test consisted of Malfunction Events:
A. 002 Fuel Cladding Failure
B. 005 Spurious Main Steam Isolation
C. 007 Loss of Normal Feedwater with Failure of HPCI, RCIC, and SBFW
D. 008 Reactor Manual Scram
E. 012 Spurious Main Steam Isolation With Failure of RPS Auto Scram Logic
F. 013 Recirc Pump "A" Trip
G. 014 Loss of Both Recirculation Pumps
H. 018 Main Generator Trip
I. 024 120V AC Bus Trip H11-P900
J. 029 Control Rod Drop
K. 034 Condenser Air Leak
L. 038 Loss of 4160 Volt ESF Bus 64C
M. 044 Loss of RPS Channel
N. 045 Steam Line Rupture in the Drywell

1998 Transient and Malfunction Testing continued:

O. 050 Annunciator Failure
P. 052 Loss of Feed
Q. 053 Main Turbine Trip at 25%
R. 054 Master Flow Control Transient
S. 055 Recirc Loop Rupture with Loss of Offsite Power
T. 056 MSIV Closure with Stuck Open SRV, Failed Closed SULCV, and Failure of HPCI/RCIC
U. 060 Loss of 4160 Volt ESF Bus 64B
V. 064 Loss of Gland Seal Exhausters
W. 071 SRM Channel Failure
X. 111 General Service Water Pump Trip
Y. 131 Recirc Pump Speed Increase Upon Scoop Tube Lock Reset

1999 Transient and Malfunction Testing
Test Completion: December 1999

This test consisted of Malfunction Events:
A. 003 Main Turbine Trip
B. 005 Spurious Main Steam Isolation
C. 008 Reactor Manual Scram
D. 009 Main Steam Line Rupture in the Steam Tunnel
E. 013 Recirc Pump "A" Trip
F. 014 Loss of Both Recirculation Pumps
G. 015 RPV Lvl Xmtr Fail - Floodup B21-N027
H. 019 Recirculation Loop Rupture "A" Large
I. 026 Control Rod (XX-YY) Uncoupled
J. 031 CRD Flow Control Valve "A" Fails Shut
K. 035 Stator Water Cooling High Temperature
L. 040 Recirculation Loop Rupture A (Small)
M. 045 Steam Line Rupture in the Drywell
N. 046 Excessive Cooldown Rate During Shutdown Cooling
O. 052 Loss of Feed
P. 053 Main Turbine Trip at 25%
Q. 054 Master Flow Control Transient
R. 055 Recirc Loop Rupture With Loss of Offsite Power
S. 056 MSIV Closure With Stuck Open SRV, Failed Closed SULCV and Failure of HPCI/RCIC
T. 057 Station Blackout
U. 061 Loss of 4160 Volt ESF Bus 65E
V. 065 RPV Reference Leg Sensing Line Rupture
W. 088 RHR Service Water Pump Trip
X. 118 Interruptible Air Header Rupture
Y. 135 Reactor Scram With Gland Seal System In Manual

2000 Transient and Malfunction Testing
Test Completion: November 2000

This test consisted of Malfunction Events:

A. 004 Feedwater Line Rupture in the Steam Tunnel
B. 005 Spurious Main Steam Isolation
C. 008 Reactor Manual Scram
D. 010 Main Steam SRV "K" Fails Open
E. 013 Recirc. Pump "A" Trip
F. 014 Loss of Both Recirculation Pumps
G. 016 Rx Recirc Pump "A" Runaway
H. 022 Loss of DC Dist Cabinet 2IA1-3
I. 027 Control Rod (XX-YY) Blade Stuck
J. 032 Pressure Regulator "A" Fails High
K. 036 Main Condenser Level Control System Failure
L. 042 Loss of Shutdown Cooling
M. 045 Steam Line Rupture in the Drywell
N. 047 Feed Line Rupture in the Drywell
O. 052 Loss of Feed
P. 053 Main Turbine Trip at 25%
Q. 054 Master Flow Control Transient
R. 055 Recirc Loop Rupture With Loss of Offsite Power
S. 056 MSIV Closure With Stuck Open SRV, Failed Closed SULCV and Failure of HPCI/RCIC
T. 058 Spurious Single Control Rod Scram
U. 062 Loss of 4160 Volt ESF Bus 65F
V. 066 RPV Wide Range Variable Leg Sensing Line Rupture
W. 093 HPCI Steamline Break in Reactor Building
X. 120 Loss of 4160 Volt Bus 65D
Y. 136 Loss of Feedwater Due to False L8 Signal

