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AUTH. NAME AUTHOR AFFILIATION
MARCHI, M.L. Wisconsin Public Service Corp.
RECIP. NAME RECIPIENT AFFILIATION
 Document Control Branch (Document Control Desk)

SUBJECT: Forwards summary of simulator performance testing & description of performance tests to be conducted during next four-yr period.

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WISCONSIN PUBLIC SERVICE CORPORATION

600 North Adams • P.O. Box 19002 • Green Bay, WI 54307-9002

March 22, 1995

10 CFR 55.45(b)(5)(ii)&(vi)

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

Ladies/Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Simulator Performance Testing

Reference: 1) Letter from K. H. Evers (WPSC) to Document Control Desk (NRC) dated
March 22, 1991

Reference 1 submitted the Kewaunee Nuclear Power Plant Simulator Certification Report and the Simulator Facility Certification (Form NRC - 474). In accordance with the requirements of 10CFR55.45(b)(5), attached is a summary of the simulator performance testing and a description of the performance tests to be conducted during the next four-year period.

If you have any questions or need additional information, please contact Jim Brandtjen at 414-388-2560, Ext. 2421.

Sincerely,

M. L. Marchi
Manager-Nuclear Business Group

JPB/rpp

Enc.

cc - US NRC - Region III
NRC Senior Resident Inspector

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ATTACHMENT 1

To

Letter from M. L. Marchi (WPSC)

To

Document Control Desk (NRC)

Dated

March 22, 1995

Kewaunee Plant Simulator Four Year Certification Report

Introduction:

This report is a supplement to the initial certification report which was submitted with NRC Form-474 in March of 1991. It contains a brief summary of the status of the certification program as required in 10 CFR 55.45. Additional information is available upon request.

Description of testing completed:

The following are brief descriptions of the certification tests which were performed during the four year period between 3/26/91 and 3/26/95:

Steady State Tests (annual)

(Test no.)(Description)

122	34% Steady State Performance Test
123	74% Steady State Performance Test
124	100% Steady State Performance Test
125	100% One Hour Stability Test

Computer Real Time Tests (once in four years)

121	- CPU Idle Time Measurement
	- Valve Stroke Time Test
	- Step Counter/Rod Speed Test
	- Annunciator Flash Rate Test

Transients (annual)

151	Manual Reactor Trip
152	Simultaneous Trip of All Feedwater Pumps
153	Simultaneous Closure of All Main Steam Isolation Valves
154	Simultaneous Trip of All Reactor Coolant Pumps
155	Trip of Any Single Reactor Coolant Pump
156	Main Turbine Trip Without Reactor Trip
157	Maximum Rate Power Change 100% to 75% and Back to 100%
158	Maximum Size LOCA With Loss of All Off-Site Power

- 159 Maximum Size Unisolable Main Steam Line Rupture
- 160 Slow Depressurization to Saturated Condition Using Pressurizer Safety Valve Stuck Open Without ECCS
- 161 Startup of an Inactive Reactor Coolant Loop
- 162 Low Pressure Feedwater Heater Bypass Valve Fails Open

Normal Operations (once in four years)

- 201 Plant Startup - Cold Shutdown to Intermediate Shutdown
- 202 Plant Startup (continued) - Intermediate Shutdown to Hot Shutdown
- 203 Plant Startup (continued) - Intermediate Shutdown to Hot Shutdown
- 204 Plant Startup (continued) - Intermediate Shutdown to Hot Standby
- 205 Plant Startup (continued) - Generator Synchronization to 20% Power
- 206 Plant Startup (continued) - 20% Power to 50% Power
- 207 Plant Startup (continued) - 50% Power to 100% Power
- 208 100% Power to Hot Standby and Cooldown to Cold Shutdown
- 209 100% Power to Hot Standby and Cooldown to Cold Shutdown (continued)
- 210 100% Power to Hot Standby and Cooldown to Cold Shutdown (continued)
- 211 100% Power to Hot Standby and Cooldown to Cold Shutdown (continued)
- 212 Load Changes- 50% Power to 70% Power to 40% Power
- 213 Reactor Trip With Recovery to 100% Power
- 214 Reactor Trip With Recovery to 100% Power (continued)
- 215 Reactor Trip With Recovery to 100% Power (continued)
- 216 Reactor Trip With Recovery to 100% Power (continued)
- 217 Core Performance Testing- Initial Criticality by Dilution
- 218 Core Performance Testing- Low Power Physics Test, Reference Bank Worth Measurement
- 219 Core Performance Testing- Reference Bank Worth Using Rod Swap
- 220 Core Performance Testing- Isothermal Temperature Coefficient Measurement
- 221 Core Performance Testing- Power Defect Measurement

Surveillance Procedures (once in four years)

