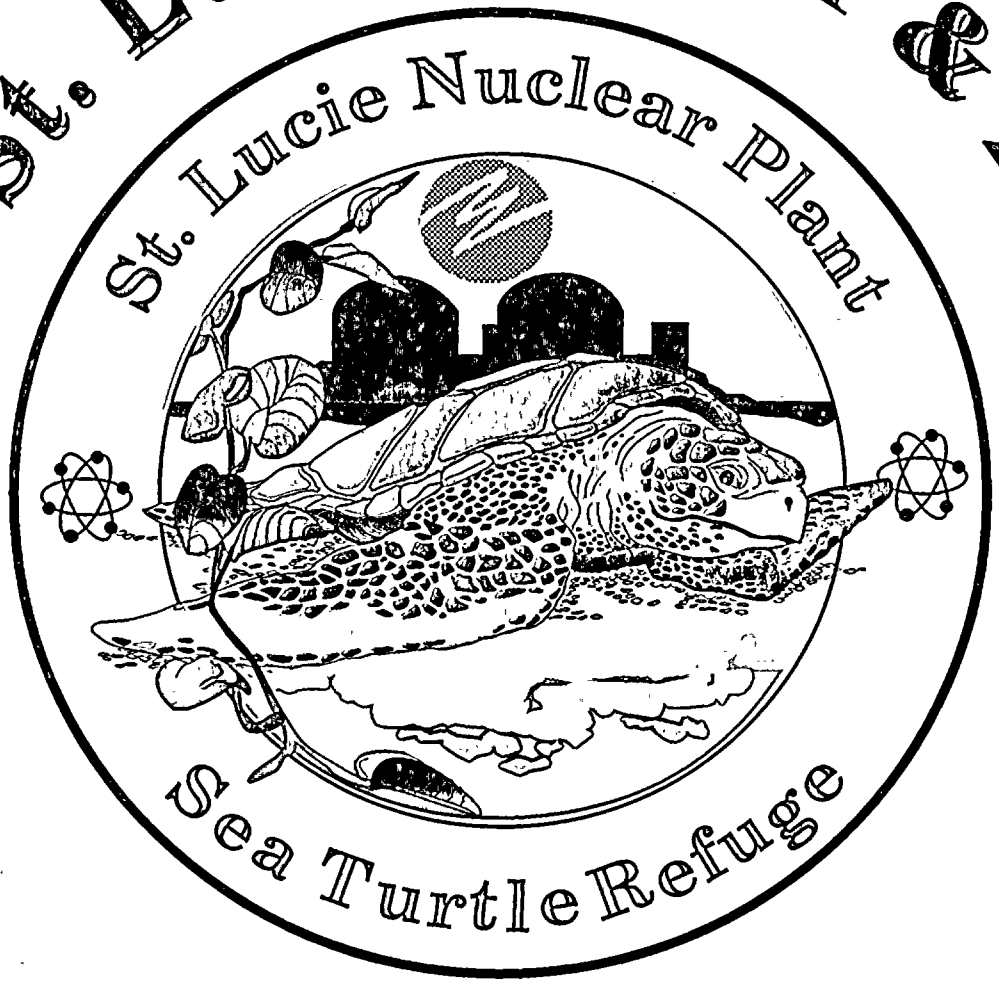
St. Lucie Units 1 & 2



1995 PLANT REFERENCED SIMULATOR CERTIFICATION REPORT

(DJE/950066-F1-R0)

9502230230 950215
PDR ADOCK 05000335
P PDR

Florida Power & Light Company, P.O. Box 128, Fort Pierce, FL 34954-0128

February 15, 1995

L-95-44
10 CFR 55.45
10 CFR 50.4

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

RE: St. Lucie UnitS 1 and 2
Docket Nos. 50-335 and 50-389
1995 Plant-Referenced Simulator Certification Report

Pursuant to 10 CFR 55.45(b)(5)(ii) and 10 CFR 55.45 (b)(5)(vi), attached is the 1995 *Plant-Referenced Simulator Certification Report* for St. Lucie Units 1 and 2. This report is required to be submitted every four years. The original certification was submitted on February 21, 1991, by FPL letter L-91-48. The report is to contain a description and schedule for correcting test failures, a description of the testing completed, and a description and schedule of testing, if different, to be performed during the next four (4) year interval.

