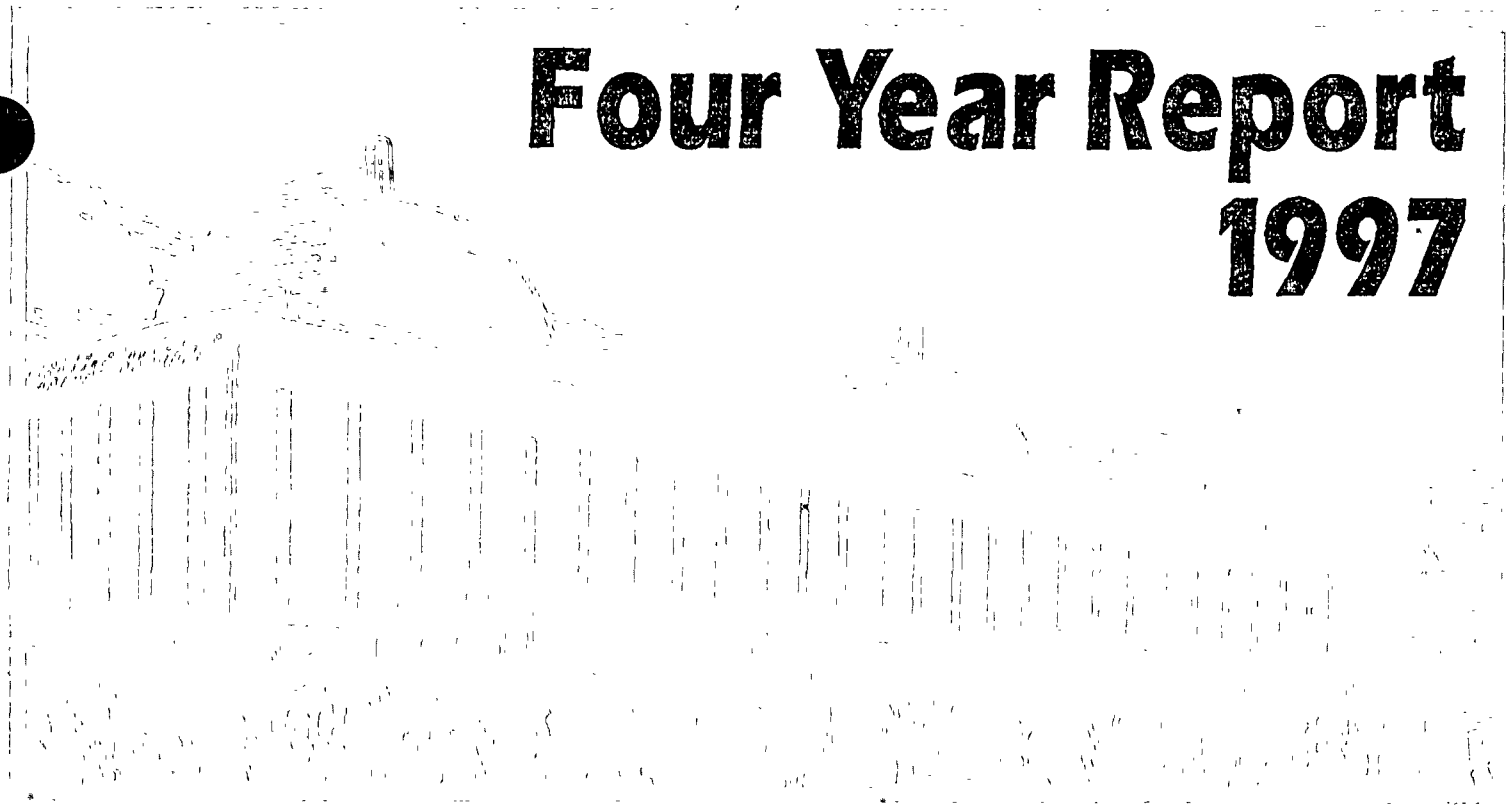
PG&E

Diablo Canyon Power Plant

SIMULATOR CERTIFICATION

Four Year Report 1997



Volume 1 of 1

ATTACHMENT

BINDER/VOLUME #:

ATTACHMENT

DIABLO CANYON SIMULATOR
FOUR YEAR CERTIFICATION REPORT

December 1, 1997

I. Introduction

The Diablo Canyon Simulator Four Year Certification Report briefly provides a description of the simulator, description and dates completed of the previous four year testing program, a schedule for the subsequent four years of testing, and a current status of simulator modifications since the 1993 Certification Report. Additional information is available upon request. The actual anniversary date of certification is December 14.

II. Simulator Information

Simulator Type:	Reference Plant Simulator
Manufacturer:	Westinghouse Elec. Corp.
Owner/Operator:	Pacific Gas & Elec. Corp.
Reference Plant:	Diablo Canyon Unit 1
Plant Location:	7 miles NW of Avila Beach, CA
Plant Type:	Westinghouse 4-Loop PWR
Plant Rating:	1130 MWE
Available for Training:	September 1984
Type of Report:	4 Year Certification Report

III. Major Simulator Changes Since the 1993 Certification Report

Simulator facility environment changes:

- Safety Parameter Display System was replaced in the plant and in the simulator. The previous simulator SPDS was an emulation of the plant system. The new simulator SPDS is a stimulated version of the plant system.

- Sound Generator was replaced by a programmable multi-voice digital system.

- Visual Annunciator System was replaced by a digitally controlled system. The simulator emulates this new system.

- Plant Process Computer Recorders were added to enhance operations trending capabilities.

Significant Simulator Modeling Changes:

- I/O Controller and Host Computer were replaced to enhance real-time capabilities.

- Instructor System and System Executive were developed to emulate and extend the original vendor, Westinghouse, software for the new I/O controller and host computer.

- Basic System Cycle Rate was increased from 4 Hertz to 8 Hertz, thus, increasing the simulation fidelity.

- Hand-held Remote Instructor Command Station was developed which interfaces with the SUN instructor interface and enables more direct contact of instructor and student.

- Building Ventilation Control Logic was fully modeled using plant schematics. The prior system, working within the restraints of the previous simulator host computer, was a event driven state display model.

- Pump Dynamic Motor Current Models were added to all major pumps and fans.

- Instructor System Component Failures were extended to valves, breakers, relays, and pumps.

- Instructor System Electrical Disconnects were created to extend the power distribution network.

- Reheater Controller was upgraded to better match the electrical schematics.

- Diesel Generator 13 was dedicated to Unit 1, per plant change, rather than being shared between Units.

- Digital Radiation Monitor channels 44A and 44B were modeled.

- Vital 120 VAC Inverters were replaced in the plant and re-modeled in the simulator.

- RCS RTD Manifolds were replaced in the plant and re-modeled in the simulator.

- Reactor Protection Systems were replaced in the plant and re-modeled in the simulator. The previous analog systems were replaced by a Westinghouse Eagle 21 digital RPS.

- 4 kV Breakers were replaced in the plant and re-modeled in the simulator. The associated under-voltage, over-current, and anti-pumping systems were also re-modeled.

- 230 kV to 12 kV Startup Transformer and Under Load Tap Changer was replaced in the plant and re-modeled in the simulator. Control and indication was added to Vertical Board 5.

IV. Certification Testing

Attachment 1, indicates the performance tests completed to certify the Simulator. These are broken down into the Annual Transient Performance Tests and the 25% per year tests. Completion dates and specific test descriptions are included. Specific data is available upon request.

Attachment 2, contains the Simulator testing plan schedules for the next four years covering January 1998 - December 2001.

V. Database Changes

Attachment 3, contains the plant Design Change Notices (DCN's) that have been completed since the 1993 Simulator Certification Report.

Attachment 4, contains the Simulator change Requests (SCR's) that have been completed since the 1993 Simulator Certification Report.

VI. Instructor System

Attachment 5, contains a copy of the Instructor's Manual since the Simulator instructor system has had numerous changes since the 1993 Simulator Certification Report.

VII. References

Title 10, Code of Federal Regulations, Part 55, "Operators' Licenses."

ANSI/ANS-3.5-1985 American Nuclear Society "Nuclear Power Plant Simulators for Use in Operator Training."

U.S. Nuclear Regulatory Commission Regulatory Guide 1.149, April 1987 "Nuclear Power Plant Simulation Facilities for use in Operator License Examinations."

FOUR YEAR TESTING SCHEDULE FOR THE DCPP SIMULATOR

REV 3 01DEC93

FIRST YEAR (1994)

TEST NO	COMPLETION DATE	DESCRIPTION
3.1.1(1)	10/5/94	Plant startup - Cold Shutdown to Hot Standby.
3.1.1(2)	10/9/94	Nuclear startup - Hot Standby to Rated Power.
3.1.1(3)	10/9/94	Turbine startup and Generator synchronization.
3.1.2(1)(a)	3/16/94	Loss of coolant: significant PWR steam generator leaks.
3.1.2(2)	8/5/94	Loss of instrument air.
3.1.2(6)	8/5/94	Loss of service water or cooling to individual components.
3.1.2(10)	8/9/94	Loss of all feedwater (normal and emergency cooling).
3.1.2(14)	8/9/94	Fuel cladding failure resulting in high activity reactor coolant or off gas and the associated high radiation alarms.
3.1.2(18)(a)	8/9/94	Failure of reactor coolant pressure and volume control systems (PWR).
3.1.2(18)(b)	8/9/94	
3.1.2(22)	5/16/94	Process instrumentation, alarms, and control system failures.

ANNUAL TRANSIENT PERFORMANCE

TEST NO	COMPLETION DATE	DESCRIPTION
A.3.1	10/18/94	Computer Real Time Test.
B.2.1 (1)	3/7/94	Simulator Stability at 100% power.
B.2.1 (2)	4/5/94	Simulator Stability at 75% power.
B.2.1 (3)	4/5/94	Simulator Stability at 50% power.
B.2.2 (1)	11/1/94	Manual reactor trip.
B.2.2 (2)	3/8/94	Simultaneous trip of all feedwater pumps.
B.2.2 (3)	4/5/94	Simultaneous closure of all Main Steam Isolation Valves.
B.2.2 (4)	3/8/94	Simultaneous trip of all reactor coolant pumps
B.2.2 (5)	7/19/94	Trip of any single reactor coolant pump.
B.2.2 (6)	11/3/94	Main turbine trip (maximum power level which does not result in immediate reactor trip).
B.2.2 (7)	7/20/94	Maximum rate power ramp (100%, down to approximately 75%, and back up to 100%).
B.2.2 (8)	7/20/94	Maximum size reactor coolant system rupture combined with loss of all offsite power.
B.2.2 (9)	11/1/94	Maximum size unisolable main steam line rupture
B.2.2 (10)	7/20/94	Slow primary system depressurization to satu rated conditions using pressurizer relief or safety valve stuck open. (Inhibit activation of high pressure Emergency Core Cooling Systems.)

SECOND YEAR (1995)

TEST NO	COMPLETION DATE	DESCRIPTION
3.1.1(4)	8/10/95	Reactor Trip followed by recovery to Rated Power.
3.1.1(5)	9/11/95	Operations at Hot Standby. (Trip and restart of a Reactor Coolant Pump.)
3.1.1(6)	9/11/95	Load changes.
3.1.2(1)(b)-1	9/11/95	Loss of coolant: inside primary containment
3.1.2(1)(b)-2	8/10/95	and outside primary containment.
3.1.2(3)(a)-1	11/8/95	Loss or degraded electrical power to the
3.1.2(3)(a)-2	9/11/95	station:
3.1.2(3)(b)	9/11/95	a. loss of offsite power
3.1.2(3)(c)	9/11/95	b. loss of emergency power
3.1.2(3)(d)-1	9/11/95	c. loss of emergency generators
3.1.2(3)(d)-2	9/11/95	d. loss of power to the plant's electrical
3.1.2(3)(d)-3	9/11/95	distribution buses
3.1.2(3)(e)-1	11/15/95	e. loss of power to the individual instrument
3.1.2(3)(e)-2	11/17/95	buses (AC as well as DC).
3.1.2(7)	9/25/95	Loss of shutdown cooling.
3.1.2(11)	9/12/95	Loss of protective system channel.
3.1.2(15)	11/8/95	Turbine trip.
3.1.2(19)	11/8/95	Reactor trip.
3.1.2(23)(a)	9/11/95	Passive malfunctions in systems, such as:
3.1.2(23)(b)	9/11/95	a. engineered safety features b. emergency feedwater systems.

ANNUAL TRANSIENT PERFORMANCE

TEST NO	COMPLETION DATE	DESCRIPTION
A.3.1	8/9/95	Computer Real Time Test.
B.2.1 (1)	8/28/95	Simulator Stability at 100% power.
B.2.1 (2)	9/11/95	Simulator Stability at 75% power.
B.2.1 (3)	7/31/95	Simulator Stability at 50% power.
B.2.2 (1)	11/2/95	Manual reactor trip.
B.2.2 (2)	9/12/95	Simultaneous trip of all feedwater pumps.
B.2.2 (3)	9/12/95	Simultaneous closure of all Main Steam Isolation Valves.
B.2.2 (4)	9/12/95	Simultaneous trip of all reactor coolant pumps
B.2.2 (5)	9/13/95	Trip of any single reactor coolant pump.
B.2.2 (6)	9/13/95	Main turbine trip (maximum power level which does not result in immediate reactor trip).
B.2.2 (7)	11/6/95	Maximum rate power ramp (100%, down to approximately 75%, and back up to 100%).
B.2.2 (8)	9/13/95	Maximum size reactor coolant system rupture combined with loss of all offsite power.
B.2.2 (9)	9/13/95	Maximum size unisolable main steam line rupture
B.2.2 (10)	11/2/95	Slow primary system depressurization to satu rated conditions using pressurizer relief or safety valve stuck open. (Inhibit activation of high pressure Emergency Core Cooling Systems.)