48-002	Nuclear Power Range Channel Daily Calibration
48-006	Intermediate Range Test at Shutdown
48-008	Source Range Channel Test at Shutdown
36-018	Pressurizer Backup Heater Groups A & B Operability Test
14-026	Auxiliary Building Special Ventilation (ASV) Monthly Test
42-047A	Diesel Generator A Combined Monthly Test
42-047B	Diesel Generator B Combined Monthly Test
54-064	Turbine Overspeed Trip Test
49-075	Control Rod Exercise
56-078	Containment Isolation Trip Test
08-081	Fire Pump Test
36-082	Reactor Coolant System Leak Rate Check
54-086	Turbine Stop and Governor Valve Operability Test
36-087	Reactor Coolant System Integrity Test
23-095	Containment Spray System Test
33-098	Safety Injection Pump and Valve Test - IST
34-099	Residual Heat Removal Pump and Valve Test - IST
23-100	Containment Spray Pump and Valve Test - IST
05B-104	Motor Driven Auxiliary Feedwater Pump and Valve Test - IST
05B-105	Turbine Driven Auxiliary Feedwater Pump and Valve Test - IST
24-107	SBV Monthly Test
42-109	Diesel Generator Manual Test
33-110	Diesel Generator Automatic Test
14-117	Auxiliary Building Special Vent System Test
24-121	Shield Building Vent (SBV) System Test
87-125	Shift Instrument Channel Checks - Operating
02-138	Service Water Pump and Valve Test - IST
36-139	Reactor Coolant System Vent Path Flow Verification
33-144	Accumulator Isolation and Check Valve Test
87-148	Daily Instrument Channel Checks
87-149	Shift Instrument Channel Checks - Shutdown
87-151	Weekly Instrument Channel Checks
42-152	Automatic Load Sequencer Test
55-167-1	Blowdown Treatment Valves Test - IST
55-167-3	MG(R) and MD(R) Valves Timing Test - IST
55-167-4	Post LOCA Valves Timing Tests
55-167-5	Miscellaneous Systems Valve Timing Tests - IST
55-167-6	Cold Shutdown Evolution Valve Timing Tests - IST
55-167-7	ISI Pump Bearing Temperatures - Auxiliary Feedwater Pumps

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55-167-9 Refueling Shutdown Valve Tests - IST
31-168 Component Cooling Pump and Valve Test - IST
33-191 Safety Injection Flow Test
05A-202 Feedwater Regulating and Bypass Valves Timing Test
34-203 RHR Isolation Check Valve Leakage Measurement
87-214 Monthly Instrument Channel Check - Operating
45-230 Radiation Monitors Monthly Source Check
05B-253 Full Flow Simultaneous Start of All Auxiliary Feedwater Pumps
25-263 Control Room Post Accident Recirc Monthly Test
05B-284 Turbine Driven Auxiliary Feedwater Pump Full Flow Test - IST
34-285 RHR Pumps Full Flow Test - IST
05B-286 Turbine Driven Auxiliary Feedwater Pump Operability Verification Below 350 deg. F
42-291B Diesel Generator B Operability Test

Malfunctions (once in four years)

300 Component Cooling Water Pump Trip
301 Reactor Coolant Activity Increase
302 Letdown Heat Exchanger Tube Rupture to Component Cooling
303 Uncontrolled Dilution
304 Reactor Coolant Pump A Seal Failure
305 Loss of Off-Site Power - 345 KV and 138 KV
306 Loss of 125 VDC Bus
307 Loss of 118 VAC
309 Loss of 4160 VAC Bus 1-1
310 Loss of 4160 VAC Bus 1-3
311 Loss of 4160 VAC Bus 1-5
312 Loss of 480 VAC Bus 1-52
313 ESF Sequencer Fails to Complete Sequence
314 Generator Lockout
315 Loss of Emergency Diesel Generators
316 Emergency Diesel Fails to Start
317 Loss of Condenser Vacuum (1000 cfm)
318 Loss of Condenser Vacuum (10 cfm)
319 Loss of Condenser Level Control (controller fails low)
320 Loss of Condenser Level Control (controller fails high)
321 Feedwater System Rupture Inside Containment, Upstream of Check Valve (6E6 lbm/hr)