The required information is included in the enclosed report. Section 1 is a list of certification tests performed by year during the past four (4) years. Section 2 is a list of open deficiencies identified during the first interval tests and includes the scheduled completion dates. Section 3 identifies the single plant change/modification that has not yet been incorporated into the simulator. Section 4 is a list of additions, deletions, and revisions to the certification testing program. Section 5 is the testing schedule for the next four (4) year interval. Section 6 includes abstracts of new test procedures to be included in the next interval.

Please contact us if there are any questions about this submittal.

Very truly yours,

D. A. Sager
Vice President
St. Lucie Plant

DAS/GRM

cc: Stewart D. Ebneter, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant

St. Lucie UnitS 1 and 2
Docket Nos. 50-335 and 50-389
L-95-44
Plant Referenced Simulator Certification Report

ST. LUCIE UNITS 1 AND 2

1995 PLANT REFERENCED SIMULATOR

CERTIFICATION REPORT

SECTION 1

CERTIFICATION TEST LIST

FOR PERIOD 1991-1994

St. Lucie UnitS 1 and 2
Docket Nos. 50-335 and 50-389
L-95-44
Plant Referenced Simulator Certification Report

1991 CERTIFICATION TESTS

TRN-001	Reactor Trip
TRN-002	Loss of all Feedwater
TRN-003	Main Steam Valve Closure
TRN-004	Loss of all RCP's
TRN-005	Loss of one RCP
TRN-006	Turbine Trip from <15% power
TRN-007	Maximum Rate Power Ramp
TRN-008	Large Break LOCA with LOOP
TRN-009	MSLB inside Containment
TRN-010	Failed open Pressurizer safety valve with no HPSI
SST-001	Steady State Test at 100% power
SST-002	Steady State Test at 30, 50 and 75% Power
SUR-002	Isothermal Temperature Coefficient Determination
SUR-003	Rod Worth Measurement
SUR-004	ARO Critical Boron Determination
SUR-006	Moderator Coefficient Determination at Power
SUR-014	Turbine Valve Test
NPE-005	Plant Shutdown from Rated Power to Cold Shutdown
MAL-002	Rapid Gross Failure of Multiple Steam Generator Tubes
MAL-005	Small Break LOCA
MAL-006	Failed Open PORV with Loss of Offsite Power
MAL-008	Loss of Instrument Air Compressors
MAL-010	Loss of Offsite Power with Failure of Both Diesel Generators
MAL-015	Loss of all RCP's, Natural Circulation Cooldown
MAL-017	Loss of Condenser Level Control
MAL-031	One Dropped Bank of CEA's
MAL-035	Trip Generator from 100% Power
MAL-045	Large Feedwater Line Break inside Containment
MAL-046	Wide Range NI Failure
MAL-050	T_{cold} input to RPS Failed High
MAL-054	RCS Flow Instrument Failure
MAL-058	Containment Radiation Monitor Failure
MAL-062	Alarm Window Incorrectly Actuates
MAL-068	Anticipated Transient Without Scram (ATWAS)

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1992 CERTIFICATION TESTS

TRN-001	Reactor Trip
TRN-002	Loss of all Feedwater
TRN-003	Main Steam Valve Closure
TRN-004	Loss of all RCP's
TRN-005	Loss of one RCP
TRN-006	Turbine Trip from <15% power
TRN-007	Maximum Rate Power Ramp
TRN-008	Large Break LOCA with LOOP
TRN-009	MSLB inside Containment
TRN-010	Failed open Pressurizer. safety valve with no HPSI
SST-001	Steady State Test at 100% power
SST-002	Steady State Test at 30, 50 and 75% Power
SUR-005	Plant Heat Balance
SUR-008	Surveillance requirements for shutdown margin
SUR-011	Diesel Generator monthly test
NPE-001	Reactor Plant Heatup - Cold to Hot Standby
NPE-002	Reactor Startup
NPE-003	Turbine Startup and Generator Synchronization
NPE-004	Reactor Trip and recovery to rated power
MAL-003	LOCA outside containment in the letdown system
MAL-009	Loss of Offsite Power
MAL-012	Loss of the MA Instrument bus
MAL-013	Loss of a non-safety related vital A.C. bus
MAL-021	Loss of Shutdown Cooling from suction valve
MAL-026	Loss of all Feedwater from 100% Power
MAL-030	One Dropped CEA
MAL-032	Freeze Control Rod Drive System
MAL-038	Pressurizer pressure and level control failures
MAL-042	Main steam line break outside Containment
MAL-047	Linear Power Range Channel failed high
MAL-051	T_{cold} input to RRS failed high
MAL-055	Feedwater flow input to 3 element controller fails
MAL-059	RWT level Instrument failure
MAL-064	ESFAS failure with small break LOCA
MAL-066	MSIS fails to actuate
MAL-067	AFAS fails to actuate