5. **INITIAL CONDITIONS PERFORMANCE TEST** - This test is performed as described in the applicable Simulator Certification Maintenance Procedure, SCM 9 - Initial Conditions Performance Test. This test encompasses:

   A. Validation that the controlled initial conditions (IC) satisfy their intended use in support of simulator training.

   B. A minimum of ten IC's are operational and include a variety of plant operating conditions, fission product poison concentrations, and various periods in core life.

   Test Completion:
   1997 – December 1997
   1998 – November 1998
   1999 – November 1999
   2000 – November 2000

ATTACHMENT 2

SIMULATOR CERTIFICATION TEST SCHEDULE

This attachment provides the Fermi 2 Control Room Simulator Certification Test schedule through the year 2004. This test schedule has been modified from the previous certification submittal to delete obsolete surveillance and malfunction tests.

Testing performed meets criteria as specified in ANSI/ANS - 3.5 - 1985 and Regulatory Guide 1.149 Revision 1, April 1987

All malfunctions are scheduled to be completed on a four-year rotation with approximately 25% performed annually.

	Test Description	Schedule
Simulator Real Time Test		2001
Normal Plant Evolutions		
	Startup From Cold Shutdown to Hot Standby	2001
	Startup From Hot Standby to Rated Power	2002
	Plant Shutdown From Rated Power to Hot Standby and Cooldown to Cold Shutdown	2003
	Reactor Trip Followed By Recovery To Rated Power	2004
Surveillance Test Procedures for Safety Related Equipment		
24.000.02	Shiftly, Daily and Weekly Required Surveillances	2001
24.000.03	Mode 5 Shiftly, Daily, and Weekly Surveillances	2002
24.000.05	Monthly Continuity Light and Channel Check	2003
24.106.01	Operable Control Rod Check	2004
24.106.02	CRD Coupling Integrity Verification	2001
24.106.04	Scram Discharge Volume Vent and Drain Valve Operability Test	2002
24.106.06	Scram Discharge Volume Vent and Drain Valves Scram Operability Test	2003
24.107.01	Feedwater Reverse Flow Check Valve Operability and Position Indication Verification Test	2004
24.107.03	SBFW Pump and Valve Operability and Lineup Verification Test	2001
27.109.01	Turbine Steam Valves Test	2002

Certification Test Schedule Cont'd:

24.109.02	Turbine Bypass Valve Operability Test	2003
24.110.05	RPS-Turbine Control and Stop Valve Functional Test	2004
24.129.01	Station and Control Air System Valve Operability and Position Indication Verification Test	2001
24.137.01	Main Steam Line Isolation Channel Functional Test	2002
24.137.03	Main Steam Line Valve Operability Test	2003
24.137.11	Safety Relief Valve (SRV) Operability Test	2004
24.137.15	MSIV Leakage Control System Functional Test	2001
24.137.16	MSIV Leakage Control System Monthly Operability Test	2002
24.137.18	Main Steam Line Drain Isolation Valve Operability Test	2003
24.138.02	Reactor Recirculation Pumps Valve Operability Test	2004
24.138.04	Recirculation Sample System Isolation Valve Operability Test	2001
24.138.06	Jet Pump Operability Test	2002
24.144.01	TWMS Valve Operability and Valve Position Indication Verification Test	2003
24.202.01	HPCI Pump Time Response and Operability Test at 1025 PSI	2004
24.202.02	HPCI Flow Rate Test at 165 PSIG Reactor Steam Pressure	2001
24.202.05	HPCI System Cold Shutdown Valve Operability Test	2002
24.203.02	Division 1 CSS Pump and Valve Operability, and Automatic Actuation	2003
24.203.03	Division 2 CSS Pump and Valve Operability, and Automatic Actuation	2004
24.203.04	Core Spray Valve Operability and Position Verification Test	2001
24.204.01	Div 1 LPCI and Suppression Pool Cooling/Spray Pump and Valve Operability Test	2002
24.204.02	RHR Valve Lineup and System Filled Verification	2003
24.204.04	RHR Shutdown Cooling Valve Operability	2004
24.204.06	Div 2 LPCI and Suppression Pool Cooling/Spray Pump and Valve Operability Test	2001
24.204.08	Non-Divisional RHR Local Valve Position Indication Verification Test	2002