THIRD YEAR (1996)

TEST NO	COMPLETION DATE	DESCRIPTION
3.1.1(7)	11/6/96	Startup, shutdown and power operations with less than full reactor coolant flow.
3.1.1(8)	11/12/96	Plant shutdown from Rated Power to Hot Standby and cooldown to Cold Shutdown conditions.
3.1.2(1)(c)-1	11/6/96	Loss of coolant: large and small reactor coolant breaks including demonstration of saturation condition.
3.1.2(1)(c)-2	6/27/96	
3.1.2(4)	11/6/96	Loss of forced core coolant flow due to single or multiple pump failure.
3.1.2(8)	11/6/96	Loss of component cooling system or cooling to individual components.
3.1.2(12)(a)	11/7/96	Control rod failure including: a. stuck rods, misaligned rods b. rod drops, uncoupled rods c. drifting rods.
3.1.2(12)(b)	7/2/96	
3.1.2(12)(c)	7/2/96	
3.1.2 (16)	11/12/96	Generator trip.
3.1.2(20)(a)	7/1/96	Main steam line as well as main feed line break (both inside and outside containment).
3.1.2(20)(b)	11/7/96	
3.1.2(20)(c)	11/12/96	
3.1.2(20)(d)	11/12/96	
3.1.2(24)	11/12/96	Failure of the automatic reactor trip system.

ANNUAL TRANSIENT PERFORMANCE

TEST NO	COMPLETION DATE	DESCRIPTION
A.3.1	9/16/96	Computer Real Time Test.
B.2.1 (1)	1/15/96	Simulator Stability at 100% power.
B.2.1 (2)	2/20/96	Simulator Stability at 75% power.
B.2.1 (3)	3/4/96	Simulator Stability at 50% power.
B.2.2 (1)	10/1/96	Manual reactor trip.
B.2.2 (2)	10/2/96	Simultaneous trip of all feedwater pumps.
B.2.2 (3)	10/15/96	Simultaneous closure of all Main Steam Isolation Valves.
B.2.2 (4)	10/15/96	Simultaneous trip of all reactor coolant pumps
B.2.2 (5)	11/21/96	Trip of any single reactor coolant pump.
B.2.2 (6)	9/27/96	Main turbine trip (maximum power level which does not result in immediate reactor trip).
B.2.2 (7)	10/16/96	Maximum rate power ramp (100%, down to approximately 75%, and back up to 100%).
B.2.2 (8)	11/5/96	Maximum size reactor coolant system rupture combined with loss of all offsite power.
B.2.2 (9)	11/6/96	Maximum size unisolable main steam line rupture
B.2.2 (10)	10/1/96	Slow primary system depressurization to satu rated conditions using pressurizer relief or safety valve stuck open. (Inhibit activation of high pressure Emergency Core Cooling Systems.)

FOURTH YEAR (1997)

TEST NO	COMPLETION DATE	DESCRIPTION
3.1.1(9)(a)	9/4/97	Core performance testing such as:
3.1.1(9)(b)	9/11/97	a. plant Heat Balance
3.1.1(9)(c)	9/8/97	b. determination of Shutdown Margin
3.1.1(9)(d)	9/2/97	c. measurement of Reactivity Coefficients
		d. measurement of Control Rod worth.
3.1.1(10)(a)	9/8/97	Operator conducted surveillance testing on
3.1.1(10)(b)	9/8/97	safety related equipment or systems such as:
3.1.1(10)(c)	9/8/97	a. on Diesel Generator 1-1
3.1.1(10)(d)	9/8/97	b. on Safety Injection Pump 1-1
		c. on Intermediate Range NR-35
		d. on Turbine Driven Aux Feedwater Pump 1-1.
3.1.2(1)(d)-1	9/10/97	Loss of coolant: failure of safety and
3.1.2(1)(d)-2	9/10/97	relief valves.
3.1.2(5)(a)	11/6/97	Loss of condenser vacuum including loss of
3.1.2(5)(b)	2/21/97	condenser level control.
3.1.2(9)	11/6/97	Loss of normal feedwater or normal feedwater system failure.
3.1.2(13)	11/25/97	Inability to drive control rods.
3.1.2(17)(a)	11/26/97	Failure in automatic control system(s) that
3.1.2(17)(b)	11/26/97	affect reactivity and core heat removal.
3.1.2(21)	11/26/97	Nuclear instrumentation failures.

ANNUAL TRANSIENT PERFORMANCE

TEST NO	COMPLETION DATE	DESCRIPTION
A.3.1	10/6/97	Computer Real Time Test.
B.2.1 (1)	2/17/97 11/6/97	Simulator Stability at 100% power.
B.2.1 (2)	~~9/30/97~~	Simulator Stability at 75% power.
B.2.1 (3)	9/2/97	Simulator Stability at 50% power.
B.2.2 (1)	9/30/97	Manual reactor trip.
B.2.2 (2)	2/10/97	Simultaneous trip of all feedwater pumps.
B.2.2 (3)	9/30/97	Simultaneous closure of all Main Steam Isolation Valves.
B.2.2 (4)	9/30/97	Simultaneous trip of all reactor coolant pumps
B.2.2 (5)	9/30/97	Trip of any single reactor coolant pump.
B.2.2 (6)	9/30/97	Main turbine trip (maximum power level which does not result in immediate reactor trip).
B.2.2 (7)	10/2/97	Maximum rate power ramp (100%, down to approximately 75%, and back up to 100%).
B.2.2 (8)	10/2/97	Maximum size reactor coolant system rupture combined with loss of all offsite power.
B.2.2 (9)	11/24/97	Maximum size unisolable main steam line rupture
B.2.2 (10)	11/24/97	Slow primary system depressurization to satu rated conditions using pressurizer relief or safety valve stuck open. (Inhibit activation of high pressure Emergency Core Cooling Systems.)

FOUR YEAR TESTING SCHEDULE FOR THE DCPP SIMULATOR

REV 4 01DEC97

FIRST YEAR (1998)

TEST NO	COMPLETION DATE	DESCRIPTION
3.1.1(1)	_____	Plant startup - Cold Shutdown to Hot Standby.
3.1.1(2)	_____	Nuclear startup - Hot Standby to Rated Power.
3.1.1(3)	_____	Turbine startup and Generator synchronization.
3.1.2(1)(a)	_____	Loss of coolant: significant PWR steam generator leaks.
3.1.2(2)	_____	Loss of instrument air.
3.1.2(6)	_____	Loss of service water or cooling to individual components.
3.1.2(10)	_____	Loss of all feedwater (normal and emergency cooling).
3.1.2(14)	_____	Fuel cladding failure resulting in high activity reactor coolant or off gas and the associated high radiation alarms.
3.1.2(18)(a) 3.1.2(18)(b)	_____ _____	Failure of reactor coolant pressure and volume control systems (PWR).
3.1.2(22)	_____	Process instrumentation, alarms, and control system failures.

ANNUAL TRANSIENT PERFORMANCE (1998)

TEST NO	COMPLETION DATE	DESCRIPTION
A.3.1	_____	Computer Real Time Test.
B.2.1 (1)	_____	Simulator Stability at 100% power.
B.2.1 (2)	_____	Simulator Stability at 75% power.
B.2.1 (3)	_____	Simulator Stability at 50% power.
B.2.2 (1)	_____	Manual reactor trip.
B.2.2 (2)	_____	Simultaneous trip of all feedwater pps.
B.2.2 (3)	_____	Simultaneous closure of all Main Steam Isolation Valves.
B.2.2 (4)	_____	Simultaneous trip of all reactor coolant pumps
B.2.2 (5)	_____	Trip of any single reactor coolant pp.
B.2.2 (6)	_____	Main turbine trip (maximum power level which does not result in immediate reactor trip).
B.2.2 (7)	_____	Maximum rate power ramp (100%, down to approx. 75%, and back up to 100%).
B.2.2 (8)	_____	Maximum size reactor coolant system rupture combined with loss of all offsite power.
B.2.2 (9)	_____	Maximum size unisolable main steam line rupture
B.2.2 (10)	_____	Slow primary system depressurization to saturated conditions using pressurizer relief or safety valve stuck open. (Inhibit activation of high pressure Emergency Core Cooling Systems.)

SECOND YEAR (1999)

TEST NO	COMPLETION DATE	DESCRIPTION
3.1.1(4)	_____	Reactor Trip followed by recovery to Rated Power.
3.1.1(5)	_____	Operations at Hot Standby. (Trip and restart of a Reactor Coolant Pump.)
3.1.1(6)	_____	Load changes.
		Loss of coolant:
3.1.2(1)(b)-1	_____	inside primary containment
3.1.2(1)(b)-2	_____	and outside primary containment.
3.1.2(3)(a)-1	_____	Loss or degraded electrical power
3.1.2(3)(a)-2	_____	to the station:
3.1.2(3)(b)	_____	a. loss of offsite power
3.1.2(3)(c)	_____	b. loss of emergency power
3.1.2(3)(d)-1	_____	c. loss of emergency generators
3.1.2(3)(d)-2	_____	d. loss of power to the plant's
3.1.2(3)(d)-3	_____	electrical distribution buses
3.1.2(3)(e)-1	_____	e. loss of power to the individual
3.1.2(3)(e)-2	_____	instrument buses (AC as well as DC).
3.1.2(7)	_____	Loss of shutdown cooling.
3.1.2(11)	_____	Loss of protective system channel.
3.1.2(15)	_____	Turbine trip.
3.1.2(19)	_____	Reactor trip.
		Passive malfunctions in systems, such as:
3.1.2(23)(a)	_____	a. engineered safety features
3.1.2(23)(b)	_____	b. emergency feedwater systems.

ANNUAL TRANSIENT PERFORMANCE (1999)

TEST NO	COMPLETION DATE	DESCRIPTION
A.3.1	_____	Computer Real Time Test.
B.2.1 (1)	_____	Simulator Stability at 100% power.
B.2.1 (2)	_____	Simulator Stability at 75% power.
B.2.1 (3)	_____	Simulator Stability at 50% power.
B.2.2 (1)	_____	Manual reactor trip.
B.2.2 (2)	_____	Simultaneous trip of all feedwater pps.
B.2.2 (3)	_____	Simultaneous closure of all Main Steam Isolation Valves.
B.2.2 (4)	_____	Simultaneous trip of all reactor coolant pumps
B.2.2 (5)	_____	Trip of any single reactor coolant pp.
B.2.2 (6)	_____	Main turbine trip (maximum power level which does not result in immediate reactor trip).
B.2.2 (7)	_____	Maximum rate power ramp (100%, down to approx. 75%, and back up to 100%).
B.2.2 (8)	_____	Maximum size reactor coolant system rupture combined with loss of all offsite power.
B.2.2 (9)	_____	Maximum size unisolable main steam line rupture
B.2.2 (10)	_____	Slow primary system depressurization to saturated conditions using pressurizer relief or safety valve stuck open. (Inhibit activation of high pressure Emergency Core Cooling Systems.)

THIRD YEAR (2000)

TEST NO	COMPLETION DATE	DESCRIPTION
3.1.1(7)	_____	Startup, shutdown and power operations with less than full reactor coolant flow.
3.1.1(8)	_____	Plant shutdown from Rated Power to Hot Standby and cooldown to Cold Shutdown conditions.
3.1.2(1)(c)-1	_____	Loss of coolant: large and small reactor coolant breaks including demonstration of saturation condition.
3.1.2(1)(c)-2	_____	
3.1.2(4)	_____	Loss of forced core coolant flow due to single or multiple pump failure.
3.1.2(8)	_____	Loss of component cooling system or cooling to individual components.
		Control rod failure including:
3.1.2(12)(a)	_____	a. stuck rods, misaligned rods
3.1.2(12)(b)	_____	b. rod drops, uncoupled rods
3.1.2(12)(c)	_____	c. drifting rods.
3.1.2 (16)	_____	Generator trip.
3.1.2(20)(a)	_____	Main steam line as well as main feed line break (both inside and outside containment).
3.1.2(20)(b)	_____	
3.1.2(20)(c)	_____	
3.1.2(20)(d)	_____	
3.1.2(24)	_____	Failure of the automatic reactor trip system.

ANNUAL TRANSIENT PERFORMANCE (2000)

TEST NO	COMPLETION DATE	DESCRIPTION
A.3.1	_____	Computer Real Time Test.
B.2.1 (1)	_____	Simulator Stability at 100% power.
B.2.1 (2)	_____	Simulator Stability at 75% power.
B.2.1 (3)	_____	Simulator Stability at 50% power.
B.2.2 (1)	_____	Manual reactor trip.
B.2.2 (2)	_____	Simultaneous trip of all feedwater pps.
B.2.2 (3)	_____	Simultaneous closure of all Main Steam Isolation Valves.
B.2.2 (4)	_____	Simultaneous trip of all reactor coolant pumps
B.2.2 (5)	_____	Trip of any single reactor coolant pp.
B.2.2 (6)	_____	Main turbine trip (maximum power level which does not result in immediate reactor trip).
B.2.2 (7)	_____	Maximum rate power ramp (100%, down to approx. 75%, and back up to 100%).
B.2.2 (8)	_____	Maximum size reactor coolant system rupture combined with loss of all offsite power.
B.2.2 (9)	_____	Maximum size unisolable main steam line rupture
B.2.2 (10)	_____	Slow primary system depressurization to saturated conditions using pressurizer relief or safety valve stuck open. (Inhibit activation of high pressure Emergency Core Cooling Systems.)

FOURTH YEAR (2001)

TEST NO	COMPLETION DATE	DESCRIPTION
		Core performance testing such as:
3.1.1(9)(a)	_____	a. plant Heat Balance
3.1.1(9)(b)	_____	b. determination of Shutdown Margin
3.1.1(9)(c)	_____	c. measurement of Reactivity Coefficients
3.1.1(9)(d)	_____	d. measurement of Control Rod worth.
		Operator conducted surveillance testing on safety related equipment or systems such as:
3.1.1(10)(a)	_____	a. on Diesel Generator 1-1
3.1.1(10)(b)	_____	b. on Safety Injection Pump 1-1
3.1.1(10)(c)	_____	c. on Intermediate Range NR-35
3.1.1(10)(d)	_____	d. on Turbine Driven Aux FW Pump 1-1.
3.1.2(1)(d)-1	_____	Loss of coolant: failure of safety and relief valves.
3.1.2(1)(d)-2	_____	
3.1.2(5)(a)	_____	Loss of condenser vacuum including loss of condenser level control.
3.1.2(5)(b)	_____	
3.1.2(9)	_____	Loss of normal feedwater or normal feedwater system failure.
3.1.2(13)	_____	Inability to drive control rods.
3.1.2(17)(a)	_____	Failure in automatic control system(s) that affect reactivity and core heat removal.
3.1.2(17)(b)	_____	
3.1.2(21)	_____	Nuclear instrumentation failures.