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1993 CERTIFICATION TESTS

TRN-001	Reactor Trip
TRN-002	Loss of all Feedwater
TRN-003	Main Steam Valve Closure
TRN-004	Loss of all RCP's
TRN-005	Loss of one RCP
TRN-006	Turbine Trip from <15% power
TRN-007	Maximum Rate Power Ramp
TRN-008	Large Break LOCA with LOOP
TRN-009	MSLB inside Containment
TRN-010	Failed open Pressurizer. safety valve with no HPSI
SST-001	Steady State Test at 100% power
SST-002	Steady State Test at 30, 50 and 75% Power
SUR-009	RCS Inventory Balance
SUR-012	RPS Logic Matrix Test
MAL-001	Complete Rupture if one Steam Generator U-Tube
MAL-004	Large Break LOCA with LOOP
MAL-007	Loss of Instrument Air - Air header rupture
MAL-011	Loss of a Safety related A.C. Bus
MAL-022	Total Loss of CCW Flow
MAL-024	RCS to CCW leak in an RCP seal cooler
MAL-028	One Stuck Rod
MAL-029	One Uncoupled Rod during startup
MAL-034	Turbine trip from <15% power
MAL-039	Reactor Coolant Volume Control Failures
MAL-040	Reactor trip initiated by low S/G level
MAL-041	Double ended MSLB inside containment
MAL-043	Failed Open Main steam safety valve
MAL-048	S/G Level Instrument Failure
MAL-052	RCS Hot Leg RTD failure
MAL-056	Steam Flow Input to 3 element controller failure
MAL-060	Annunciator Panel failures
MAL-065	RAS fails to actuate

1994 CERTIFICATION TESTS

TRN-001	Reactor Trip
TRN-002	Loss of all Feedwater
TRN-003	Main Steam Valve Closure
TRN-004	Loss of all RCP's
TRN-005	Loss of one RCP
TRN-006	Turbine Trip from <15% power
TRN-007	Maximum Rate Power Ramp
TRN-008	Large Break LOCA with LOOP
TRN-009	MSLB inside Containment
TRN-010	Failed open Pressurizer. safety valve with no HPSI
SST-001	Steady State Test at 100% power
SST-002	Steady State Test at 30, 50 and 75% Power
SUR-010	Wide Range NI Functional
SUR-013	Full Length CEA Periodic Exercise
SUR-015	Hydrogen Recombiner Test
SUR-018	Boron Flow Test
MAL-014	Loss of 2B/2BB DC Bus
MAL-016	Slow Condenser Vacuum Leak
MAL-018	Loss of all CCW Pumps
MAL-019	Rupture of one ICW Header
MAL-020	Loss of Shutdown Cooling
MAL-023	Rupture of "B" CCW Header
MAL-025	Loss of Both Main feedwater pumps
MAL-027	Failed Power Supply to one RPS channel
MAL-033	Excessive Reactor Coolant Activity
MAL-036	Inadvertent dilution at power
MAL-037	Steam Bypass control system valve fails open
MAL-044	Small Feedwater Line Break Outside Containment
MAL-049	Containment Pressure transmitter failure
MAL-053	RCS Hot Leg RTD failure
MAL-057	Steam Generator Pressure Transmitter Failed Low
MAL-061	Alarm Window fails to Actuate
MAL-069	Hot Shutdown Control Panel Cooldown

SECTION 2

OPEN DISCREPANCY REPORTS ON CERTIFICATION TESTS

920156 NPE-001 As S/G's approached saturation temperature during plant heatup Narrow range level dropped from 65% to 50% almost instantly. Scheduled Completion Date is July 1, 1995.