- 322 Feedwater System Rupture Inside Containment, Upstream of Check Valve (6E5 lbm/hr)
- 323 Feedwater System Rupture Outside Containment (6E4 lbm/hr)
- 324 Feedwater System Rupture Outside Containment (6E6 lbm/hr)
- 325 Inadvertent Feedwater Isolation
- 326 Inadequate Condensate to the Auxiliary Feedwater Pump Suction
- 327 Loss of All Feedwater Flow (Normal and Auxiliary)
- 328 Loss of Instrument Air Header
- 329 Main Steam Line Rupture Inside Containment (1.75E6 lbm/hr)
- 330 Main Steam Line Rupture Inside Containment (1.75E5 lbm/hr)
- 331 Main Steam Line Rupture Outside Containment (1E6 lbm/hr)
- 332 Main Steam Line Rupture Outside Containment (1E7 lbm/hr)
- 333 Steam Dump Valve Sticks Open
- 334 Source Range Channel Fails High
- 335 Source Range Channel Fails Low
- 336 Intermediate Range Channel Fails Low
- 337 Intermediate Range Channel Fails High
- 338 Power Range Channel Upper Detector Failure
- 339 Simultaneous Trip of All Reactor Coolant Pumps
- 340 Single Reactor Coolant Pump Trip
- 341 Loss of Coolant Accident - Hot Leg (4.5E4 lbm/sec)
- 342 Loss of Coolant Accident - Hot Leg (180 lbm/sec)
- 343 Loss of Coolant Accident - Cold Leg (6.6E4 lbm/sec)
- 344 Loss of Coolant Accident - Cold Leg (165 lbm/sec)
- 345 Loss of Coolant Accident - Pressurizer Steam Space
- 346 Reactor Coolant System Leaks
- 347 Pressurizer Power Operated Relief Valve Fails Open (2E4 lbm/hr)
- 348 Pressurizer Power Operated Relief Valve Fails Open (2E5 lbm/hr)
- 349 Pressurizer Safety Valve Seat Leakage
- 351 Control Rod Urgent Failure
- 352 Continuous Rod Motion of Controlling Bank
- 353 Dropped Control Rod
- 354 Misaligned Control Rod
- 355 Stuck Control Rod
- 356 Control Rod Ejection
- 357 Reactor Trip Breakers Fail to Open on Trip Signal
- 358 Residual Heat Removal Pump Seal Failure
- 359 Residual Heat Removal Pump Trip
- 360 Radiation Process Monitor Failure
- 361 Steam Generator Level Controller Unstable
- 362 Steam Generator Tube Leak (50 gpm)
- 363 Steam Generator Tube Leak (250 gpm)

- 364 Steam Generator Tube Leak (500 gpm)
- 365 Safety Injection Pump Trip
- 366 Service Water Pump Trip
- 367 Pressurizer Pressure Controller Fails Low
- 368 Pressurizer Pressure Controller Fails High
- 369 Pressurizer Level Controller Fails Low
- 370 Pressurizer Level Controller Fails High
- 371 Feedwater Flow Channel Fails High
- 372 Feedwater Flow Channel Fails Low
- 373 Steam Generator Level Channel Fails High
- 374 Steam Generator Level Channel Fails Low
- 375 Main Steam Density Compensation Failure (main steam pressure transmitter fails high)
- 376 Main Steam Density Compensation Failure (main steam pressure transmitter fails low)
- 377 Main Steam Impulse Pressure Transmitter Fails High
- 378 Main Steam Impulse Pressure Transmitter Fails Low
- 379 Reactor Coolant System Loop B Hot Leg RTD Fails High
- 380 Reactor Coolant System Loop B Hot Leg RTD Fails Low
- 382 Letdown Line Leak Inside Containment
- 383 Charging Pump Discharge Header Rupture
- 384 Charging Line Leak Inside Containment
- 386 Circulating Water Pump Screen Plugging
- 387 Circulating Water Pump Trip
- 388 Auxiliary Feedwater Pump Discharge Line Rupture
- 390 Condensate Pump Trip
- 391 Auxiliary Feedwater Pump Suction Strainer Plugged
- 394 Residual Heat Removal Suction Relief Valve Leakage
- 395 Residual Heat Removal Pump Suction Break
- 396 Residual Heat Removal Pump Discharge Break
- 398 Inadvertent Safety Injection
- 500 Loss of Emergency Diesel Generator Cooling
- 501 Turbine Control Valve #4 Fails Open
- 502 Turbine Control Valve #4 Fails Closed
- 503 Volume Control Tank Level Transmitter (LT-141) Failure
- 504 Volume Control Tank Level Transmitter (LT-112) Failure
- 506 Letdown Line Heat Exchanger Temperature Failure
- 507 Reactor Coolant System Wide Range Pressure Failure

Uncorrected Test Failures:

Test

218 Core Performance Testing- Low Power Physics Test, Reference Bank Worth Measurement

With the reactor in hot standby, Control Bank A was inserted following a dilution to maintain a zero DPM start up rate. The simulator response was acceptable until Control Bank A was within seven steps of the bottom of the core. At that point, further insertion of the control bank caused positive reactivity to be added.