ANNUAL TRANSIENT PERFORMANCE (2001)

TEST NO	COMPLETION DATE	DESCRIPTION
A.3.1	_____	Computer Real Time Test.
B.2.1 (1)	_____	Simulator Stability at 100% power.
B.2.1 (2)	_____	Simulator Stability at 75% power.
B.2.1 (3)	_____	Simulator Stability at 50% power.
B.2.2 (1)	_____	Manual reactor trip.
B.2.2 (2)	_____	Simultaneous trip of all feedwater pps.
B.2.2 (3)	_____	Simultaneous closure of all Main Steam Isolation Valves.
B.2.2 (4)	_____	Simultaneous trip of all reactor coolant pumps
B.2.2 (5)	_____	Trip of any single reactor coolant pp.
B.2.2 (6)	_____	Main turbine trip (maximum power level which does not result in immediate reactor trip).
B.2.2 (7)	_____	Maximum rate power ramp (100%, down to approx. 75%, and back up to 100%).
B.2.2 (8)	_____	Maximum size reactor coolant system rupture combined with loss of all offsite power.
B.2.2 (9)	_____	Maximum size unisolable main steam line rupture
B.2.2 (10)	_____	Slow primary system depressurization to saturated conditions using pressurizer relief or safety valve stuck open. (Inhibit activation of high pressure Emergency Core Cooling Systems.)

DECEMBER 1, 1997
DIABLO CANYON POWER PLANT DESIGN CHANGES (DCN's) INCORPORATED
SINCE THE FOUR YEAR CERTIFICATION REPORT OF DECEMBER 1993

1. DC-47074 SIM VIBRATION AND LOOSE PARTS MONITOR
2. DC-45523 REPLACE VIB AND LOOSE PARTS SYSTEM
3. DC-45581 REMOVE D/G 1-3 LEADS FROM UNIT 2
4. DC-45480 IMPLEMENT RE-44A AND B
5. DC-45765 IMPLEMENT CHANGES TO RECORDER TR-83
6. DC-47556 REMOVE RE-27 FROM SERVICE
7. DC-45132 D/G PWR SUPPLY XFER SWITCHES AND ALARM
8. DC-47031/45480/45416 RM-44A AND 44B IMPLEMENTATION
9. DC-47685 CHANGE TUR-MW TRANSDUCER FAILURE SETPOINT
10. DC-44487 RMS DIGITAL SYSTEM
11. DC-47630 EARS REPLACEMENT
12. DC-47686 RE-15 MODS AND PPC INPUT
13. DC-39600 SPDS MONITORS SHOULD COME FROM UNINTERRUPTIBLE POWER
14. DC-47004 CHANGE LR-60 AND LR-61 TO BUBBLER SYSTEM
15. DC-47771 SEISMIC TRIP FROM .325 TO .3
16. DC-47819 POWER SUPPLY ALARMS FOR POV 1 AND 2
17. DC-47689 NI-52 RECORDER IN PAMS PNL A0306858
18. DC-47690 POWER SUPPLY TO WR S/G RECORDER LOOPS 3 AND 4
19. DC-45031 AR-A0143682 C/R ALARM FOR D/G BREAKERS
20. DC-47282 ELECT MODS ON 120V VITAL INST AC
21. DC-47195/47929 VALVE STROKE / SWITCH REMOVAL
22. DC-45140/46140 RONAN REPLACEMENT
23. DC-47821 ADD AIR COMP 0-7 AND CHANGE PK WINDOWS
24. DC-47513 VARIOUS MOV STROKE TIMES
25. DC-47812 MOVE PAMS LABELS ON INSTRUMENTS
26. DC-47811 MORE PAMS LABELS ON INSTRUMENTS
27. DC-47933 MOV LOGIC / TORQUE CHANGES
28. DC-47011/48011 ABANDON CHLORINE MONITORS
29. DC-47660 D/G OVERSPEED TRIP SETPOINT CHANGE
30. DC-47865 TURBO ASSIST LOW PRESSURE ALARM
31. DC-47779 TURBINE STOP VALVE AND TRIP LOGIC !!! CANCELED!!!
32. DC-47855/47928 SSPS SI RESET TIMER AND SWITCH
33. DC-47282 IMPLEMENT INVERTER REPLACEMENT
34. DC-47303 PDP FLOW CHANGES
35. DC-47963 SETPOINT CHANGES TO ASW !!!CANCELED!!!
36. DC-47956 ADD AUTO STOP LATCH AND 2 OUT OF 3 LOGIC
37. DC-43425 RTD MANIFOLD REMOVAL
38. DC-47947 MFP SETPOINT CHANGES
39. DC-47978 REPLACE SI RESET SWITCHES
40. DC-47909 MAIN ANNUNCIATOR MULTIPLIER
41. DC-49018 CFCU LOW SPEED RELAY
42. DC-47228 CHG/LTDN VLVS TO DIFFERENT SSPS RELAYS
43. DC 47739/47689 A03066858 ADD WIDE RANGE FLUX PAM 1
44. DC-49074 1R6 CORE LOAD, DON'T RELOAD THIS CYCLE
45. DC-41540 IMPLEMENT EAGLE 21 REACTOR PROTECTION SYS
46. DC 41540 VERIFY REV 2 IMPLEMEN OF EAGLE 21
47. DC 45891 OTDT BISTABLE LITE PWR SUP CHANGE
48. DC 49095/ 337695 REMOVE GREEN BAND ON TI 153
49. DC-49040 REMOVE RX-40 RE 32/33/34/35 RAD MON

50. DC-45140 AR/339217 PK1505 P-250 MET TOWER TEMP
51. DC 45323 AR/330306 ABANDON TR-84 STATOR REC.
52. DC-EN-49035 S/G BD HX LINE ADDITION TO BD TANK
53. DC-50005 CHANGE MFP L.O. STRAINER DELTA P ALARM SP
54. DC-49079/49083 AFW RUNOUT CHANGES
55. DC-102035 PK05-10 DOESN'T ALARM ON FAIL OF TE-423/433
56. DC 47909 AR 311433/320689 REM PRESS SW ALRM FROM PS 169/170
57. DC-47502 CHANGE STROKE TIMES ON 8808'S AND 8809 VALVES
58. DC 49217 AR 346041 REVISE LTOP PRESS TO 435 TEMP TO 270
59. DC 49206 AR 378184 CHANGE DEH LDA FROM 10 SEC TO 2
60. DC 49200 AR 380151 RCP UNDERVOLTAGE RELAY INSTALLATION
61. DC 49242/AR382229 RE-INSTALL RCP 1-3 LOWER BRG TEMP
62. DC 49228 AR376625 6 SEC TIME DELAY ON COND/BSTR PMP
63. DC 49200/AR362097 ADD TIME DELAY TO 12KV BKRS
64. DC 49244 AR 382781 REMOVE VOL BSTRS ON 10% DUMPS
65. DC 49237/AR386462 XFMR TAP CHANGE
66. DC 49246 AR 195521 PPC DATA RECORDING
67. DC 49218 AR 360958 COND DELTA P ALARM AND IND
68. DC 49302, 411711 INTERLOCK LO MARGIN ALARM WITH P-10
69. DC 49123, 412281 REMOVE ERFDS AND REPLACE SPDS
70. DC 49341 AR 417901 4KV BUS FIRST LEV RELAY SETTINGS
71. DC 49298 AR 393016 ADD PUSHBUTTONS TO TEST CLOASE MFW SUP VLS
72. DC 49315 AR 416254 REVISE CWP AUTO START LOGIC XFER SCHEME
73. DC 49335 ADD CLOSE SPRING NOT ENRG. ALARM TO BUS HX13 BKRS
74. DC 47961 AR 364643 REPLACE 4KV BKR OC. UV AND ANTI PUMP
75. DC 49319 AR 408911 RELOCATE TCV-130 AND REROUTE PIPING
76. DC 49368 A 417425 REINITIALIZE CORE FROM PRELIM NDR

DECEMBER 1, 1997
DIABLO CANYON POWER PLANT SIMULATOR CHANGE REQUESTS (SCR's) INCORPORATED SINCE THE FOUR YEAR CERTIFICATION REPORT OF DECEMBER 1993

1. I.R. AMPS DON'T DISPLAY ON SPDS T/C MAP
2. OVERLOADING D/G DID NOT SLOW IT DOWN
3. MODEL TGA TO INCLUDE NEW POINTS TO BE ADDED FOR GENAIDE
4. E-1 AND E-2 VENT RESPONSE
5. SPDS DISPLAYS HAVE A NEW REVISION
6. SPDS RAD MONITOR DISPLAY DOESN'T SHOW "?"
7. SPDS: CHANGE METHOD OF ENCODING VALVES AND GETTING SIM VALUES
8. PPC WHR METERS / POINTS NOT DRIVEN
9. PK1419 INPUTS FROM STATOR CLG WTR TEMP DON'T ALARM
10. AUX BLDG VENT DAMPERS FAILURE LIGHTS
11. PPC POINTS P2223A AND P2222A READ THE SAME AND SHOULD NOT
12. DRIVE AMPS FOR ESF FANS ON POV
13. PPC POINTS Y0712A AND Y0717A READ DIFFERENT FROM PLANT
14. PPC PLOT TO F4, TEMPLATE, NOT WORKING PROPERLY
15. FHB VENT LIGHT WON'T COME ON FOR FAN S-1
16. TURB TEMP SCANNER ALARM # 0893 ON PK1416 KEEPS COMING IN
17. LOCA'S DON'T RAISE LEVELS IN CONTAINMENT PROPERLY
18. RECORDER RESPONSE ON PY-15 LOSS
19. ONE CIRC PUMP DOESN'T GIVE ENOUGH COOLING
20. PPC R10C PRINTOUT ON WRONG COMPUTER
21. PPC ALARM TYPEWRITER NOT PRINTING ALARMS
22. ACCOUNT FOR CORE AGE DETECTOR EFFICIENCIES IN RMS MODEL
23. TOO MUCH SWELL OR STEAM FLOW WHEN ROLLING UP TURBINE
24. SUN OVR ALM SYS ANNUNCIATOR WINDOW DOESN'T CLEAR
25. PPC POINT T2278A GOES INTO ALARM ON RAMP DOWN AT 75% POWER
26. TURBINE BLDG TEMP TCFWCBA SHOULD BE USED IN CALCULATIONS
27. CAN'T USE SUN SYSTEM "SAVE TO TAPE" FOR TREND MENU
28. 250 V DC BUS LOADS NOT MODELED
29. AFW PUMP CROSSTIE LINE HAS TOO MUCH ADMITTANCE
30. LIB FUNCTION IN EXPERT MODE ON SUN NOT WORKING
31. SUN PSD DISPLAY GLOBALS
32. SUN REMOTE CONTROL SCREEN
33. SUN RECORDER A/B SCREEN
34. INSTALL SECOND SUN STATION IN INSTRUCTOR BOOTH
35. ADD HANDLER / SOFTWARE FOR LOSS OF POWER TO ERFDS MULTIPLEXERS
36. AFTER 1 HR OF A 100 GPM CND TUBE LEAK, NO SIGN OF DEMIN BREAKTHRU.
37. DC SUPPLY TO 120V VITAL INVERTERS IS NOT DYNAMIC
38. MSR SHELL AND TUBE BUNDLE PRESSURE DROP AFTER TRIP
39. RCP'S DON'T TRIP AFTER PHASE B ISOLATION
40. SUN LOA STATUS MENU
41. SI PP 1-2 RESTARTS WITH MAL SIS2B ACTIVE
42. SUN HTX CLF'S DO NOT SHOW CORRECT STATUS FOR MULTIPLE FAILURES
43. MONCP DOESN'T WORK PROPERLY ON VB4
44. U2 PRESSURIZATION FANS DON'T START ON U-1 RE ALARMS
45. VARIOUS LAMACOIDS DIFFERENT FROM PLANT
46. SCALES ON LR-60, LR-61, AND LR-62 ARE DIFFERENT THAN PLANT
47. SIM CORE AVG TEMP ON PAM3 AND 4 IS TOO LOW DUE TO AVG ERROR
48. PPC POINTS ON SIM DON'T READ ZERO LIKE PLANT PPC
49. CCW RETURN TEMPS TOO LOW COMPARED TO PLANT