940066 MAL-018 On a loss of all ICW pumps the generator monitor temperature alarm (D49) never cleared after 2C ICW pump was started on "A" header. Scheduled Completion Date is January 15, 1996.

940067 MAL-018 "A" ICW header pressure never came above 13# after 2C ICW pump was started on "A" header. Scheduled Completion Date is January 15, 1996.

940108 MAL-053 With TE-1112HA failed high the RCS upper head saturation margin did not show suspect data as it should. Scheduled Completion Date is January 15, 1996.

940109 MAL-049 With a containment pressure instrument failed high the ATI fault indicator did not show this. Scheduled Completion Date is January 15, 1996.

940122 ALL Main generator H_2 pressure is much to sensitive to temperature changes. Scheduled Completion Date is January 15, 1996.

940125 MAL-025 The SBCS did not respond correctly after the plant tripped from TLOF at 50% power. Scheduled Completion Date is January 15, 1996.

940127 MAL-025 After the plant tripped AFAS-1 did not actuate as a Rupture ID was picked up on feedwater header D/P. Scheduled Completion Date is January 15, 1996.

940137 MAL-014 2B steam flow increased to 4.2 E6 LBM/HR 50 seconds into the event, remained there for one minute, then became erratic and blew the S/G dry in approximately 250 seconds. Scheduled Completion Date is January 15, 1996.

940138 MAL-019 The CCW and TCW systems had virtually zero heatup from the loss of all ICW flow. Scheduled Completion Date is January 15, 1996.

940163 MAL-069 Could not get either BAM pump to start locally and borate the RCS to cold shutdown conditions. Scheduled Completion Date is January 15, 1996.

940203 TRN-008 Plenum level dropped to zero then increased to 2.8 feet 20 seconds later and "FROZE" at this value. Scheduled Completion Date is January 15, 1996.

SECTION 3

PLANT CHANGES/MODIFICATIONS (PC/M)

PC/M 91174-2 The replacement of the DEH Operator Panel B in RTGB 201 has not been installed. This panel will be purchased and installed by January 15, 1996.

SECTION 4

ADDITIONS, DELETIONS, AND REVISIONS

TO THE CERTIFICATION TEST PROGRAM

MAL-018 Loss of all ICW Pumps - Change to "Loss of One ICW Header" This will still meet the requirements of ANSI/ANS 3.5 Section 3.1.4 (6) Loss of Service water or cooling to individual components. There is no procedural guidance for a single loss of all ICW pumps but there is however a plant procedure that covers loss of a single ICW header. This will not only allow verification of simulator response to the malfunction (as the current procedure does) but will also test Simulator fidelity by combating the casualty utilizing guidance in the Off-Normal as would be performed in the reference plant.

MAL-022 Loss of all CCW Pumps - Change to "Loss of One CCW Header" This will still meet the requirements of ANSI/ANS 3.5 Section 3.1.4 (8) Loss of component cooling or cooling to individual components. There is no procedural guidance for a single loss of all CCW pumps but there is however a plant procedure that covers loss of a single CCW header. This will not only allow verification of simulator response to the malfunction (as the current procedure does) but will also test Simulator fidelity by combating the casualty utilizing guidance in the Off-Normal as would be performed in the reference plant.

MAL-070 Creation of new Certification test - "Loss of one Heater Drain Pump from 100% Power" Plant data available for comparison, IHE-92-067.

MAL-031 One dropped bank of Rods - Change to "One Slipped Rod" ANSI/ANS 3.5 has no requirement for a dropped bank of rods. This condition would either cause an automatic trip on Local Power density or require an immediate manual trip per plant procedures.