Although this discrepancy will be corrected as soon as possible, this problem is considered to have little effect on training. This problem was discovered using a Reactor Test Procedure which placed the control rods in a configuration that is not expected to occur during training or examinations. Also, this discrepancy has never caused a problem during any previous examinations or training, and no training is anticipated which would use this configuration.

05B-286 Turbine Driven Auxiliary Feedwater Pump Operability Verification Below 350 deg. F

With the reactor at 0% power and RCS temperature at 233 deg. F., the discharge pressure of the TDAFWP (Turbine Driven Auxiliary Feedwater Pump) under recirculation conditions was greater than allowed by the SP acceptance criteria. Also, when one of the two TDAFWP steam supply valves was closed, TDAFWP discharge pressure decreased, which should not occur.

These discrepancies are scheduled to be addressed during the next software release (6/95). This Surveillance Procedure has been deleted from the plant, and therefore these discrepancies will have no affect on training.

210 100% Power to Hot Standby and Cooldown to Cold Shutdown

While cooling down, with the RCS temperature less than 200 deg. F, the pressurizer was filled. During the filling process, the pressurizer liquid temperature cycled inappropriately.

This discrepancy is scheduled to be addressed during the next software release (6/95), but is considered to have little to no affect on anticipated training or examinations.

05A-202 Feedwater Regulating and Bypass Valves Timing test

During the performance of Surveillance Procedure 05A-202, the closing times for the main feedwater regulating valves slightly exceeded the SP acceptance criteria.

This discrepancy is scheduled to be addressed during the next software release (6/95), but is considered to have no affect on training or examinations.

Schedule for Correction of Uncorrected Test Failures:

The discrepancies identified above are planned to be corrected in one of the next two software releases which are scheduled for June and December of 1995.

Additions/Deletions Incorporated Since Initial Certification:

Test no.	Description	Change	Reason for Change
05B-283	Motor Driven AFW Pumps Full Flow Test - IST	Added	It is an operator conducted, safety related, Surveillance Procedure implemented in the plant since initial certification.
05B-286	Turbine Driven AFW Pump Operability Verification Below 350 F	Deleted	This procedure was deleted in the plant.
14-026	Aux Bldg Special Ventilation (ASV) Monthly Test	Deleted	Surveillance Procedure 14-026 was replaced by procedures 14-026A and 14-026B in the Plant.
14-026A	Aux Bldg Special Ventilation Train A Operability Test	Added	Surveillance Procedure 14-026 was replaced by procedures 14-026A and 14-026B in the Plant.

Test no.	Description	Change	Reason for Change
14-026B	Aux Bldg Special Ventilation Train B Operability Test	Added	Surveillance Procedure 14-026 was replaced by procedures 14-026A and 14-026B in the Plant.
224	Hot Standby to 100% Power	Added	This test number is not a new test. It was added to accommodate the data collection system. It is just a continuation of tests 201,202,203,204,205,and 206 (Plant Startup to 100% Power).
23-095	Containment Spray System Test	Deleted	This procedure was deleted in the plant.
24-107	SBV Monthly Test	Deleted	Surveillance Procedure 24-107 was replaced by procedures 24-107A and 24-107B in the Plant.
24-107A	SBV Train A Operability Test	Added	Surveillance Procedure 24-107 was replaced by procedures 24-107A and 24-107B in the Plant.
24-107B	SBV Train B Operability Test	Added	Surveillance Procedure 24-107 was replaced by procedures 24-107A and 24-107B in the Plant.
317	Loss of Condenser Vacuum	Deleted	This test was redundant to test 318 (Loss of Condenser Vacuum).
339	Trip of any Single Reactor Coolant Pump from 100% Power	Deleted	It was determined to be redundant to Test 155 (Trip of any Single Reactor Coolant Pump) which is performed annually.
34-203	RHR Isolation Check Valve Leakage Measurement	Deleted	It was determined that this procedure was not conducted from the control room.

Test no.	Description	Change	Reason for Change
34-204	SI-22B Leakage Measurement	Deleted	It was determined that this procedure was not conducted from the control room.
340	Simultaneous Trip of All Reactor Coolant Pumps From 100% Power	Deleted	It was determined to be redundant to Test 154 (Simultaneous Trip of all Reactor Coolant Pumps) which is performed annually.
382	Letdown Line Leak Inside Containment	Added	It was requested to be added by Operations Training to better support the Training Program
383	Charging Pump Discharge Header Rupture	Added	It was requested to be added by Operations Training to better support the Training Program
384	Charging Leak Inside Containment	Added	It was requested to be added by Operations Training to better support the Training Program
385	Letdown Line Break Downstream of LD-6	Added	It was requested to be added by Operations Training to better support the Training Program
386	Circ. Water Pump Screen Plugging	Added	It was requested to be added by Operations Training to better support the Training Program
387	Circ. Water Pump Trip	Added	It was requested to be added by Operations Training to better support the Training Program
388	AFW Discharge Line Rupture	Added	It was requested to be added by Operations Training to better support the Training Program
389	FW Pump Trip (FW17)	Added	It was requested to be added by Operations Training to better support the Training Program