50. SWFLAG=F DOES NOT LIST ENOUGH PAGES
51. SEQ VALVE TURBINE OPERATION RESULTS IN SWINGS WHILE SEPARATED
52. CCPS HAVE VARIOUS PROBLEMS WITH BREAKER CLOSING WHEN IT SHOULD
53. SEISMIC RX TRIP BISTABLES INCORRECT
54. VARIOUS SUN TREND QUESTIONS
55. ON SYSTEM FREQ CHANGES, SECURITY PWR ALARMS AND PPC INV ALARMS
56. MALF FOR PZR RELIEF VALVES SHOULD BE REMOVED, IN GCF NOW
57. DEG 13 DID NOT LOAD ON U-2 BUS ON LOSS OF S/U POWER
58. MALF SYD1, LOSS OF OFFSITE POWER, NOT REALISTIC
59. CHANGE FROM SEQUENTIAL TO SINGLE VALVE CAUSES IV TO CLOSE
60. CONDENSER EFFECTS ON LOSS OF CWP
61. MALF CWS3 DOESN'T CAUSE CWP AMPS OSCILLATIONS
62. NEED SW PP FOR STANDBY START ALARM AND AMPS ON 14E.
63. MAL EPS3 VS PK WINDOWS AND BLUE LIGHTS
64. FCV-664/FCV-663 CONTROL SWITCH DOESN'T WORK RIGHT
65. TURBINE CRITICAL SPEEDS NEED CHANGING
66. CORE EXIT T/C TEMP NOT RIGHT ON CSF-2 STATUS TREE
67. SOUND GENERATOR KEEPS GOING WHEN IT SHOULDN'T
68. MAL VEN26 SHOULD ALSO TRIP SUPPLY FAN
69. ADD GLOBAL HX PLUGGING UNDER CND FOR MAIN COND PLUGGING
70. NEED S SIGNAL RESET BEFORE VENT FAN E-1 SHOULD RESTART
71. DELETE SIGNALS FROM RM-14A, 14B, 32, AND 33 TO THE SPDS
72. DIESEL AIR COMPRESSOR NEEDS UNLOADER
73. MAL AIR1H FOR HEADER 3623 GETS WRONG EQUIPMENT
74. ADD LC-921A AND LC-921B TO BISTABLES
75. SPDS T/C > 1000 LOSE DIGIT
76. 86G1 RELAY TRIPS WITH NO DC CONTROL POWER
77. D/G RECORDERS SHOULDN'T RUN IF NO VOLTAGE ON DIESEL GEN
78. TEN PERCENT STEAM DUMPS RESPONSE TO TRIP OPEN SIGNAL
79. LOSS OF OFFSITE POWER CAUSES DC BRG OIL PP LIGHTS TO GO OUT
80. USE MET TOWER VARIABLES TO DRIVE RMS RAD TRANSPORT
81. CHANGE MONCP AND REPLAY POT THRESHOLDS FROM 1 BIT TO 2 BITS
82. SOUND GENERATOR NOT WORKING WHEN STEAM DUMPS ARE OPEN
83. INSTALL FUSES FOR MUX 04-08 SUB-2 ON BACK OF VB3
84. MALF TUR4 OPTION 3 DOESN'T WORK PROPERLY
85. MAKE MAIN TURBINE ROTOR POSITION VARY ON SEISMIC MALFUNCTION
86. TOO MUCH CARRYOVER FROM S/G'S ON CONDUCTIVITY MODEL
87. POWER SUPPLIES HAVE CHANGED ON PPC PEN RECORDERS
88. CNM PARTICULATE RADIATION WENT DOWN ON PZR SAFETY FAILURE
89. PK1010 "674 FIRE DETECTED" IS ONLY INPUT
90. ALARM # 1121 COMES IN WITH # 423 (RE-15 HIGH RAD)
91. SITE EMERGENCY ALARM
92. RHR PP CAVITATES WHILE ON COLD LEG RECIRC
93. COND AND BOOSTER PUMPS AUTO STARTS NOT RIGHT
94. HC-128 NEEDS TO BE REVERSE ACTING ON LOSS OF VOLTAGE AND AIR
95. SPDS T/C DISPLAY ON G: DRIVE SERVER READS WRONG
96. PZR LEVEL CONTROL TAKES TOO LONG TO STABILIZE
97. SUN DOESN'T RESPOND TO GCF'S PROPERLY
98. PCV-135 SHOULD FAIL OPEN ON LOSS OF PY-14
99. SUN DOESN'T DISPLAY PRESENT VALUE OF GCF'S
100. TUNE RHR PP AMPS TO PMT 10.06
101. RCS PRESS ON METERS AND SPDS READS PSIA INSTEAD OF PSIG
102. DON'T GET POSITIVE RATE TRIP ON EOL LOAD REJECTION
103. ADD LOA'S FOR CR VENT PANEL TRANSFER SWITCHES

104. # 1 SEAL FAILURE PROBLEMS
105. SPDS CNM SPRAY PP STATUS LOGIC WRONG
106. INCORE T/C'S READING WRONG POINTS
107. SPDS DISPLAY OF NIS PR ON SPDS READS WRONG
108. SPDS DISPLAY OF T-COLD BARS ON E-0.2 MISSING
109. HEAD T/C'S DON'T READ HEAD TEMPS, THEY READ CORE EXIT TEMPS
110. SPDS CONTAINMENT WIDE RANGE LEVEL READS 0 VS 64 FT
111. S/G BD CATION CONDUCTIVITY COMES IN FIRST ON AIR INLEAKAGE
112. AMSAC S/G LO LEVEL GENERAL WARNING NOT SET RIGHT
113. LP TURB PRESS INPUT TO DEH SEEMS TO BE ON WRONG SIDE OF IV'S
114. D/G DOES NOT GO TO MECHANICAL GOV SPEED
115. FIT-81 POWER SUPPLY NOT MODELED
116. AR A0309590 HP SEAL OIL B/U PP START STPT TO 13 #
117. D/G 1-1 MW-HR METER DOESN'T RECORD PROPERLY
118. PC-474C LIGHTS VS 474D
119. MW METER ON DEH PANEL ALWAYS READS 1130
120. D/G 1-3 NO ALARM GOING TO LOCAL CONTROL
121. R-58 GREEN OPERATE LIGHT BLINKING
122. PK1517 AUX FHB VENT PWR SUPPLY FAILS ON IN INIT
123. PK08 P-13 LIGHT ON IN INIT 1
124. BA STORAGE TANK ALARM IN - PK0512
125. MULTIPLE COND ALARMS ON RAMP DOWN
126. FAILED TE-411A LOW, TAVG AND DELTA T INDICATION WENT LOW
127. REHEAT AND INTERCEPT VALVES BACKWARDS
128. TRIP OF 1-2 CWP DOES NOT RESULT IN A TURB TRIP FROM LOSS OF VACUUM
129. D/G'S WOULD NOT START MANUALLY OR WITH A LOSS OF S/U OR SI
130. LOGIC FOR B/S LC 461A NOT CODED IN
131. VERIFY COMPUTER DEMUX PTS TO PPC ARE NOT THE SAME AS CB DEMUX PTS
132. B/S CHANNEL LIGHTS STILL POWERED FROM PY11A AND PY13A
133. P-13 STATUS LIGHT DOESN'T CHANGE ON LOSS OF POWER
134. RE-58 LIGHT BLINKS
135. ADD CB DEMUX POWER TO PK08 STATUS LIGHT LOGIC
136. ADD PLANT PAGE KILL
137. ON UNIT TRIP SPDS GOES AWAY
138. LO STM PRESS AND HI PRESS RATE B/S DON'T LIGHT ON LOSS OF PY12
139. TIME TRIP DELAY FOR S/G'S DOESN'T WORK PROPERLY
140. FAILURE OF NR T-HOT CAUSES WRONG ALARMS
141. TUNE CONDENSATE ADMITTANCES TO MATCH PLANT
142. TCCMMARG LOOKS STRANGE ON ANSI TEST ATPTRN10
143. CHANGE ENGLISH DESCRIPTIONS IN PGDISV4
144. BISTABLE AMSAC ARMED C-20 DOESN'T RESPOND PROPERLY
145. PZR HTR 1-2 DOESN'T SHOW LOAD WHEN ON BUS G
146. ADD SIM OUT OF OPERATING LIMITS "CROSS" TO NEW SIM MODEL
147. ON SOME DBA LOCA'S TCNM EXCEEDS 271 DEG F
148. RIL LOW ALARM NOT SET PROPERLY, SET FOR 100% POWER ALL THE TIME
149. PZR SAFETY VALVE LEAKS, NO STEAM FLOW OUT OF PRT
150. ADD STM LINE PRESS AND RATE BISTABLES TO PK0202 AND 0204
151. PPC TAVG POINTS INDICATE WRONG
152. TDAFW PP LCV'S MOVED TO GCF, NO LONGER NEEDED IN MAL
153. PPC READING ABOUT 30 COUNTS HIGHER THAN RM-15 INDICATES
154. RM-15 FAILURE BRINGS IN PLANT VENT ALARM #1121 ON PK1125
155. MOVE MAL DEH2A AND DEH2B TO GCF
156. RM14 AND 14R RDU LIGHTS HAVE PROBLEMS ON CYCLING RDU POWER
157. AFTER RM14 SKID SWAP TO RE87, RM14R READING CHANGES

158. CHECK SOURCE RE-87, RM14R SKID PP B LIGHT COMES ON
159. TURN RDU POWER OFF RM44A, DISPLAY STAYS ON
160. ADD LOA FOR U-2 52-VU-24 BREAKER
161. ADD MALFUNCTION FOR RHR PP DISCHARGE FAILURE
162. MALF DEH1, SET MW TO 1000 AND RAMP TO 6 MIN, FAILED IN 1 SEC
163. RX-TRIP RESPONSE OF PLANT VS SIM FOR 12/26/93
164. AR-A0325889 CHANGE STPT ON H2 TO VCT
165. AR-A0324731 VERIFY RM 19 RESPONSE TO EXCS LETDON
166. D/G BKR TRIPS WITH RELAYS CUTOUT
167. LOA CD HAS WRONG ENGLISH DESCRIPTIONS
168. RE-73 WON'T GO ABOVE 576 CPM
169. COND/BSTR PUMP PRESS GRREATER THAN 1000
170. A0320965 PK12/01 REMOVE AUX STM ALARMS
171. POST TRIP COOLDOWN WILL FULL AFW FLOW
172. A0315258 CHANGE H2 SEAL OIL TEMP ALARMS
173. CHANGE LABEL ON TUR LOA 3 CYL HTG STM
174. CHANGE SETPOINT ON PS-30 TO MATCH PLANT
175. CONDENSOR AIR IN LEAKAGE AFFECT ON SG BLDN CAT CON
176. PCV-456 SHOULD BE INTERLOCKED WITH LP 2 TC 423B
177. GLAND STM NEEDS TO CONSERVE MASS
178. AUX STM NEEDS TO CONSERVE MASS
179. DRIVE PPC STATOR TEMP FOR MAIN GEN
180. P-11 BISTABLE LIGHTS ON LOSS OF P-11A
181. ADD LOSS OF AC OR DC TO MN ANNUN SS
182. LOA AIR2 FOR CNTMNT N2 SUPPL DOESN'T WORK
183. LCV-459/460 DON'T CLOSE ON LOSS OF AIR
184. CAUTION TAG EQUIP PER PHOTOS TO MATCH PLANT
185. MASS CHANGE OF PZR DOESN'T EQUAL VCT CHANGE
186. TOO MUCH RCP SEAL LEAKAGE ON FAILURE
187. LOSS OF ALL AC TURB DC BRG OIL PMPLITE
188. CSP SEQ.ON BUS VIA ESF TIMERS
189. NEED TO INCREASE ANNUN BUFFER SIZE
190. ONE DROPPED ROD CAUSES RX TRIP AT 100% PWR
191. SPDS RE-15 DOESN'T GO INTO ALARM
192. SPDS E-1 DISP FOR CONT SPRAY PUMPS IS WRONG
193. MAKE D/G SPEED SAG OFF ON OVERLOAD
194. CORRECT RTD XMT ENG DISCRIP. FOR DELTA T
195. LO STM PRESS MSIV ISOL.SHOULDN'T ALARM PK0823
196. NEG.STM LLINE RATE B/S DON'T COME IN ABOVE P-11
197. GCF CNH SEVERITY BAR AND ENGLISH DESCR NEED WORK
198. REMOVE 60 GPM BLOCK ON CCP 13
199. PEN PR-507 STM HDR PRESS DOESN'T WORK VB3
200. AMSAC GENERAL WARNING LITE COMES ON
201. OVERRIDES HAVE ONLY ONE LINE OF ENG. DESCR
202. TCV 149 FAILS TO WRONG POS ON LOSS OF AIR
203. FCV 724 FAILS TO WRONG POS ON LOSS OF INST AIR
204. NEED 4 MORE RVRLIS LOA'S FOR WR/NR ALARMS
205. OLD LOW STM PRESS B/S LITES STILL ON
206. ALARMS IN MUX POINT 000 DON'T ALARMS ON CRT
207. TR 83 POINTS 3-6 READ 4.5 DEGREES WHEN ON TRN GR
208. OVERRIDES DUPLICATED AND IN WRONG SYS
209. SGTR IN PROGRESS PK ALARMED SPDS DID'NT GO RED D
210. TURB ECC IN ALARM IN SANP 19
211. MODEL RHR ROOM TEMPS AND SMOKE ALARMS

212. ADD FAIL VOLT COLUMN TO XMITTER DECK
213. CIRC WTR DT ALARMS ON TRIP OF CWP 12
214. SCALER TIMER NOT WORKING PROPERLY
215. RCP 11 SEAL LEAKOFF RECORDERS BROKEN
216. ROD IN/OUT SWITCH STICKS
217. AR A0330587 FOR RE 15/15R SKIDS
218. AR A0330273 FOR RM 14 SKID
219. AR A0330274 FOR RM 14R SKID
220. SPDS 10% STEAM DUMP INDICATION
221. GCF NEEDS A FAIL AUTO/MAN FUNCTION
222. AR A0323107 ADD ANNUN WINDOW PK0606 ALM 863
223. SOUND GENERATOR STICKS ON
224. FCV 664/663 CONT VAC/PRESS REL OPENS W/O PB
225. PI 474 FAILS HI WHEN 456 XMTR IS FAILED
226. FAN E 4 DAMPER M 29 SHOULD FAIL CLOSE ON AIR LOSS
227. A0330673/330677 REPLACE RM 44A/B FIRMWARE
228. PPL LOAS OUT OF ORDER
229. CHANGE STROKE TIMES ON 8107/8108 AR 0335897
230. XMT FAILURES FOR RE-53/54 WON'T CLEAR
231. U1,U2 PRESS FANS CYCLE WITH RE 51/52 IN ALARM
232. ADD MORE NOISE TO MN STM LINE RAD MON
233. 337228 RE-11 RANDOM READINGS
234. 260222 DRPI A PLUS B DOESN'T GIVE GEN WARNING ALARM
235. 330673/330677 REPLACE FIRMWARE R-44A/B MONITORS
236. GCF FOR CWS6/7 PMP ARE INCORRECT SERVICE WATER
237. AR 339282/339269 CHG MN GEN REV PWR TO 2 SEC
238. ALL STEAM DUMP VALVES SHOULD NOT BE LINEAR
239. RM 71-74 NOW POWERED FROM PY-14
240. AR-340245 CHANGE RE 14/14R 24/24R 28/28R STPTS
241. AR 337953 CHANGE RE 15/15R SETPOINTS
242. PPC VALIDYNE POINTS SHOULD ONLY UPDATE IN 10 SEC
243. PY-13A SHOULD BE POWERED FROM AC BUS 13 NOT DC 12
244. CNM VENTING TOO FAST VIA FCV 662,663
245. D/G'S NEED NEW FAIL TO START MECHANISM
246. ADD FW PUMP LO VAC TRIP LOCAL LATCH
247. MODEL RAD XPORT OF STM BRK IN AUX BLDG
248. RE-14 LED DISPLAY LOSES OR ZEROES FIRST DIGIT
249. MAIN ANNUN TIME STRIKE NOT ACCURATE
250. NEED LOA FOR DC PWR TO MOD 72-1354
251. LOOP 1 DELTA T READS HIGHER THAN OTHER LOOPS
252. NEED LOAS FOR GLAND SEAL STEAM ON VB3
253. COND REJECT OVBD LOA DOESN'T WORK
254. LCV-12 WON'R REJ TO CST WITH NO COND VAC
255. FW HTRS WON'T GO BELOW 212 DEG WITH NO VAC
256. FW TEMPS TO S/G ON PPC BOUNCE WITH NO FW FLOW
257. NEED LOA TO DRAIN COND HOTWELL
258. NEED LOA FOR SSPS OUTPUTS TO TEST
259. NEED WINK/BLINK FOR EACH GEN RELAY TOGGLE SW
260. RE-15/15R FAIIL ALM REFLASHES AFTER 2 HOURS
261. SUN MENU LOA STATUS HAS PROBLEMS
262. TURBINE DEH DIS FOR INITAL MW PICKUP WRONG
263. RE-24/28 FAIL LITES COME ON IN SNAP 8 AFTER 25 MINN
264. PZR TEMP INCREASING ON ANSI 3.1.1(1)
265. D/G OVERCRANK LOGIC INCORRECT