SECTION 5

NEXT FOUR YEAR TESTING SCHEDULE

1995 CERTIFICATION TESTS

TRN-001	Reactor Trip
TRN-002	Loss of all Feedwater
TRN-003	Main Steam Valve Closure
TRN-004	Loss of all RCP's
TRN-005	Loss of one RCP
TRN-006	Turbine Trip from <15% power
TRN-007	Maximum Rate Power Ramp
TRN-008	Large Break LOCA with LOOP
TRN-009	MSLB inside Containment
TRN-010	Failed open Pressurizer. safety valve with no HPSI
SST-001	Steady State Test at 100% power
SST-002	Steady State Test at 30, 50 and 75% Power
SUR-002	Isothermal Temperature Coefficient Determination
SUR-003	Rod Worth Measurement
SUR-004	ARO Critical Boron Determination
NPE-005	Plant Shutdown from Rated Power to Cold Shutdown
MAL-002	Rapid Gross Failure of Multiple Steam Generator Tubes
MAL-005	Small Break LOCA
MAL-006	Failed Open PORV with Loss of Offsite Power
MAL-008	Loss of Instrument Air Compressors
MAL-010	Loss of Offsite Power with Failure of Both Diesel Generators
MAL-017	Loss of Condenser Level Control
MAL-031	One Slipped CEA[1]
MAL-035	Trip Generator from 100% Power
MAL-045	Large Feedwater Line Break inside Containment
MAL-046	Wide Range NI Failure
MAL-050	T_{cold} input to RPS Failed High
MAL-054	RCS Flow Instrument Failure
MAL-058	Containment Radiation Monitor Failure
MAL-062	Alarm Window Incorrectly Actuates
MAL-068	Anticipated Transient Without Scram (ATWAS)

[1]See Section 6

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1996 CERTIFICATION TESTS

TRN-001	Reactor Trip
TRN-002	Loss of all Feedwater
TRN-003	Main Steam Valve Closure
TRN-004	Loss of all RCP's
TRN-005	Loss of one RCP
TRN-006	Turbine Trip from <15% power
TRN-007	Maximum Rate Power Ramp
TRN-008	Large Break LOCA with LOOP
TRN-009	MSLB inside Containment
TRN-010	Failed open Pressurizer. safety valve with no HPSI
SST-001	Steady State Test at 100% power
SST-002	Steady State Test at 30, 50 and 75% Power
SUR-005	Plant Heat Balance
SUR-008	Surveillance requirements for shutdown margin
SUR-009	RCS Inventory Balance
SUR-018	Boron Flow Test
NPE-001	Reactor Plant Heatup - Cold to Hot Standby
NPE-002	Reactor Startup
NPE-003	Turbine Startup and Generator Synchronization
MAL-003	LOCA outside containment in the letdown system
MAL-009	Loss of Offsite Power
MAL-012	Loss of the MA Instrument bus
MAL-013	Loss of a non-safety related vital A.C. bus
MAL-021	Loss of Shutdown Cooling from suction valve
MAL-026	Loss of all Feedwater from 100% Power
MAL-030	One Dropped CEA
MAL-032	Freeze Control Rod Drive System
MAL-038	Pressurizer pressure and level control failures
MAL-042	Main steam line break outside Containment
MAL-047	Linear Power Range Channel failed high
MAL-051	T_{cold} input to RRS failed high
MAL-055	Feedwater flow input to 3 element controller fails
MAL-059	RWT level Instrument failure
MAL-064	ESFAS failure with small break LOCA
MAL-066	MSIS fails to actuate
MAL-067	AFAS fails to actuate