Certification Test Schedule Cont'd:

24.205.05	Division 1 RHRSW Pump and Valve Operability Test	2003
24.205.06	Division 2 RHRSW Pump and Valve Operability Test	2004
24.205.08	Div 1 RHR Cooling Tower Fan Operability and RHRSW, EESW Valve Line-up Verification	2001
24.205.10	Div 2 RHR Cooling Tower Fan Operability and RHRSW, EESW Valve Line-up Verification	2002
24.206.01	RCIC System Pump and Valve Operability Test	2003
24.206.02	RCIC Valve Operability Test	2004
24.206.04	RCIC System Automatic Actuation and Flow Test	2001
24.207.04	RBCCW/EECW Miscellaneous Valve Operability Test	2002
24.207.05	EECW Valve Operability Test	2003
24.207.06	EECW/EESW Actuation Functional Test-Division 1	2004
24.207.07	EECW/EESW Actuation Functional Test-Division 2	2001
24.208.02	Division 1 EESW Pump and Valve Operability Test	2002
24.208.03	Division 2 EESW Pump and Valve Operability Test	2003
24.324.01	Combustion Turbine Generator 11 Unit 1 Monthly Operability Check	2004
24.402.01	Drywell and Suppression Chamber Vacuum Breaker Operability Test	2001
24.402.07	Drywell to Suppression Chamber Vacuum Breaker Closed Verification Test	2002
24.404.02	Division 1 SGTS Filter and Secondary Containment Isolation Damper Operability Test	2003
24.404.03	Standby Gas Treatment System Valve Operability Test	2004
24.404.04	Division 2 SGTS Filter and Secondary Containment Isolation Damper Operability Test	2001
24.406.01	Nitrogen Inerting System Valve Operability Test	2002
24.408.03	Division 1 Primary Containment Monitoring System Valve Operability and Position Indication Verification Test	2003
24.408.04	Division 2 Primary Containment Monitoring System Valve Operability and Position Indication Verification Test	2004

Certification Test Schedule Cont'd:

24.409.02	Division I Post LOCA Thermal Recombiner System Valve Operability Test	2001
24.409.03	Division II Post LOCA Thermal Recombiner System Valve Operability Test	2002
24.413.03	Control Room Emergency Filter Monthly Operability Test	2003
24.415	Drywell Cooling Fan 1 and 2 Operability Test	2004
24.603.02	SRM/IRM/APRM Overlap Verification	2001
24.608	Rod Worth Minimizer Functional Test	2002
24.610.01	RPS - Manual Scram Functional Test	2003
24.623	Reactor Manual Control/Reactor Mode Switch/ Refueling Platform - Refueling Interlocks	2001
24.630	Remote Shutdown Instrument Channel Checks	2002
24.630.01	Remote Shutdown Panel Control Circuit and Switch Test	2003
24.702.01	Miscellaneous Systems Valve Operability Test	2004
24.707.01	Reactor Water Cleanup (RWCU) Valve Operability Test	2001
24.800.04	Alternate Coolant Circulation and Decay Heat Removal Standby Lineup Operability Verification	2002