266. REMOVE EAGLE 10% STEAM FLOW LOGIC CLIP
267. ADD ? IN SPDS FOR NO FLOW CONDITIONS
268. PZR COLD CAL 462 READS 4% WITH NO WATER IN PZR
269. TURBINE STOP VALVE BISTABLES IN WRONG ORDER
270. ADD MSIV CLOSURE TO SOUND GENERATOR
271. CHANGE GAIN ON PC-507
272. PK1416 INPUT 822 FROM Y2821C DOESN'T ALARM
273. IF PPC IS DEAD 865 ALARM CYCLES
274. TUR DEH OPER AUTO LIGHT WITH MAL TUR4 ACTIVE
275. AIR OP VALVE 8881 DOESN'T FAIL CLOSED ON LOSS OF AI
276. MODEL SJAE AND AIR REMOVAL SUBSYSTEM
277. ADJUST TRIM OF HCV-142 TO MATCH PLANT
278. ADJUST RESPONSE TO EXCESS LTDN TO MATCH PLANT
279. REMOVE BREAK BEFORE MAKE ON PZR LEV SWAP FOR LTDN L
280. CONT RECIRC SUMP IND PEG HI ON SB LOCA
281. RX POWER ESPONSE TO 10% STM DUMP TOO GREAT
282. VCT MAKE UP FLOWS TOO LOW
283. PRT HI LEVEL ALARM AT 87 VS 89
284. PRT NITROGEN REG PROBLEMS
285. RONAN GROUP DISPLAY STATUS ALARMS ON INIT
286. CHANGE PUMP CAVITATION OVERCURRENT TRIP TIMERS
287. ADD ACCUMULATOR PRESSURE ALARMS
288. CHANGE CST LO-LO LVL ALARM TO 54.5 IN. VS 39
289. CHANGE TAVG DEVIATION ALARM SETPOINT TO +/- 6 DEGF
290. S.I. PUMP DISCH HDR BLEEDS OFF TOO SLOW
291. DRPI DATA A ONLY SWITCH DOESN'T WORK PROPERLY
292. LETDOWN PRESS SPIKE ON RESTORATION OF LETDN
293. AR A0346240/345890 FIRMWARE FOR RM-15 AND RM-15R
294. HCV-110 SHOULD ALLOW 40 GPM WHEN FULL OPEN
295. HYDROGEN GAS HI TEMP ALARM SHOULD BE 122 DEGF
296. SIM SHOULD MODEL SSPS MULTIPLEXER IN A+B POSITION
297. WRITE SNAPS WITH AIR COMP 05 LEAD, 06 LAG
298. PK1317 # 1255 SHOULD ALARM ON LOSS OF 12KV SU BUS
299. XMT CVC6 FOR FI-111 DOESN'T FAIL FR-111
300. EDG ESF PUMP MW LOADING SEEMS WRONG, SEE SNAP 59
301. PZR HTRS TURN ON WITH C/S IN OFF POSITION
302. AR A0353752 PK0620/0625 PPC SELECT ALARM WINDOWS
303. AR A0346240 CHANGING RM15/15R CHECK SRC, PWR FAIL
304. PPS TROUBLE ALARM DOESN'T COME IN IF BST'S TRIP
305. MODEL ROD DRIVE MG SET FLYWHEEL COASTDOWN
306. TUNE CNM INST AIR LEAKAGE TO MATCH PLANT DATA
307. ADD CODE FOR SIGNAL ISO TO SPDS FOR RE-15, 15R
308. HOT SHUTDN RM AUX SW PANEL, DRIVE WINK&BLINK LITES
309. PK0721 THRU PK0724 HAVE WRONG DESCRIPTIONS
310. SIM MISSING VARIOUS LAMACOIDS COMPARED TO U-1 PHOTOS
311. VB3 NEEDS NEW GREEN STRIPING, FCV-436 & 437 REMOVED
312. CONTMT HI PRESS BISTABLES RESET IS INCORRECT
313. SPDS E-1 SCREEN, RWST READS 0 WHEN LVL IS 33%
314. ACCUM PRESS HANGS UP AT 236 PSIA ON A LARGE LOCA
315. SIM BACK PANELS MISSING VARIOUS LAMACOIDS VS U-1
316. SIM PAM PANELS MISSING PLASTIC TRIM AROUND OPENINGS
317. DDR10 RECORDERS NOT READING RIGHT
318. RONAN CRT DOES NOT GIVE CORRECT ALARMS STATUS
319. AR 348577 REPLACE NR 46 AND 47

320. OVERRIDES DO NOT RESET WITH NEW INIT
321. BELL ON/OFF TOGGLE GETS CONFUSED
322. A0359318 PROVIDE PPC INPUT FOR AFW PP1 DISCH PRESS.
323. REVISE METERS FOR FC-110A AND FC 128
324. RE-DO MET TOWER PROGRAM
325. MAL DEG1B OPTION DOESN'T ALLOW D/G RESTART
326. RE-29,14,87 PEG HI ON LOSS OF ALL AC RESTORATION
327. NEW VICTOREEN RMS DISPLAYS READ WRONG ON PWR RESTORE
328. CHGING PUMP AMPS DON'T CHANGE WHEN PUMP CAVITATES
329. SUN LOSES MONSIM VARIABLES AFTER INIT
330. MODEL NORMAL S/U XFMR 1-1 LOADING
331. MODEL ALARMS ON LOSS OF S/U TO UNDERGRND LOOP
332. AR 346974 MODEL SEAL INJ SHINE EFFECTS ON RM13
333. GCF PMP CWS4 DOESN'T WORK
334. PI-846 MN TURB LUBE OIL PRESS READS LOW ON VB4
335. CLEARING MAL SEI1 SHOULD NOT RESET EFM MONITOR
336. RM-2,4,7,19 HI ALARM AND RM-15 FAILURE
337. TEAM DATA DOESN'T CAPTURE INTEGER VARIABLES
338. DEH PROBLEMS IN TURBINE MANUAL
339. DFP FAILURE ON MAL SHOULD CAUSE PPS TROUBLE ALARM
340. RE-58,59,51,52 INDICATE LARGE SPIKES
341. PK08 YELLOW WINDOW ALARMS NOT MODELED PROPERLY
342. SUN MENU TIME SCALES DOESN'T CHANGE SIMSPEED
343. CHANGE COND PP DISCH CATION COND ALARM TO 0.2UMHOS
344. CAN'T OVERRIDE NI-35D, IR SUR
345. SPARE INPUT ALARMS ON STM LINE BREAK
346. DRIVE PPC EPR2 DISPLAY FROM RMS AND PLANT VENT
347. MODEL MN ANNUN ALARMS DUE TO LOSS OF PWR
348. LOAD REJ RX TRIP UNIT TRIP DOESN'T OCCUR
349. HOT S/D RELAYS TRIP AFTER RE-INIT
350. REMOVE VEN MALS AND DRIVE FROM GCF PUMP FAILURES
351. PDP SHOULD PUT OUT 111 GPM
352. XMT RHR5 AND 6 ARE SCALED WRONG AND DOESN'T WORK
353. OVERRIDES OF METERS DOESN'T WORK
354. YELLOW WINDOWS CLEARING DOESN'T RING BELL
355. RONAN COMPUTER GETS LOCKED UP FROM SOME EVENTS
356. MODEL MORE CLAD DAMAGE ON SBLOCA FUEL OVERHEATING
357. CCW CHECK VAVLE SLAM NNOISE NEED WORK
358. TIME TO CLEAR FOR PMP GCF'S DOESN'T WORK PROPERLY
359. DRIVE ALRM INPUTS 999 AND 1325 FROM FAN BKR RELAYS
360. INST AIR PRESS HI IN SNAP 23
361. LO STM LINE HI RATE B/S DON'T MATCH PPC E3 SCREEN
362. INCORP GCF OPTIONS FOR VEN FANS WHEN NEW VEN MODEL WRITTEN
363. UPDATE RANGE FOR RMS XMT GCF'S
364. REHEAT STOP VLVS CLOSE ON LOAD REJECTION
365. SIM GEN KVAR RECORDER PEN PEGGED HI
366. MAL RCS1 & 2 SUN MENU SHOWS WRONG OPTION 1
367. PLP AUX12 FOR MET TOWER CHI/Q HAS WRONG MAX LIMIT
368. FCV-14 STUCK PARTIALLY OPEN, NO MONITOR LITE BOX
369. MAKE TURB BRNG TEMP DEPENDENT ON L.O. TEMP
370. PULLED FUSE FOR FCV-54 LITES ON VB3 DID NOT GO OUT
371. WRONG SLIDE BAR FOR GCF CNH FAIL PWR OPTION
372. ADD SIM OP LIMIT EXCEEDED MESSAGE TO SOUND GEN.
373. MAL AIR 1F DOESN'T AFFECT CONT. PRESS

374. ADD LOA'S OR GCF'S FOR FW HTR LEVEL CONTROL SETTINGS
375. RAMP ACTIVE MAL GOES TO ZERO VALUE FIRST
376. STATOR COOLING WATER PUMPS TRIP WHEN PY-17 DE-ENERGIZED
377. RIL ALARM NOT WORKING
378. AR 366612 MAIN UNIT MVAR AND MWATT RECORDER CHANGE OUTS
379. AR 362064 DELETE EAGLE 21 PDP TIME DELAY FUNCTION
380. PZR BORON DOESN'T SEEM TO BE EQUALIZED WITH RCS
381. ONLY 1 GCF PUMP DEH FAILURE IN SUN MENU
382. RE-15 READING LOW POST TRIP WITH S/G LEAK OF 13 GPM
383. RCP THERMAL BARRIER TO CCW LEAK MAL RESPONSE INCORRECT
384. CHANGE MET TOWER TO PPC VARIABLES TO DECREASE WITH DISTANCE
385. SPDS CDFSF-1 SCREEN SR SUR DOESN'T TRACK CC1 METERS
386. RPS/TTD ALARM SHOULD CLEAR WHEN DELAY TIME IS EXCEEDED
387. LCV-459/460 WON'T STAY OPEN,GRN LITE GOES OUT
388. RONAN DOESN'T ALWAYS GET ALARM SUMMARY
389. ISOLATING GLAND STM AT 100% causes loss of vac trip
390. TR-83 GROUP ALARM DRIVES WRONG PK WINDOWS
391. POV-DAMPER M4B OPEN LED NOT WORKING
392. MAKE NEW SUN GCF OPTION FOR (BKR)
393. AUX BLDG VENT WON'T SWAP TO BLDG ONLY
394. AR 337868/337294 CHANGE STPNTS FOR CCP 1-1 LUBE OIL
395. AR 323793/370965 SPARE SOME MAIN ANNUN LEV SW LARMS AUX STM
396. AR 366534/354277 AFTER 1R7 CHECK STROKE TIMES ON FCV-658,659,668,669
397. AR 320965,234437,323793 DEFEAT ALRMS AUX STM TO PK12-01
398. PI-30 GEN PRESS DOESN'T FAIL ON LOSS OF PY-17
399. PI-848 GEN SEAL OIL DP FAIL ON LOSS OF PY-17
400. PMP CNDS DOESN'T WORK
401. MN TURB AC BRG OIL HPSO B/U GRN LITE WON'T GO OUT
402. FCV-128 CONTROLLER DOESN'T WORK IN MANUAL
403. GV POSITIONS DON'T READ CORRECTLY ON DEH WHEN FULLY OPEN
404. VCT PRESS CHANGE WITH MASS CHANGE
405. SPDS SCREENS DON'T CHANGE IF PY-13A OR PY-14 DE-ENERGIZED
406. SPURIOUS INITIATION OF FUEL FAILURE
407. EFFECT OF LOSS OF PWR TO PT-8 TURB IMP FEDBACK
408. LOSS OF PY 17 SHOULD FAIL HOTWELL LEV RECORDER AND TI 995
409. ADD PWR SUPPLY TO WHITE LITES FOR CIV INDICATION DC 47114 AR-365160
410. AR 364596 NEW TS-530 INPUT TO PK 15-05 MET TOWER TEMP
411. HTR DRAIN TANK LEVEL TRANSMITTERS
412. AR 372261 RCP THERMAL BARRIER LOW FLOW ALARM TO 140 GPM
413. LOSS OF PY 16 SHOULD CAUSE PK 10-05 ALARM
414. ADD LOA AND MODEL U-2 ON AUX OR S/U POWER
415. RE-WRITE SNAPS SO ONLY ONE EH PUMP RUNNING
416. ADD OC CAPABILITY IN PMP OPTION 6
417. DFWCS MAINTAIN 55% LEVEL ON FW STARTUP AFTER RX TRIP
418. S/F B/D AND COND. CATION COND. INCREASE ON FW STARTUP
419. MAIN GEN AVR PRE-POSITION LITE SHOULD GO OUT AT 100%
420. RE-WRITE POWER SNAPS TO HAVE PDP RUNNING
421. RCS PRESS RESPONSE ON A LOAD REJECTION
422. MODEL DDR10 REC AND PPC STATOR DISPLAY TEMPERATURE
423. CORRECT CCP FLOW PROBLEM AND ADD GCF PMP OPTION 6
424. ADD FAILURE CAPABILITY FOR 500 KV BKRS
425. GCF DELAY TIME FOR SI PUMP 11 ACTIVATES TOO SOON
426. MODEL POWER TO PLANT P.A. ON SIMULATOR
427. BCMS METER INDICATION ON CC1 ADD TO XMT