1997 CERTIFICATION TESTS

TRN-001	Reactor Trip
TRN-002	Loss of all Feedwater
TRN-003	Main Steam Valve Closure
TRN-004	Loss of all RCP's
TRN-005	Loss of one RCP
TRN-006	Turbine Trip from <15% power
TRN-007	Maximum Rate Power Ramp
TRN-008	Large Break LOCA with LOOP
TRN-009	MSLB inside Containment
TRN-010	Failed open Pressurizer.safety valve with no HPSI
SST-001	Steady State Test at 100% power
SST-002	Steady State Test at 30, 50 and 75% Power
SUR-010	Wide Range NI Functional
SUR-012	RPS Logic Matrix Test
SUR-013	Full Length CEA Periodic Exercise
SUR-014	Turbine Valve Test
SUR-015	Hydrogen Recombiner Test
NPE-004	Reactor Trip and recovery to rated power
MAL-001	Complete Rupture if one Steam Generator U-Tube
MAL-004	Large Break LOCA with LOOP
MAL-007	Loss of Instrument Air - Air header rupture
MAL-011	Loss of a Safety related A.C. Bus
MAL-022	Loss of One CCW Header[2]
MAL-024	RCS to CCW leak in an RCP seal cooler
MAL-028	One Stuck Rod
MAL-029	One Uncoupled Rod during startup
MAL-034	Turbine trip from <15% power
MAL-039	Reactor Coolant Volume Control Failures
MAL-040	Reactor trip initiated by low S/G level
MAL-041	Double ended MSLB inside containment
MAL-043	Failed Open Main steam safety valve
MAL-048	S/G Level Instrument Failure
MAL-052	RCS Hot Leg RTD failure
MAL-056	Steam Flow Input to 3 element controller failure
MAL-060	Annunciator Panel failures
MAL-065	RAS fails to actuate

[2]See Section 6

1998 CERTIFICATION TESTS

TRN-001	Reactor Trip
TRN-002	Loss of all Feedwater
TRN-003	Main Steam Valve Closure
TRN-004	Loss of all RCP's
TRN-005	Loss of one RCP
TRN-006	Turbine Trip from <15% power
TRN-007	Maximum Rate Power Ramp
TRN-008	Large Break LOCA with LOOP
TRN-009	MSLB inside Containment
TRN-010	Failed open Pressurizer. safety valve with no HPSI
SST-001	Steady State Test at 100% power
SST-002	Steady State Test at 30, 50 and 75% Power
SUR-006	Moderator Coefficient Determination at Power
SUR-011	Diesel Generator monthly test
MAL-014	Loss of 2B/2BB DC Bus
MAL-015	Loss of all RCP's; Natural Circulation Cooldown
MAL-016	Slow Condenser Vacuum Leak
MAL-018	Loss of one ICW Header[3]
MAL-019	Rupture of One ICW Header
MAL-020	Loss of Shutdown Cooling
MAL-023	Rupture of "B" CCW Header
MAL-025	Loss of Both Main feedwater pumps
MAL-027	Failed Power Supply to one RPS channel
MAL-033	Excessive Reactor Coolant Activity
MAL-036	Inadvertent dilution at power
MAL-037	Steam Bypass control system valve fails open
MAL-044	Small Feedwater Line Break Outside Containment
MAL-049	Containment Pressure transmitter failure
MAL-053	RCS Hot Leg RTD failure
MAL-057	Steam Generator Pressure Transmitter Failed Low
MAL-061	Alarm Window fails to Actuate
MAL-069	Hot Shutdown Control Panel Cooldown
MAL-070	Loss of One Heater Drain Pump from 100% Power[4]

[3]See Section 6

[4]See Section 6

SECTION 6

ABSTRACTS OF NEW TEST PROCEDURES

MAL-018 LOSS OF ONE INTAKE COOLING WATER (ICW) HEADER

APPROACH

This test examines a loss of one ICW header due to a breaker failure on the "A" ICW pump. All of the alarms and indications will be verified. Data will be collected to demonstrate the correct response of the simulator to the loss of one ICW header. After the response is verified the "C" ICW pump will be started on the "A" ICW header to reestablish cooling water flow.

INITIAL CONDITIONS

100% Power, Steady State, Middle of Life, Equilibrium Xenon

FINAL CONDITIONS

100% Power, Steady State, Middle of Life, Equilibrium Xenon with the "C" ICW pump running on the "A" ICW header.

OPTIONS

The simulator is capable of several different malfunctions in the ICW system. The traveling screens can be failed or overloaded, the ICW pumps can have a sheared shaft or any degree of bearing wear, and the ICW pump breakers can be failed in either the open or closed position. There is also local start/stop capability of the pumps.

LIMITATIONS AND ASSUMPTIONS

This test only involves the loss of one ICW header and does not include any other possible malfunctions. No emergency procedures will be used, however, Off-Normal Procedure 2-0640030 is referenced.