Plant Malfunctions

001	Loss of FW Flow Signal "A"	2001
002	Fuel Cladding Failure	2002
003	Main Turbine Trip	2003
004	Feedwater Line Rupture in the Steam Tunnel	2004
007	Loss of Normal Feedwater with a Failure of HPCI, RCIC, and SBFW	2002
009	Main Steam Line Rupture in the Steam Tunnel	2003
010	Main Steam SRV "K" Fails Open	2004
011	HPCI System Spurious Initiation	2001
012	Spurious Main Steam Isolation With Failure of RPS Auto Scram Logic	2002
015	RPV Level Xmtr. Fail-Floodup B21-N027	2003
017	Spurious Scram	2001
018	Main Generator Trip	2002
019	Recirculation Loop Rupture "A" Large	2003
022	Loss of DC Dist Cabinet 2IA1-3	2004
023	Earthquake	2001
024	120V AC Bus Trip H11-P900	2002
026	Control Rod (XX-YY) Uncoupled	2003

Certification Test Schedule Cont'd:

027	Control Rod (XX-YY) Blade Stuck	2004
028	Control Rod Drift In	2001
029	Control Rod Drop	2002
031	CRD Flow Control Valve "A" Fails Shut	2003
032	Pressure Regulator "A" Fails High	2004
033	Loss of 4160 Volt Bus 69J	2001
034	Condenser Air Leak	2002
035	Stator Water Cooling High Temperature	2003
036	Main Condenser Level Control System Failure	2004
037	Loss of Offsite Power	2001
038	Loss of 4160 Volt ESF Bus 64C	2002
040	Recirculation Loop Rupture "A" (small)	2003
042	Loss of Shutdown Cooling	2004
043	Feed Pump Min. Flow Recirc. Valve Fails Open	2001
044	Loss of RPS Channel	2002
046	Excessive Cooldown Rate During Shutdown Cooling	2003
047	Feed Line Rupture in the Drywell	2004
048	LPRM 16-49-1D Fails Fullscale	2001
050	Annunciator Failure	2002
057	Station Blackout	2003
058	Spurious Single Control Rod Scram	2004
059	Reactor Power Oscillations	2001
060	Loss of 4160 Volt ESF Bus 64B	2002
061	Loss of 4160 Volt ESF Bus 65E	2003
062	Loss of 4160 Volt ESF Bus 65F	2004
063	Off Gas Explosion	2001
064	Loss of Gland Seal Exhausters	2002
065	RPV Reference Leg Sensing Line Rupture	2003
066	RPV Wide Range Variable Leg Sensing Line Rupture	2004
067	RPS/NSSS Drywell Pressure Transmitter Failure	2001
071	SRM Channel Failure	2002
088	RHR Service Water Pump Trip	2003
093	HPCI Steamline Break in the Reactor Building	2004
107	Turbine Trip With Failure of Bypass Valves	2001
111	General Service Water Pump Trip	2002
118	Interruptible Air Header Rupture	2003
120	Loss of 4160 Volt Bus 65D	2004
121	Reactor Scram Sub. to Resetting a Scram Due to Failure to Bypass High Scram Discharge Volume Level Scram	2001
135	Reactor Scram with Gland Seal System In Manual	2003
136	Loss of Feedwater Due to False L8 Signal	2004

ANNUAL OPERABILITY TEST SCHEDULE

Initial Conditions Performance Test

Steady State Performance Test

Transient Events

005	Spurious Main Steam Isolation
008	Reactor Manual Scram
013	Recirculation Pump "A" Trip
014	Loss of Both Recirculation Pumps
045	Steam Line Rupture in the Drywell
052	Loss of Feed
053	Main Turbine Trip at 25% Power
054	Master Flow Control Transient
055	Recirculation Loop Rupture With Loss of Offsite Power
056	MSIV Closure With Stuck Open SRV, Failed Closed SULCV and Failure of HPCI/RCIC