428. D/G 13 KV AND MVAR RECORDER NOT WORKING
429. TCNM EXCEED 271 ON DBA LOCA
430. SHOULD GET VIBRATION ON CFCU WHEN STARTED IN HI SPEED
431. SOURCE RANGE ENERGIZES TOO SOON AFTER RX TRIP
432. LOSS OF 480 V 1F OR 1H SHOULD CAUSE FIRE PUMP PP ALM
433. INT RANGE DETECTORS DON'T READ ON PPC
434. LOA PPL1 AND 2 DON'T WORK (RX TRIP BKRS)
435. VENT DAMPER FAILURE LED'S ARE ON WITH NO SLENOID LEDS
436. VENT DAMPER M-4B FAIL LED LITES DON'T COME ON
437. VENT DAMPER M-21 FAILS CLOSED VS OPEN ON LOSS OF AIR
438. VENT DAMPER M-8A/B FAIL CLOSE AT 20 VS 80 LB AIR
439. NEED LOA FOR CR VENT EQUIP PWR TRANSFER SWITCHES
440. CR VENT DAMPER 4 INDICATES WRONG WHEN LOGIC PWR ON B/U
441. XMT'S FOR MFW LM 537D AND 547D FUNCTION IMPROPERLY
442. PMP ASW 1 OPTION 5 BRINGS IN WRONG ALARM
443. SCREEN REFUSE HI LVL ALARM WITH NO SWP'S RUNNING
444. DEH LDA SETPOINT AND DISABLE CIV.AR 370977
445. AR 342176/288113 DISCONNECT ALT D/C TACH PACK SUPPLY
446. AR 374782 CHANGE FW HTR OUTLET FROM 205 TO 320 FCV420
447. C-7A/B DID NOT ACTUATE
448. LOAD TRANSIENT BYPASS DIDN'T ACTUATE
449. D/G FREQUENCEY NOT MATCHING M-9A CRITERIA
450. CHANGE TEAM LOGICAL CAPTURE FORMAT FROM T,F TO 1,0
451. RCP SEAL WTR LO DP ALARM SHOULD BE SET FOR 250
452. RAISE MIN AIR PRESSURE FOR DIESEL START
453. TOO MUCH RAD RELEASE TO CNMT ON DBA LOCA
454. DEH GV DISPLAY DOESN'T SHOW DECIMAL
455. GET CROSS 1 HOUR AFTER LOSS OF RHR
456. PPC PEN RECORDER 2 NOT BEING DRIVEN
457. CLOSING LOA'S CCW 17/18 DOESN'T ISOLATE CFCU 1-1 LEAK
458. AR 356412/352336 INSTALL SETPOINT SWITCH ON RM-2
459. AR 378627/368351 DELETE PKG BLR INPUT PK 13-22
460. PAM 1 NR51 RECORDER POWER SUPLY
461. POV1/2 POWER SUPPLIES TO FANS AND LED'S
462. VICTOREEN DIG RAD MON DISPLAY ON FAILURES
463. CLOSING SPRING BKR FAILURE NOT WORKING
464. S/G 2 LEVEL COMPARED WITH OTHER S/G'S
465. AIR COMP 06/07 INDICATIONS ON 480 V LOAD CENTERS
466. AR 369663 CHANGE RHR FLOW SETPOINTS FROM 500 TO 475
467. AR 379640 CHANGE RANGE ON CONT SPRAY RECORDER
468. CHANGE STM DUMP LOGIC DC 437649 AND DC 437610
469. AR 383413/387231 CHANGE TO SCREEN DIFF AUTO START
470. PK0106 CCW HDR ALARM SETPOINTS WRONG
471. MAIN GEN UF TIME DELAYS WRONG
472. VERIFY 1/3 DPM PST TRIP NI DECAY TIME
473. TURB STOP VALVE B/S GO OUT ON LOSS OF PY17
474. BKR EPS 19 FOR 52VU14 NOT WORKING
475. ALARM 353 SHOULD NOT OCCUR ON LOSS OF PY 12
476. ALRMS 784,785,796 DID NOT OCCUR ON LOSS OF PY 12
477. ALARM 402 DID NOT OCCUR ON LOSS OF PY 12
478. SPDS C/D RATE DOESNJT RESET WHEN RE INITING
479. PI 505 SHOULD FAIL LOW ON LOSS OF PY 12
480. HCV 670/123 SHULD FAIL ON LOSS OF PY 12
481. ALARMS 99 AND 113 DIDN'T OCCUR ON LOSS OF BUS 11

482. P250 DEAD COMPUTER ALARM NOT WORKING
483. STM DUMP LITES POWERED FROM WRONG BUS
484. AR379269 ADD FIRMWARE FOR RE-34
485. FRV'S TRAVEL LIMIT REMOVED
486. DON'T GET PK1804 #99 WHEN FAIL FUSE
487. AR385574 DRIVE NEW SCREEN DP PPC POINTS
488. AUX BLDG VENT MODE WON'T STAY IN BLDG ONLY
489. ALARM 573 DOESN'T COME IN AT 3 MILS
490. MOORE CONTROLLERS RETURN TO AUTO ON RESTORE POWER
491. LOSS OF AC/DC TO MN ANNUN NOT CAUSING LOSS
492. UNABLE TO INJECT WATER VIA 9003A/B VIA GRAVITY
493. ADD TURB BRG 9,10,11 TO MAL TUR3
494. MODEL 11 TUR BRG VIB INCREASE AS SEAL OIL TEMP INC
495. D/G CONTOL POWER XFER SWITCHES ARE MODELED AS ONE
496. RCP AMPS PEG HIGH ON PHASE B RCP TRIP
497. CCP WON'T RESTART AFTER OC TRIP
498. AIR COMP 01/02 WON'T TURN OFF
499. PPC POINT R0087R DOESN'T INDICATE
500. MAL EPS6B DC BUS 12 CAUSES PROBLEMS WITH SIM
501. VERIFY EAGLE 21 RACKS TRANSMITTER LOCALES
502. PZR HTR PROP. CAN'T RESTORE AFTER LOW LEVEL
503. AR 385574 PROVIDE INTAKE TRAV. SCREEN DIFF PRESS ON PPC
504. DRIVE XMTTRS ASSOC.WITH 2 EAGLE RACKS VICE IY PNLS
505. LAMICOIDS FOR CHLORINE VENT PANEL
506. BLANK RMS MODULE PLATE VS SPARE MODULE
507. MINOR WITHC POSITIONS CHANGES ON SNAPS
508. OTDT SETPOINTS READ HIGHER ON SIM
509. SCMM YI 31 POINTS DON'T MATCH PLANT
510. VITAL 480 V BUS LOADING TOO HIGH
511. DEH BUTTONS ARE BLANK IN PLANT
512. CONTROL BOARD BANDING CHANGES PER DENNIS
513. PPC POINT FIT81F READS 0 SCFM ON SIM
514. PPC P-11 POINTS DIFF THAN PLANT
515. MAKE SIM MATCH PLANT PPC RMS DATA
516. LARGE PULSE VALUES ON PPC
517. PPC POINTS USED IN R2 CALCS READ ZERO
518. PPC POINTS ON POISON AND REACTIVITY READ ZERO
519. SUSPICIOUS VALUES FOR STM LINE ISO PPC POINTS
520. MODEL INVERTOR UPS VALUES FOR PPC
521. SIM PPC LOGICAL EQUIPMENT STATUS WRONG
522. MODEL B/U MET TOWER POINTS
523. SIM MAIN CONDENSER VAC POINTS DON'T MATCH PLANT
524. PPC POINT P0125A DOESN'T MATCH PLANT
525. ADD SI SIGNALS TO FIRST OUT SIGNALS
526. INCORE T/C DISPLAY DISCREPANCIES FROM PLANT DATA
527. RAD MON DECORDERS DON'T MATCH PLANT
528. INIT 22 HAS UNSTABLE FW FLOWS
529. MAL SYD1 LOCKS UP SIMULATOR
530. ACTION CONDITIONAL ON JPPLSI DON'T ACTUATE
531. TIMERS FOR DEAD VITAL BUS DIESEL LOADING WRONG
532. PHASE A ISOL TRAIN B LITES DON'T COME ON WITH TRN A
533. MS1 ISO LITE AND S/G ISO LITE FLASHES AFTER SI
534. DISCUSS RESPONSE CHANGE ON T/C DURING E DRIL
535. RHR AND CSP RESPONSE ON E DRILL

536. ADD XMITTERS FOR LT 942/943/ CONT WR LEVEL
537. OVERRIDE FOR LR-942 DOESN'T WORK
538. CHANGE 8104 ADMITTANCE TO MATCH PLANT DATA
539. HTR DRAIN PUMP DISCH FLOW ALARM CYCLES ON PPC
540. HTX SCW2 RESETS TO 100% WHEN FOULING VALUE CHANGED
541. PZR LEVEL AND CHARGING FLOW FLUCTUATIONS
542. CST LITE FLASHES WITH FCV-724 IN AUTO
543. TRIP OPEN SIGNAL TO 40% DUMPS IN STM PRESS MODE
544. MU WTR XFER PUMP DOESN'T BRING IN BUS H ALARM
545. MAKE OPTION FOR TT45 TO READ 624 AT FULL POWER
546. D/G AIR PRESSURE ALARMS
547. TURBINE IV AND RH VALVE TEST NOT WORKING CORRECT
548. PK WINDOW LITES WITH NO RONAN ALARM ACTIVE
549. MN GEN VOLT REG XFER TO TEST CAUSES SIM PROBLEM
550. PK WINDOW DOESN'T REFLASH AFTER SER OVERRIDE CLEARED
551. DBA LOCA CAUSES SIM PROBLEMS
552. ADD LOA'S TO CUTOUT LOSS OF CHARGER ALARMS
553. AFW LCV CONTROLLERS AT HSDP TAKE A LOT OF TURNS,,
554. MAIN TURB TURNING GEAR INDICATES ON
555. SIM DIED ON LOCA IN CONTAINMENT
556. TURBINE VIBRATION LOCAL RESET
557. D/G VOLTS AND FREQ FLUCTUATIONS WHEN LOADING
558. CROSS ON DBA LOCA
559. PUMP BREAKERS OPEN ON XFER TO S/U
560. RAISE RCS PRESSURE FOR CROSS TO 3200
561. U2 12KV S/U BUS POTENTIAL LITE ON W/O POWER
562. LOSE DC BUS IN HOU AND A HALF W/O CHARGER
563. GET 1000 GPM RHR FLOW WITH NO PUMP RUNNING
564. GET C3/4 B/S LITES ON LOSS OF PY11A
565. LOA'S FOR MAIN TURB TURNING GEAR DON'T WORK
566. ADD MAL CRF12 TO STOP FROM HITTING BOTTOM
567. PK315 #467 FOR C-11 DOESN'T ALARM ON INIT 1
568. SIM BLOWUP ON LOCA TWO-PHASE FLOW
569. CONDENSOR TUBE LEAK MAL AFFECTS OTHER QUADRANTS
570. PMP OPTION 6 DOESN'T WORK ON CCP 13
571. MAKE REPLAY WORK IN AUTOMATIC
572. AR-374849 CHANGE RCP CCW LOW FLOW ALARM TO 106
573. SEIKO PRINTER WORKS INCONSISTENTLY
574. PZR SAFETY TAILPIPE ALARM AT 185 VIC 205
575. RVLIS AND TMS PLASMA DISPLAYS
576. D/G SYNCHROSCOPE DOES NOT OPERATE
577. LR 148 LOSS OF POWER OVR DOESN'T WORK
578. SOUND GENERATOR DOESN'T WORK
579. AR396830 DC 49284 CCW PRESS SYSTEM
580. LOSS OF DRPI PWR DOESN'T DRIVE PPC POINT TO ZERO
581. MAL SYD3 NOT CAUSING TURB LOAD CHANGE
582. AR 398224 CCW SETPOINT CHANGE TO 70
583. RX TRIP BKR RESET TWICE FROM CC1
584. ADD GCF BLOCK AUTO AND MAN TRIP 4KV 12KV PUMPS
585. RCP SEAL RTN BLUE PEN READS LOW
586. 406564 EAGLE 21 EPROM VALUE FOR 12 SECONDS
587. TUNE COND SYS TO MATCH PLANT ADD LOA VLV
588. MORE STM FLOW NOISE ON MSS3C AND D
589. MAL MSS3C AND D SHOULD BRING IN SMOKE ALARMS