Test no.	Description	Change	Reason for Change
390	Cond. Pump Trip	Added	It was requested to be added by Operations Training to better support the Training Program
391	AFW Suction Strainer Plugged	Added	It was requested to be added by Operations Training to better support the Training Program
393	RHR Suction Relief Valve Leakage (RH06)	Added	It was requested to be added by Operations Training to better support the Training Program
394	RHR Suction Relief Valve Leakage	Added	It was requested to be added by Operations Training to better support the Training Program
395	RHR Pump Suction Break	Added	It was requested to be added by Operations Training to better support the Training Program
396	RHR Pump Discharge Break	Added	It was requested to be added by Operations Training to better support the Training Program
397	Inadvertent Phase A Isolation	Added	It was requested to be added by Operations Training to better support the Training Program
398	Inadvertent SI	Added	It was requested to be added by Operations Training to better support the Training Program
42-047	Diesel Generator Combined Monthly Test	Delete	Surveillance Procedure 42-047 was replaced by procedures 42-047A and 42-047B in the Plant.
42-047A	Diesel Generator A Combined Monthly Test	Added	Surveillance Procedure 42-047 was replaced by procedures 42-047A and 42-047B in the Plant.
42-047B	Diesel Generator B Combined Monthly Test	Added	Surveillance Procedure 42-047 was replaced by procedures 42-047A and 42-047B in the Plant.

Test no.	Description	Change	Reason for Change
42-109	Diesel Generator Manual Test	Deleted	This procedure was deleted in the plant.
42-152	Automatic Load Sequencers Test	Deleted	This procedure was deleted in the plant.
42-291A	Diesel Generator A Operability Test	Added	It is an operator conducted, safety related, Surveillance Procedure implemented in the plant since initial certification.
42-291B	Diesel Generator B Operability Test	Added	It is an operator conducted, safety related, Surveillance Procedure implemented in the plant since initial certification.
500	Loss of Emergency Diesel Cooling	Added	It was requested to be added by Operations Training to better support the Training Program
501	Turbine Control Valve Failure	Added	It was requested to be added by Operations Training to better support the Training Program
502	Turbine Control Valve Failure	Added	It was requested to be added by Operations Training to better support the Training Program
503	VCT Level Trans. LT-141 Failure	Added	It was requested to be added by Operations Training to better support the Training Program
504	VCT Level Trans. LT-112 Failure	Added	It was requested to be added by Operations Training to better support the Training Program
505	Letdown Line Pressure Trans. PT-135 Failure	Added	It was requested to be added by Operations Training to better support the Training Program
506	Letdown Line HX Temperature Failure	Added	It was requested to be added by Operations Training to better support the Training Program

Test no.	Description	Change	Reason for Change
507	RCS Wide Range Pressure Failure	Added	It was requested to be added by Operations Training to better support the Training Program
509	Dropped Rod Without a Reactor Trip	Added	It was requested to be added by Operations Training to better support the Training Program
55-167-8	Hot/Intermediate Shutdown Valve Tests- IST	Added	It is an operator conducted, safety related, Surveillance Procedure implemented in the plant since initial certification.
55-167-7	ISI Pump Bearing Temperatures - AFW Pumps	Deleted	This procedure was deleted in the plant.
87-273	Biennial Validation of AOV Position Remote Indication	Deleted	It was determined that this procedure was not conducted from the control room.

Test Schedule for Next Four Years:

1995/1996

Steady State Tests

<u>(Test no.)</u>	<u>(Description)</u>
122	34% Steady State Performance Test
123	74% Steady State Performance Test
124	100% Steady State Performance Test
125	100% One Hour Stability Test

Transients

151	Manual Reactor Trip
152	Simultaneous Trip of All Feedwater Pumps
153	Simultaneous Closure of All Main Steam Isolation Valves
154	Simultaneous Trip of All Reactor Coolant Pumps
155	Trip of Any Single Reactor Coolant Pump
156	Main Turbine Trip Without Reactor Trip
157	Maximum Rate Power Change 100% to 75% and Back to 100%
158	Maximum Size LOCA With Loss of All Off-Site Power
159	Maximum Size Unisolable Main Steam Line Rupture
160	Slow Depressurization to Saturated Condition Using Pressurizer Safety Valve Stuck Open Without ECCS
161	Startup of an Inactive Reactor Coolant Loop
162	Low Pressure Feedwater Heater Bypass Valve Fails Open