TEST OBJECTIVES

Verify the proper response of the simulator to the loss of one ICW header. (ANSI 3.5, Section 3.1.2)

Ensure that the operator was required to take the same action on the simulator to mitigate the consequences of the loss of

one ICW header as would have been required on the reference plant using the plant procedures.(ANSI 3.5, Section 3)

Verify that the operators/instructors did not observe a difference between the response of the simulator control room instrumentation and the reference plant. (ANSI 3.5, Section 3.1)

Ensure that the malfunction showed plant operations of the reference plant which occurred continuously and in real time. (ANSI 3.5, Section 3.1.1 and 3.1.2.)

Verify that the critical parameters and the other parameters which were important to the successful completion of this evolution were displayed on the appropriate instrumentation, and provided proper alarm or protective system action or both. (ANSI 3.5, Section 3.1.1.)

Verify that the loss of one ICW header interaction with the other simulated systems provides total system integrated response. (ANSI 3.5, Section 3.3.1)

Verify that the simulator does not fail to cause an alarm or automatic action that would occur in the reference plant and, conversely, does not cause an alarm or automatic action that would not occur in the reference plant for this malfunction. (ANSI 3.5, section 4.2.1 (c)).

Verify that the operator was able to control the malfunction to a steady state condition provided that the simulator operating limits were not exceeded. (ANSI 3.5, Section 3).

MAL-022 LOSS OF ONE COMPONENT COOLING WATER (CCW) HEADER

APPROACH

This test examines the loss of one CCW header due to a breaker failure on the "A" CCW pump. All of the alarms and indications will be verified. Data will be collected to demonstrate the correct response of the simulator to the loss of one CCW header. After the response is verified the "C" CCW pump will be started on the "A" CCW header to reestablish cooling water flow.

INITIAL CONDITIONS

100% Power, Steady State, Middle of Life, Equilibrium Xenon

FINAL CONDITIONS

100% Power, Steady State, Middle of Life, Equilibrium Xenon with the "C" CCW pump running on the "A" CCW header.

OPTIONS

The simulator is capable of several different malfunctions in the CCW system. The CCW pumps can have a sheared shaft or any degree of bearing wear. The CCW pump breakers can be failed in either the open or closed position. There is also local start/stop capability of the pumps.

LIMITATIONS AND ASSUMPTIONS

This test only involves the loss of one CCW header and does not include any other possible malfunctions. No emergency procedures will be used, however, Off-Normal procedure 2-0310030 is referenced.

TEST OBJECTIVES

Verify the proper response of the simulator to the loss of one CCW header. (ANSI 3.5, Section 3.1.2)

Ensure that the operator was required to take the same action on the simulator to mitigate the consequences of the loss of one CCW header as would have been required on the reference plant using the plant procedures. (ANSI 3.5, Section 3)

Verify that the operators/instructors did not observe a difference between the response of the simulator control room

instrumentation and the reference plant. (ANSI 3.5, Section 3.1)

Ensure that the malfunction showed plant operations of the reference plant which occurred continuously and in real time. (ANSI 3.5, Section 3.1.1 and 3.1.2.)

Verify that the critical parameters and the other parameters which were important to the successful completion of this evolution were displayed on the appropriate instrumentation, and provided proper alarm or protective system action or both. (ANSI 3.5, Section 3.1.1.)

Verify that the loss of one CCW header interaction with the other simulated systems provides total system integrated response. (ANSI 3.5, Section 3.3.1)

Verify that the simulator does not fail to cause an alarm or automatic action that would occur in the reference plant and, conversely, does not cause an alarm or automatic action that would not occur in the reference plant for this malfunction. (ANSI 3.5, section 4.2.1 (c)).

Verify that the operator was able to control the malfunction to a steady state condition provided that the simulator operating limits were not exceeded. (ANSI 3.5, Section 3).

MAL-070 LOSS OF ONE HEATER DRAIN PUMP FROM 100% POWER

APPROACH

This test examines a loss of one heater drain pump from 100% power due to a breaker failure on the "B" heater drain pump. All of the alarms and indications will be verified. Data will be collected to demonstrate the correct response of the simulator to the loss of one heater drain pump. After the response is verified the malfunction is corrected and the heater drain pump is restarted.