590. ANNUNCIATOR SUPPORT FILES INCONSISTENT
591. BACK TRACK TIME FIELD
592. MAIN ANNUN TIME STRIKE
593. PMP FAILURE NOT MODELED FOR AIR COMP.CR VENT
594. CHANGE PWR SUPPLY FOR AIR COMP 05 TO U2 BUS 25D
595. ADD SSPS SLAVE RELAYS TO GCF RELAY
596. CHANGE DEHC VALVE CURVE TO MATCH PLANT
597. RCP SEAL LEAKOFF FLO LO WRONG ALARM
598. P-4 DOESN'T RESET UPON MOMENTARY RX TRIP RESET
599. LOAD REJECT AND GEN VOLTS DON'T RECOVER
600. ADD SOUNDFILE TO SUN TO PLAY PRE-PROGRAMMED SOUNDS
601. ADD SEPARATE SCREEN ON SUN TO MONITOR VARIABLES
602. PUT VIB AND LOOSE PARTS POINTS AS RCS BISTABLES
603. RX TRIPS AFTER ABOUT 1 1/2 HOURS OF STEADY STATE
604. ADD RX TRIP BKR AUX CONTACTS TO GCF RLY
605. TEAM COMMANDS NEED BETTER ERROR MESSAGES
606. SPDS SCREENS GO BLANK ON LOSS OF OFFSITE POWER
607. VCT PRESSURE AND LEVEL BLOWUP ON E DRILL
608. PPC FW HTR 1-1 INLET TEMPS FROM WRONG POINTS
609. PPC POINT P2220A MODELED FROM WRONG PLACE IN SYSTEM
610. DOCUMENT RCP LOOP FLOW COINCIDENCE TEST
611. ADD PT 505A FIRST STAGE POINT
612. RCP SEAL LEAKOFF FLOW LO ALARM CONSTANT REFLASH
613. RHR PUMP AMPS LOSS ON PY FAILURE
614. CCP AMPS READ LOW COMPARED TO PLANT
615. RCP 12 #1 SEAL LEAKOFF FLOW READS LOW
616. CIRC WATER PUMP TRIPS ON START
617. AR 410107 HP DRAIN TANK DUMP VLVS 73/76 FAIL OPEN ON LOAIR
618. ADD SCREEN WASH START FROM U-2 SCREENS FOR ALARMS
619. PPC POINT FOR RE-34 NOT RESPONDING TO XMT FAILURE
620. PPC POINT FOR RE 44A,B SHOULD BE DRIVEN IN CPM
621. PRT PRESSURE AND TEMP INCREASING FOR NO REASON DURING E DRILL
622. MAIN TRUB COAST DOWN TOO FAST AFTER TRIP
623. LOA FOR MFW CHEM INJ PUMPS NEEDS OFF POSITION
624. DRIVE NEW PPC POINT F0702A FT-13 SJAE FLOW
625. MN ANNUN CRT INITIAL TIME STRIKE FROM LAST FREEZE TIME
626. POST TRIP COOLDOWN WITH FULL AFW FLOW NOT GREAT ENOUGH
627. VALVE POSITION LIMIT PROBLEM AND SNAP VALUES
628. S/G BLDN CAT COND HI RANGE READING WRONG
629. POST TRIP COND TUBE SHEET VALUES READ HIGH
630. ACCOUNT FOR EAL INJ FLOW FOR SEAL LKOFF RADIATION
631. MN TUR STM FLOW DECREASE THEN INCREASES AFTER MSIV CLOSURE
632. ADD COLUMN IN PLANT STATUS DISPLAY FILE
633. AR 414028 ALARM IN CONTROL ROOM ON ANNUN PWR LOSS
634. CHANGE MGENWLIS CALC TO INCLUDE MODEL TIME CONSTANT
635. MODEL AMSAC GENERAL WARNING FROM PT 505/506 FAILURES
636. MODEL SCREEN REFUSE SUMP PUMP AMPS
637. A0368528 CHNG EMER STOP PB PWR SUPPLES FOR D/G 1-2-3
638. ADD MFW PUMP & TURB VIB POINTS TO XMT DECK
639. RONAN DATABASE ERRORS
640. TURBINE COASTDOWN TOO LONG
641. D/G CRANKCASE VAC LO ALARM DOESN'T COME IN
642. DED S/D ONL S/G NR LEV SHOULD BE COLD CAL
643. PPC COMPARISON ADDRESS VALUES

644. ADD DISCONNECTS FOR 480 V BKRS FROM AP-8
645. HCV-653 ON VB3 WON'T ZERO
646. ADD DISCONNECTS FOR DC CONTROL PWR TO 4 & 12 KV FDRS
647. NEGATIVE MASS IN S/G ON FW BREAK INSIDE CONT.
648. CAN'T PRESSURIZE RHR SYS PER OP B-2 V
649. PK 1416 #0612 CYCLES EXCESSIVELY
650. FW PP DISCH PRESS DECREASES TOO FAST POST TRIP
651. DED S/D PANEL RED AND GREEN LITES DO NOT WORK
652. DELETED POINT SHOULD N;OT SHOW ON T/C HOTTEST TEMP
653. SW BIGELOW STATOR CLG WATER TEMP DON'T MATCH PLANT
654. AR 415396 NEW COLD GAS TEHM, NEW PWR SUP WITH ALARM
655. 1996 CONTROL BOARD WALKDOWNS
656. OVERRIDE STATUS IS REMOVED FROM SUN STATION
657. FW HTR TEMP SPIKES ON PLANT TRIP
658. CND CHEM INJ PP 12 LOA DOESN'T CHANGE VB3 LITE
659. DG RESPONSE WHEN ENERGIZING SU XFMR 12
660. DG WON'T START ON 27HHB2 RELAY UNDERVOLTAGE
661. M1A,B2A,2B DAMPERS NOT DUAL TRAINED
662. DG 13 BKR OVERCURRENT ALRM DOESN'T WORK
663. DG OC ALARM AND BLUE LIGHT
664. BATTERY CHARGERS WORK WITHOUT POWER
665. SCREEN REFUSE PUMP ALARMS ON PK 1302
666. ANNUN PK0315 TO AMBER VS WHITE LENS
667. DROP LAST DIGIT OF CONDENSER PRESS PI-44
668. MAIN GEN UNDER FREQ INDICATION
669. STATOR COOLING WATER TEMP ALARM
670. SNAP 19,28 38 VARIOUS DECAY HEAT RATES, AND AFW FLOW COOLDOWN
671. GET CROSS DUE TO RHR BREAK
672. A0418130 CHANGE LETDOWN MODELILNG ON INAD CHG FLOW
673. ASW PUMPS AMPS EXCEEDED WHEN SUPPLYING TWO HEAT EXCH
674. DEH PRESSURE METER STUCK
675. USEM MONITOR2 THEN SAVEM MONITOR2 DOESN'T WORK
676. BKRS 14DE AND 15DE OC TRIP WHEN BUSSES XTIED
677. ADD 480 VOLT BUS FREQ SOURCES TO OEPSTOT
678. TDAFW PUMP RPM COASTDOWN IS VERY SLOW ADN OSCILLATES
679. CONT SUMP WATER TEMP NOT SEEN AT RHR AR 422216
680. AR 419503 REMOVE ANNUN INPUT 774 FROM PK15-23 ROLM PBX
681. CRDM FAN SUCTION TEMPS ARE TOO UNIFORM
682. SALT LEAK IS TOO CLEARLY INDICATED ON AFFECTED QUADRANT
683. AR 415955 ADD INPUR TO PPC FROM FT-13 SJAE COND. FLOW
684. TUNE FCV-110A TO GET 35 GPM FLOW
685. SOMETIMES SPDS READS WRONG PLANT VALUES
686. SCREEN REFUSE SUMP HI LEV ALARM DOESN'T OCCUR ANYMORE
687. CHANGE BST AIR1 DESCRIPTION
688. SUN VALUE FOR LOA MWS1 HAS STRANGE VALUES
689. SNAP 11 MFW PP SUCTION FLOWS PEGGED HIGH
690. 12 KV BKR DISCONNECTS DON'T WORK
691. LOSS OF POWER TO DEHCXMT DOESN'T KICK IT OUT
692. TC-505A HIGH LIMIT SHOULD BE 576.6
693. FCV-31 FAILS WRONG ON LOSS OF PY-15
694. OT AND OPDT ROD STOP LITES ON LOSS OF PY 13A
695. TURBINE RPM INCREASES TO 50 RPM ON LOSS OF 4KV BUS D
696. FR 158 RED PEN READS LOW
697. MSIV'S WON'T CLOSE WHEN GCF VLV CLEARS

698. SOURCE RANGE COUNTS TO SPDS WRONG
699. NEED TO DRIVE PC POINTS N0053A AND 54A
700. SEAL RETURN LINE RELIEF VALVE DOESN'T CYCLE ON SI
701. FCV 53 AND 54 FAIL AT WRONG AIR PRESSURE
702. XMT CND38 DOESN'T WORK
703. ALARM POINTS 0059 AND 1317 ARE REVERSED
704. RELEASING ANNUN TEST PB SHOULD STOP BELL AND LITES
705. OPENING FIRE PP BKRS SHOULD CAUSE ALARM
706. AR 416844 CHANGE PZR HTR LOADS
707. AR 424102 REMOVES LT-147 FROM PANEL PM-251
708. ALLOW VALVES TO HAVE DIFFERENT OPEN/CLOSE STROKE TIMES
709. GET NEG RATE TRIP ON 25 MW/MIN RAMP DOWN
710. AR 426833, DC 49363 RWST LEVEL XMTRS TO BE CHANGED
711. AR 424036 PK 1316 SERV AIR DRYER ALARM ERRONEOUS
712. AR 365661 ALARM INPUT 1378 NOT CORRECT
713. AR 416236 DC 49313 CHANGE COND BSTR PUM AUTO START
714. AR 416253 DC 49314 CHANGE HTR 2 DRN PMP TRIP LOGIC
715. ECCS PUMPS CAN BE S/D WITHOUR RESETTING SI
716. AR 396496 DC 49304 REROUT CVC PIPING FE-128
717. AR 426881 PUT P2000 ON PPC INVERTER AND REMOVE P2000 INVERTER
718. AR 4255535 SPARES NUMEROUS PK WINDOWS AND INPUTS
719. CHARGING PUMP STATOR TEMP INCREASE
720. CHECK REACTIVITY EFFECTS OF RODS/BORON AT EOL
721. CCP TRIP ON O.C.ON SAFETY INJECTION
722. REMOTE CONTROL ENHANCEMENTS
723. ALARM INPUT 1248 SHOULD BE 130 DEGREES
724. ADD XMTS FOR MOORE CONTROLLERS
725. AR 428283 ADD SWITCHES TO BLOCK COND/BSTR PUMP START
726. SWAPPING FROM 05 TO 06 AIR COMP CAUSES ALARM
727. AIR COMPRESSOR FLOWS ARE WRONG
728. FAN S-97 FAILURE OOCCURS WHEN S-96 HAS POWER LOSS
729. MAL EPS4 DOESN'T CAUSE S/U OR AUX BKR TRIPS
730. BEARING OIL LIFT PUMP WON'T SHUT DOWN AT 1800 RPM
731. PROBLEMS GOING TO TURB MANUAL ON DEHC
732. LOA OR DSC WON'T CLEAR AFTER TIME DELAY ACTIVATION
733. CCP FLOW DOESN'T MATCHSTP M-54 DATA
734. SPRAY ADD FLOW CONTINUES AFTER PUMP STOP
735. ADD VARIABLE MONITORING TO REMOTE CONTROL
736. FAN E-4 O/C TRIP DOESN'T ALARM
737. RM-44B STAYS IN ALARM AFTER POWER BACK
738. TDAFW PUMP RECIRC FLOW TOO HIGH
739. HI COND ALARM WITH SMALL INCREASE IN DO2
740. HOT LEG TEMPERATURE RESPONSE ON DBA LOCA
741. CONDENSER DELTA P ON CWP TRIP
742. CONTAINMENT TEMP STEP CHANGE

PACIFIC GAS AND ELECTRIC COMPANY

DIABLO CANYON POWER PLANT SIMULATOR

HANDBOOKS

13.2

INSTRUCTOR SYSTEM USER'S GUIDE

REV	DATE	AUTHORED BY	REASON FOR ISSUE/REVISION
0	02/27/89	Roman/Cross	Functional Design Spec.
1	06/15/89	J. W. Cross	Final Draft
2	09/23/92	D. Bearden	Post Delivery Update
3	10/13/92	D. Bearden	Redline Copy Incorporation's
4	03/05/92	D. Bearden	Redline Update.
5	11/12/93	D. Bearden	Redline Update.
6	01/20/95	G. Hutchison	SGI Update
6A	06/21/95	G. Hutchison	Init Revision
7	11/06/97	G. Hutchison	Redline Update

TABLE OF CONTENTS

1.0 Introduction

The Instructor System Handbook User's Guide provides detailed step by step instructions for each of the instructor system features. The format for each section is identical, consisting of:

1. Introduction
2. Detailed procedures
3. Key list with explanation
4. Expert command syntax

The system HELP feature is a duplicate of the majority of these instructions. Thus, the necessity of referring to this document is minimized.

2.0 System Recovery

The recommended procedure in the case of a system failure is to reboot both the SGI computer (Simulator Troubleshooting Manual) and the Sun computer. Several types of failures can occur. The following is a brief description of these failures.

2.0.1 RPC Timeout

This failure is the result of a communication timeout between a Sun computer and a SGI computer. This error may appear during the startup sequence or during the processing of an expert command. The error is usually due to one of the following reasons:

- o The SGI computer is halted.
- o A required task is not running on the SGI computer.

  Issuing the **xli** command from the **sgit%** prompt at one of the SGI computer terminals will tell whether the required tasks are running. If a required task is not running, the terminal will display which task is not running, ex: **gsllink is not running.**
- o The SGI computer is in a solid run state (infinite loop).
- o The Ethernet system is not operational (due to a hardware failure or a loose cable).

2.0.2 DATALINK Failure Detected

This failure can occur after the system has been started up. This error occurs when either command processing has stopped or data transfer from the SGI to the Sun has stopped. The error is usually due to a temporary timing glitch between the SGI and Sun computers. If the DATALINK RESTORED message is not received within a minute the failure was likely due to one of the following reasons:

- o The SGI computer is halted.
- o A required task is not running on the SGI computer.

Issuing the **xli** command from the **sgit%** prompt at one of the SGI computer terminals will tell whether the required tasks are running. If a required task is not running, the terminal will display which task is not running, ex: **gsllink is not running.**

- o The SGI computer is in a solid run state (infinite loop).
- o The Ethernet system is not operational (due to a hardware failure or a loose cable).

2.0.3 Failure of the Simulator to Respond to an ISS Command

This is usually the result of a datalink failure. The MESSAGE feature can be used to see if a datalink failure had previously occurred.

2.0.4 Display Update Failure

This is usually the result of a datalink failure. The MESSAGE feature can be used to see if a datalink failure had previously occurred.

2.0.5 Task is not Active

The named simulator auxiliary task is not executing properly. The **xli** command on the SGI computer can provide additional information on the status of auxiliary tasks.

A list of the tasks that need to be running is as follows:

hsdlink
unixrpcv1
simservr
sunsim
scxwrited
simtyio
gsllink
sim_nspds_link
sim_ppc_link

If any of these tasks are not running **xli** will display a message saying the specific task is not running.
Sometimes you can recover a task that is not there by activating the task from a **sgit%** prompt.

Example: **sgit%simtyio &** (return)
The & is needed to allow use of your terminal for something else.

3.0 Initialization

The INIT key provides access to the simulator initialization feature. This feature provides access to 94 initial conditions (ICs) which are grouped together as follows:

- ICs 1-77 are a mixture of permanent and temporary IC sets for instructor and programmer usage. ICs 1-50 are permanent snaps protected by one password, ICs 51-70 are temporary snaps unprotected for instructor usage, and ICs 71-77 are temporary snaps protected by another password for programmer usage.

- ICs 78-81 are temporary storage locations for the SNAPSHOT function.

- IC 82 is written whenever a replay, backtrack, hardware diagnostic, or initial condition command is executed.

- ICs 83-94 are backtrack IC sets.

The instructor may select any one of these IC sets for simulator initialization.

The mode of step counter initialization can be altered from the option menu prior to resetting. The three modes of initialization include:

- AUTOMATIC -- the step counters will increment only as necessary to arrive at their required positions.