Normal Operations

217	Core Performance Testing- Initial Criticality by Dilution
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Surveillance Procedures

42-047A	Diesel Generator A Combined Monthly Test
48-002	Nuclear Power Range Channel Daily Calibration
48-006	Intermediate Range Test at Shutdown
48-008	Source Range Channel Test at Shutdown

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36-018 Pressurizer Backup Heater Groups A & B Operability Test
14-026A Auxiliary Building Special Ventilation Train A Operability Test
54-064 Turbine Overspeed Trip Test
49-075 Control Rod Exercise
56-078 Containment Isolation Trip Test
08-081 Fire Pump Test
36-082 Reactor Coolant System Leak Rate Check
54-086 Turbine Stop and Governor Valve Operability Test
36-087 Reactor Coolant System Integrity Test
05B-283 Motor Driven Auxiliary Feedwater Pumps Full Flow Test - IST
42-291A Diesel Generator A Operability Test
24-107A Shield Building Ventilation Train A Operability Test

Malfunctions

300 Component Cooling Water Pump Trip
301 Reactor Coolant Activity Increase
303 Uncontrolled Dilution
304 Reactor Coolant Pump A Seal Failure
305 Loss of Off-Site Power - 345 KV and 138 KV
306 Loss of 125 VDC Bus
307 Loss of 118 VAC
309 Loss of 4160 VAC Bus 1-1
310 Loss of 4160 VAC Bus 1-3
311 Loss of 4160 VAC Bus 1-5
312 Loss of 480 VAC Bus 1-52
313 ESF Sequencer Fails to Complete Sequence
314 Generator Lockout
315 Loss of Emergency Diesel Generators
316 Emergency Diesel Fails to Start
318 Loss of Condenser Vacuum (10 cfin)
319 Loss of Condenser Level Control (controller fails low)
320 Loss of Condenser Level Control (controller fails high)
321 Feedwater System Rupture Inside Containment, Upstream of Check Valve (6E6
lbm/hr)
322 Feedwater System Rupture Inside Containment, Upstream of Check Valve (6E5
lbm/hr)
385 Letdown Line Break Downstream of LD-6
389 Feedwater Pump Trip
393 Residual Heat Removal Suction Relief Valve Leakage

397 Inadvertent Phase A Isolation
505 Letdown Line Pressure Transmitter PT-135 Failure

1996/1997

Steady State Tests

<u>(Test no.)</u>	<u>(Description)</u>
122	34% Steady State Performance Test
123	74% Steady State Performance Test
124	100% Steady State Performance Test
125	100% One Hour Stability Test

Transients

151	Manual Reactor Trip
152	Simultaneous Trip of All Feedwater Pumps
153	Simultaneous Closure of All Main Steam Isolation Valves
154	Simultaneous Trip of All Reactor Coolant Pumps
155	Trip of Any Single Reactor Coolant Pump
156	Main Turbine Trip Without Reactor Trip
157	Maximum Rate Power Change 100% to 75% and Back to 100%
158	Maximum Size LOCA With Loss of All Off-Site Power
159	Maximum Size Unisolable Main Steam Line Rupture
160	Slow Depressurization to Saturated Condition Using Pressurizer Safety Valve Stuck Open Without ECCS
161	Startup of an Inactive Reactor Coolant Loop
162	Low Pressure Feedwater Heater Bypass Valve Fails Open

Normal Operations

- 201 Plant Startup - Cold Shutdown to Intermediate Shutdown
- 202 Plant Startup (continued) - Intermediate Shutdown to Hot Shutdown
- 203 Plant Startup (continued) - Intermediate Shutdown to Hot Shutdown
- 204 Plant Startup (continued) - Intermediate Shutdown to Hot Standby
- 205 Plant Startup (continued) - Generator Synchronization to 20% Power
- 206 Plant Startup (continued) - 20% Power to 50% Power
- 207 Plant Startup (continued) - 50% Power to 100% Power
- 220 Core Performance Testing- Isothermal Temperature Coefficient Measurement
- 221 Core Performance Testing- Power Defect Measurement
- 224 Plant Startup (continued) - 50% Power to 100% Power

Surveillance Procedures

- 24-107B Shield Building Ventilation Train B Operability Test
- 33-098 Safety Injection Pump and Valve Test - IST
- 34-099 Residual Heat Removal Pump and Valve Test - IST
- 23-100 Containment Spray Pump and Valve Test - IST
- 05B-104 Motor Driven Auxiliary Feedwater Pump and Valve Test - IST
- 05B-105 Turbine Driven Auxiliary Feedwater Pump and Valve Test - IST
- 33-110 Diesel Generator Automatic Test
- 14-117 Auxiliary Building Special Vent System Test
- 24-121 Shield Building Vent (SBV) System Test
- 87-125 Shift Instrument Channel Checks - Operating
- 02-138 Service Water Pump and Valve Test - IST
- 36-139 Reactor Coolant System Vent Path Flow Verification
- 05B-284 Turbine Driven Auxiliary Feedwater Pump Full Flow Test - IST
- 42-291B Diesel Generator B Operability Test