INITIAL CONDITIONS

100% Power, Steady State, Middle of Life, Equilibrium Xenon

FINAL CONDITIONS

100% Power, Steady State, Middle of Life, Equilibrium Xenon

OPTIONS

The simulator is capable of several different malfunctions in the heater vent and drain system. Heater normal and alternate drains can be failed open or closed. The heater drain pumps can have a sheared shaft or any degree of bearing wear, and the heater drain pump breakers can be failed in either the open or closed position. There is also local start/stop capability of the pumps.

LIMITATIONS AND ASSUMPTIONS

This test only involves the loss of one heater drain pump from 100% power and does not include any other possible malfunctions. No emergency procedures will be used, however, Off-Normal Procedure 2-0700030 is referenced.

TEST OBJECTIVES

Verify the proper response of the simulator to the loss of one heater drain pump from 100% power.

Ensure that the operator was required to take the same action on the simulator to mitigate the consequences of the loss of one heater drain pump as would have been required on the reference plant using the plant procedures.

Verify that the operators/instructors did not observe a difference between the response of the simulator control room

instrumentation and the reference plant. (ANSI 3.5, Section 3.1)

Ensure that the malfunction showed plant operations of the reference plant which occurred continuously and in real time. (ANSI 3.5, Section 3.1.1 and 3.1.2.)

Verify that the critical parameters and the other parameters which were important to the successful completion of this evolution were displayed on the appropriate instrumentation, and provided proper alarm or protective system action or both. (ANSI 3.5, Section 3.1.1.)

Verify that the loss of one heater drain pump interaction with the other simulated systems provides total system integrated response.

Verify that the simulator does not fail to cause an alarm or automatic action that would occur in the reference plant and, conversely, does not cause an alarm or automatic action that would not occur in the reference plant for this malfunction. (ANSI 3.5, section 4.2.1 (c)).

Verify that the operator was able to control the malfunction to a steady state condition provided that the simulator operating limits were not exceeded. (ANSI 3.5, Section 3).

MAL-031 ONE SLIPPED CONTROL ELEMENT ASSEMBLY (CEA)

APPROACH

This test examines a slipped CEA at 100% power. All of the alarms and indications will be verified. Data will be collected to demonstrate the correct response of the simulator to the slipped CEA. After the response is verified the CEA is withdrawn to it's proper position.

INITIAL CONDITION

100% Power, Steady State, Middle of Life, Equilibrium Xenon

FINAL CONDITIONS

100% Power, Steady State, Middle of Life, Equilibrium Xenon

OPTIONS

The simulator is capable of several different malfunctions in the Control rod drive system. Any number of CEA's can be partially or fully inserted, the drive system can be frozen or move without operator control, and the rod block circuitry can be failed.

LIMITATIONS AND ASSUMPTIONS

This test only involves the slippage of one CEA from 100% power and does not include any other possible malfunctions. No emergency procedures will be used, however, Off-Normal Procedure 2-0110030 is referenced.

TEST OBJECTIVES

Verify the proper response of the simulator to the slippage of one CEA.

Ensure that the operator was required to take the same action on the simulator to mitigate the consequences of the slipped CEA as would have been required on the reference plant using the plant procedures.

Verify that the operators/instructors did not observe a difference between the response of the simulator control room instrumentation and the reference plant. (ANSI 3.5, Section 3.1)

Ensure that the malfunction showed plant operations of the reference plant which occurred continuously and in real time. (ANSI 3.5, Section 3.1.1 and 3.1.2.)

Verify that the critical parameters and the other parameters which were important to the successful completion of this evolution were displayed on the appropriate instrumentation, and provided proper alarm or protective system action or both. (ANSI 3.5, Section 3.1.1.)

Verify that the slippage of one CEA interaction with the other simulated systems provides total system integrated response.

Verify that the simulator does not fail to cause an alarm or automatic action that would occur in the reference plant and, conversely, does not cause an alarm or automatic action that would not occur in the reference plant for this malfunction. (ANSI 3.5, section 4.2.1 (c)).

Verify that the operator was able to control the malfunction to a steady state condition provided that the simulator operating limits were not exceeded. (ANSI 3.5, Section 3).