Malfunctions

- 302 Letdown Heat Exchanger Tube Rupture to Component Cooling
- 323 Feedwater System Rupture Outside Containment (6E4 lbm/hr)
- 324 Feedwater System Rupture Outside Containment (6E6 lbm/hr)
- 325 Inadvertent Feedwater Isolation
- 326 Inadequate Condensate to the Auxiliary Feedwater Pump Suction
- 327 Loss of All Feedwater Flow (Normal and Auxiliary)
- 328 Loss of Instrument Air Header

329	Main Steam Line Rupture Inside Containment (1.75E6 lbm/hr)
330	Main Steam Line Rupture Inside Containment (1.75E5 lbm/hr)
331	Main Steam Line Rupture Outside Containment (1E6 lbm/hr)
332	Main Steam Line Rupture Outside Containment (1E7 lbm/hr)
333	Steam Dump Valve Sticks Open
334	Source Range Channel Fails High
335	Source Range Channel Fails Low
336	Intermediate Range Channel Fails Low
337	Intermediate Range Channel Fails High
338	Power Range Channel Upper Detector Failure
341	Loss of Coolant Accident - Hot Leg (4.5E4 lbm/sec)
342	Loss of Coolant Accident - Hot Leg (180 lbm/sec)
345	Loss of Coolant Accident - Pressurizer Steam Space
382	Letdown Line Leak Inside Containment
386	Circulating Water Pump Screen Plugging
390	Condensate Pump Trip
394	Residual Heat Removal Suction Relief Valve Leakage
398	Inadvertent Safety Injection
501	Turbine Control Valve #4 Fails Open
502	Turbine Control Valve #4 Fails Closed
506	Letdown Line Heat Exchanger Temperature Failure
509	Dropped Rod Without A Reactor Trip

1997/1998

Steady State Tests

<u>(Test no.)</u>	<u>(Description)</u>
122	34 % Steady State Performance Test
123	74 % Steady State Performance Test
124	100 % Steady State Performance Test
125	100 % One Hour Stability Test

Transients

- 151 Manual Reactor Trip
- 152 Simultaneous Trip of All Feedwater Pumps
- 153 Simultaneous Closure of All Main Steam Isolation Valves
- 154 Simultaneous Trip of All Reactor Coolant Pumps
- 155 Trip of Any Single Reactor Coolant Pump
- 156 Main Turbine Trip Without Reactor Trip
- 157 Maximum Rate Power Change 100% to 75% and Back to 100%
- 158 Maximum Size LOCA With Loss of All Off-Site Power
- 159 Maximum Size Unisolable Main Steam Line Rupture
- 160 Slow Depressurization to Saturated Condition Using Pressurizer Safety Valve Stuck Open Without ECCS
- 161 Startup of an Inactive Reactor Coolant Loop
- 162 Low Pressure Feedwater Heater Bypass Valve Fails Open

Normal Operations

- 208 100% Power to Hot Standby and Cooldown to Cold Shutdown
- 209 100% Power to Hot Standby and Cooldown to Cold Shutdown (continued)
- 210 100% Power to Hot Standby and Cooldown to Cold Shutdown (continued)
- 211 100% Power to Hot Standby and Cooldown to Cold Shutdown (continued)
- 212 Load Changes- 50% Power to 70% Power to 40% Power
- 218 Core Performance Testing- Low Power Physics Test, Reference Bank Worth Measurement
- 219 Core Performance Testing- Reference Bank Worth Using Rod Swap

Surveillance Procedures

- 14-026B Auxiliary Building Special Ventilation Train B Operability Test
- 33-144 Accumulator Isolation and Check Valve Test
- 87-148 Daily Instrument Channel Checks
- 87-149 Shift Instrument Channel Checks - Shutdown
- 87-151 Weekly Instrument Channel Checks
- 55-167-1 Blowdown Treatment Valves Test - IST
- 55-167-3 MG(R) and MD(R) Valves Timing Test - IST
- 55-167-4 Post LOCA Valves Timing Tests
- 55-167-5 Miscellaneous Systems Valve Timing Tests - IST
- 55-167-6 Cold Shutdown Evolution Valve Timing Tests - IST

55-167-9 Refueling Shutdown Valve Tests - IST
31-168 Component Cooling Pump and Valve Test - IST
33-191 Safety Injection Flow Test
34-285 RHR Pumps Full Flow Test - IST
42-047B Diesel Generator B Combined Monthly Test

Malfunctions

343 Loss of Coolant Accident - Cold Leg (6.6E4 lbm/sec)
344 Loss of Coolant Accident - Cold Leg (165 lbm/sec)
351 Control Rod Urgent Failure
352 Continuous Rod Motion of Controlling Bank
353 Dropped Control Rod
354 Misaligned Control Rod
355 Stuck Control Rod
356 Control Rod Ejection
357 Reactor Trip Breakers Fail to Open on Trip Signal
358 Residual Heat Removal Pump Seal Failure
359 Residual Heat Removal Pump Trip
360 Radiation Process Monitor Failure
361 Steam Generator Level Controller Unstable
362 Steam Generator Tube Leak (50 gpm)
363 Steam Generator Tube Leak (250 gpm)
364 Steam Generator Tube Leak (500 gpm)
365 Safety Injection Pump Trip
366 Service Water Pump Trip
367 Pressurizer Pressure Controller Fails Low
368 Pressurizer Pressure Controller Fails High
383 Charging Pump Discharge Header Rupture
387 Circulating Water Pump Trip
391 Auxiliary Feedwater Pump Suction Strainer Plugged
395 Residual Heat Removal Pump Suction Break
503 Volume Control Tank Level Transmitter (LT-141) Failure
507 Reactor Coolant System Wide Range Pressure Failure

1998/1999

Steady State Tests

<u>(Test no.)</u>	<u>(Description)</u>
122	34% Steady State Performance Test
123	74% Steady State Performance Test
124	100% Steady State Performance Test
125	100% One Hour Stability Test

Computer Real Time Tests

121	- CPU Idle Time Measurement
	- Valve Stroke Time Test
	- Step Counter/Rod Speed Test
	- Annunciator Flash Rate Test

Transients

151	Manual Reactor Trip
152	Simultaneous Trip of All Feedwater Pumps
153	Simultaneous Closure of All Main Steam Isolation Valves
154	Simultaneous Trip of All Reactor Coolant Pumps
155	Trip of Any Single Reactor Coolant Pump
156	Main Turbine Trip Without Reactor Trip
157	Maximum Rate Power Change 100% to 75% and Back to 100%
158	Maximum Size LOCA With Loss of All Off-Site Power
159	Maximum Size Unisolable Main Steam Line Rupture
160	Slow Depressurization to Saturated Condition Using Pressurizer Safety Valve Stuck Open Without ECCS
161	Startup of an Inactive Reactor Coolant Loop
162	Low Pressure Feedwater Heater Bypass Valve Fails Open

Normal Operations

- 213 Reactor Trip With Recovery to 100% Power
- 214 Reactor Trip With Recovery to 100% Power (continued)
- 215 Reactor Trip With Recovery to 100% Power (continued)
- 216 Reactor Trip With Recovery to 100% Power (continued)

Surveillance Procedures

- 05A-202 Feedwater Regulating and Bypass Valves Timing Test
- 87-214 Monthly Instrument Channel Check - Operating
- 45-230 Radiation Monitors Monthly Source Check
- 05B-253 Full Flow Simultaneous Start of All Auxiliary Feedwater Pumps
- 25-263 Control Room Post Accident Recirc Monthly Test
- 55-167-8 Hot/Intermediate Shutdown Valve Tests - IST

Malfunctions

- 346 Reactor Coolant System Leaks
- 347 Pressurizer Power Operated Relief Valve Fails Open (2E4 lbm/hr)
- 348 Pressurizer Power Operated Relief Valve Fails Open (2E5 lbm/hr)
- 349 Pressurizer Safety Valve Seat Leakage
- 369 Pressurizer Level Controller Fails Low
- 370 Pressurizer Level Controller Fails High
- 371 Feedwater Flow Channel Fails High
- 372 Feedwater Flow Channel Fails Low
- 373 Steam Generator Level Channel Fails High
- 374 Steam Generator Level Channel Fails Low
- 375 Main Steam Density Compensation Failure (main steam pressure transmitter fails high)
- 376 Main Steam Density Compensation Failure (main steam pressure transmitter fails low)
- 377 Main Steam Impulse Pressure Transmitter Fails High
- 378 Main Steam Impulse Pressure Transmitter Fails Low
- 379 Reactor Coolant System Loop B Hot Leg RTD Fails High
- 380 Reactor Coolant System Loop B Hot Leg RTD Fails Low
- 384 Charging Line Leak Inside Containment
- 388 Auxiliary Feedwater Pump Discharge Line Rupture
- 396 Residual Heat Removal Pump Discharge Break
- 500 Loss of Emergency Diesel Generator Cooling
- 504 Volume Control Tank Level Transmitter (LT-112) Failure