- MANUAL -- the step counters do not move during initialization.

- FULL RESET -- the step counters reset to zero and step forward to their required position.

PROCEDURE 1 of 1 -- INITIALIZATION

1. Select INIT from the control menu on the control CRT or using the R4 function key.

2. If it is desired to change the step counter mode of initialization, select the desired mode prior to resetting the simulator.

3. Select an IC set from the activity window or by manual entry in the option menu.

4. BLINK SWCK IS ON is the default mode, and any switches out of position for the IC set will blink on and off.
To display a list of misaligned components on the expert screen, select BLINK SWCK IS ON, this will toggle the menu to display TEXT SWCK IS ON and display misaligned components on the expert screen vice blinking lites on the control boards.

This box informs you that the Simulator is presently in wink & blink mode, so when you hit the Continue box, lites will wink & blink to inform you of out of position switches.

This box is a toggle box, clicking on this box will change the title of the box to TEXT SWCK IS ON, which means that when Continue is hit a list of out of position switches will scroll on the expert screen. No wink & blinks will occur. This is useful for exam setups, since a burnt out lite for an out of position switch would not flash in wink & blink, but will indicate on the expert screen.

5. Select CONTINUE from the option menu or using the F3 function key.

When you click Continue the list of misaligned switches will scroll across the expert screen, if the list is greater than ~20 lines you will need to click the PAGE SWCK box to continue the list. There is also a 30 second timer to give you time to re-align the switches. After 30 seconds a prompt will appear on the expert screen, requesting you type "more" or "bypswck" to repeat switch check or continue thru the patch file. Clicking the PAGE SWCK box or typing "more" will give an updated list of misaligned switches, clicking END SWITCH CHECK or typing "bypswck" will continue thru the patch file.

6. Align the control board.

NOTE: Misaligned digital inputs are located by flashing lights on the control board. Misaligned analog inputs are located by flashing lights and an associated meter indication. The associated meter indicates mid-scale when aligned, low when the analog input value is too low, and high when the analog input value is too high. In text mode the IC value for the switch and the present control board value are displayed on the expert screen for pots and switches that are not aligned per the IC set.

7. Select END SWITCH CHECK when it is desired to bypass the control board alignment check.

   NOTE: After the control board alignment is complete and END SWITCH CHECK is selected, the SUMMARY feature is automatically entered.

8. When the SIM NOT READY indication changes to the SIM READY indication, select FROZEN from the control menu or using the R15 function key to start the simulation RUNNING.

KEY SUMMARY

INIT -- Activates the initialization feature.

CONTINUE -- Starts the MCB alignment check procedure.

TEXT SWCK IS ON -- Provides a listing of all misaligned components on the SUN CRT expert screen

BLINK SWCK IS ON -- Provides control board flashing lites for switches out of position

PAGE SWCK -- Next page of misaligned components, or repeats listing of misaligned components if only 1 page long.

END SWITCH CHECK -- Bypasses the MCB alignment check.

EXPERT COMMAND SYNTAX

INIT XXX -- Selects and resets the simulator to IC XXX.

BYPASSCK -- Bypasses the switch check feature.

4.0 Snapshot

The SNAP key selects the Snapshot feature. This feature allows the instructor to write an initial condition or snapshot of current power plant status and conditions including malfunctions, local operator actions, global component failures, plant parameters, overrides, and remote control unit assignments by storing the necessary information in a circular buffer of four snapshots (ICs 78 - 81). The contents of any snapshot (IC 78 - 81) can be moved to any other initial condition (ICs 1 - 77). A password is sometimes necessary to store into a particular IC number. Selecting SNAP will cause the current simulator condition to be saved in the oldest of the four snapshot ICs and a display of the current ICs (ICs 78 - 81) will appear. It will also be possible to change the IC set title, the source IC set, and the destination IC set.

PROCEDURE 1 of 2 -- WRITE A SNAPSHOT

1. Freeze the simulator, ensure that the annunciator horn is enabled and all alarms are acknowledged, and then select the SNAP key from the action window on the control CRT or press the R7 function key.

2. Select a source IC set by selecting CHANGE SOURCE IC SET and selecting from the activity window or by manual entry in the option menu. Valid ICs are 78 - 81.

3. Select a destination IC set by selecting CHANGE DESTINATION IC SET and selecting a box from the activity window or by manual entry in the option window at the DESTINATION IC SET:prompt. Valid ICs are 1 - 77.

4. Select WRITE IC SET when the appropriate source and destination ICs are selected. If the selected destination IC set is protected by a password, a prompt will appear in the option window requesting the password. The password is checked and if valid, the IC is written. If, however, the password in invalid, the operation will not be completed; to re-enter the password, WRITE IC SELECT must be selected again. If the selected destination IC set is not password protected, the IC will be written.

PROCEDURE 2 of 2 -- WRITE A TITLE

1. Select the source IC set.

2. Enter the new title by manual entry in the option window. Upon issuing a carriage return, the new title will be written to the source IC set.

KEY SUMMARY

CHANGE SOURCE IC SET -- Enable selection of the source IC set.

CHANGE DESTINATION IC SET -- Enable selection of the destination IC set.

WRITE IC SET -- Write the source IC set to the destination IC set.

PAGEUP (up arrow) -- Page backward through available ICs (wraparound will occur at beginning of buffer).

PAGEDOWN (down arrow) -- Page forward through available ICs (wraparound will occur at end of buffer).

EXPERT COMMAND SYNTAX

WRSNAPID title -- Changes the title of the simulator status in memory.

WRSNAP n -- Write the current simulator status in memory to IC n.

Example:

1. To write the current snap, first find a clear snap number using the INIT menu, for example snap 54 is titled clear.
2. On the expert line type:
   wrsnapid requal snap for r971, save till 1/1/98
3. On the expert line type:
   wrsnap 54

INSTRUCTORS DO NOT USE THE FOLLOWING COMMANDS

MOVESNAP n,m -- Write IC n to IC m.

MOVESNAP n,m,password -- Write IC n to password protected IC m.

IDSNAP n,title -- Changes the title of snap # n that was previously written.
You may have to sleep the Sun and SGI computers and restart to see the title change.

5.0 Backtrack

The BACKTRK key selects the Backtrack feature. This feature allows the instructor to back up during the training session and restart the simulator from a previous time. Backtrack ICs (ICs 83-94) are being written periodically, normally at five minute intervals in a stacked buffer, the most recent in IC-83 and the oldest in IC-94. The oldest backtrack IC is dropped out the bottom of the stack as each new backtrack is written to the top of the stack. The time interval at which backtracks are being written may be changed by an expert command (SW SNAPFREQ=n). This backtrack writing can be enabled or disabled from the options menu or by toggling the F6 function key.

Manual and Automatic scan are available to preview the backtrack ICs on the simulator control boards. The instructor has the option of selecting a backtrack IC to be previewed by number, elapsed time, or run time. The simulator condition which exists before previewing or resetting to a backtrack is saved in snapshot 82; therefore, it can be returned to after completion of the backtrack sequence.

PROCEDURE 1 of 4 -- SELECTING A BACKTRACK

1. Select the BACKTRK key from the action window on the control CRT or press the R5 function key.

2. Select a backtrack IC by selecting from the activity window, by manual entry of an IC number in the option window at the SELECT BACKTRACK IC SET BY NUMBER prompt, by elapsed time in the format hh:mm:ss at the BY ELAPSED TIME prompt or by run time in the format hh:mm:ss at the BY RUN TIME prompt.

3. If it is desired to change the step counter mode of initialization, select the desired mode prior to resetting the simulator.

4. Select the INIT TO #__ key. Backtrack initialization is identical to normal initialization.

PROCEDURE 2 of 4 -- MANUAL SCANNING

1. Select the backtrack IC to be scanned.

2. Select the scan direction by selecting the REVERSE/FORWARD toggle key (selection of this key will have no affect on the current execution of manual scanning; however, this indicates the next backtrack IC to be scanned, forward or backward, when SCAN STEP is selected subsequently).

3. Select the SCAN STEP key (manual and automatic scanning cannot be active concurrently; if automatic scanning is active when manual scanning is selected, an error message will appear on the screen and automatic scanning will need to be disabled before manual scanning can be initiated). The simulator will be frozen, if it is running, and preview that IC.

4. To continue scanning, select the SCAN STEP key again. The next IC will be scanned according to the scan direction.

PROCEDURE 3 of 4 -- AUTOMATIC SCANNING

1. Select the first backtrack IC to be scanned.

2. Select the scan direction by selecting the REVERSE/FORWARD toggle key.

3. Select the AUTO SCAN START/STOP key. The simulator will be frozen, if it is running, and preview the selected IC for five seconds. After five seconds, the simulator will preview the next IC, according to the scan direction.

4. To stop automatic scanning, select the AUTO SCAN START/STOP key again.

PROCEDURE 4 of 4 -- DISABLING/ENABLING BACKTRACK WRITING

1. Select the BACKTRK DISABLED/ENABLED key to toggle between writing and not writing backtracks.

KEY SUMMARY

RESET -- Reset the simulator to the selected backtrack IC.

SCAN STEP -- Scan the selected IC.

AUTO SCAN START/STOP -- Start or stop automatic scanning.

BACKTRK DISABLED/ENABLED -- Disable or enable backtrack writing.

REVERSE/FORWARD -- Set the scan direction.

PAGEUP (up arrow) -- Page backward through available ICs (wraparound will occur at beginning of buffer).

PAGEDOWN (down arrow) -- Page forward through available ICs (wraparound will occur at end of buffer).

EXPERT COMMAND SYNTAX

INIT n -- Initialize to IC n.

PREVIEW n -- Preview the IC n. ***NOT USED AT THIS TIME***

SNAPFREQ 0 -- Disable backtrack writing.

SNAPFREQ n -- Set the frequency at which backtracks are being written to n seconds.

6.0 Annunciator

The annunciator control feature consists of three keys providing the following functions:

- o Master acknowledge for all SER and main control board alarms
- o Master reset for all SER and main control board alarms
- o Audible alarm enable/disable

PROCEDURE 1 of 3 -- ALARM ACKNOWLEDGE

1. Select MASTER ACK in the control menu of the control CRT or select the R-1 function key.

PROCEDURE 2 of 3 -- ALARM RESET (NOT implemented)

1. Select MASTER RESET in the control menu of the control CRT or select the R-3 function key.

PROCEDURE 3 of 3 -- AUDIBLE ALARM CONTROL

1. When the audible alarm is enabled, select BELL ON /off or the R-2 function key to silence the audible alarm.

   NOTE: In this condition, no audible alarm will be received when new alarms are activated.

2. When the audible alarm is disabled, select BELL OFF/on or the R-2 function key to return the audible alarm to normal operation.

KEY SUMMARY

MASTER ACK -- Master annunciator acknowledge.

MASTER RESET -- Master annunciator reset. (NOT implemented)

BELL ON/off -- Control audible alarm.

EXPERT COMMAND SYNTAX

ANACK -- Acknowledge all alarms.

ANRSET -- Reset all alarms. (NOT implemented)

ANHORN -- Toggle audible alarm.

7.0 Run/Freeze

The RUNNING/FROZEN key is a toggle key for stopping and starting the simulation. There is a soft key on the Control CRT and a dedicated function key (R-15) on the keyboard.

The soft key is highlighted in green when the simulator is in the running mode, and in dark blue when in the frozen mode.

PROCEDURE 1 of 1 -- START/STOP SIMULATION

NOTE: The simulator must have been initialized to a particular IC set or placed into the diagnostic mode prior to using the RUNNING/FROZEN key.

1. To start the simulator when frozen, select the FROZEN key on the control CRT or the R-15 function key.

2. To stop the simulator when running, select the RUNNING key on the control CRT or the R-15 function key.

KEY SUMMARY

RUNNING/FROZEN -- Toggles between the frozen and running modes of the simulator.

EXPERT COMMAND SYNTAX

RUN XXX -- Run for XXX seconds and then to freeze.

RUN -- Starts the simulation and continues to run until otherwise stopped.

FRZ -- Freeze the simulation.

FRZ WHEN trigger--Freezes simulator when the stated trigger is set.
ex: **frz when fnispr.lt.5.0** This will freeze the simulator when any power range NI channel gets less than 5.0 % power.

8.0 Expert Mode

The EXPERT key selects the Expert Mode feature which allows the instructor to enter expert commands at the command prompt. The reply to these commands will appear in the EXPERT WINDOW on the screen. The expert commands provide a quick interface for simulator control. Commands exist for most control features. Some examples are IDA activation and clearing, time scaling, snapshot control, and software debugging. The Instructor System Handbook User's Guide (Section 13.2) describes all available expert commands.

PROCEDURE 1 of 4 -- SELECT EXPERT MODE

1. Select the EXPERT key from the control window on the control CRT or press the R13 function key.

2. Position the cursor inside the expert window.

3. Type in the desired command(s).

NOTE: You must use the proper expert command sequence when typing expert commands. Reasonable values must be put in for each selection, and zero fills put in for time delays and ramp times. Some examples are as follows:

```
MAL AFW3A ACT,100,20,30,C,JPPLRT,40
MAL PPL3A ACT,2,0,0,C,FNISPR(1).LT.95,0
MAL PPL3B ACT,1,1,30,D,0
MAL RCS1 ACT,1,1,0,,D,0

LOA AFW8 100,20,30,D,0
LOA EPS6 T,0,30,D,0
LOA PPL4 F,0,0,D,0

BST CND1 1,0,0,30,D,5
BST CND2 2,0,0,0,C,JPPLRT,0

HTX CCW1 1,.5,20,30,D,0
HTX CCW2 1,.5,0,0,C,FNISPR.GT.95,0

XMT MSS1 3,100,20,30,D,0
XMT RHR6 3,100,0,0,C,JPPLRT,0

SER 1127 ACT,1,0,0,D,300
SER 99 ACT,2,0,20,C,JPPLRT,0

OVR XV4D088M ACT,100,20,30,D,0
```

OVR XV3I188O ACT,1,0,0,C,JPPLRT,5

DLY CCW1 1,0,0,30,D,0
DLY CCW1 4,100,20,30,D,0

PLP AUX1 65,20,30,C,JPPLRT
PLP AUX3 15.7,20,30,D

PROCEDURE 2 of 4 -- SELECTING CONTROL PANEL MONITORING

1. Select Expert Mode.

2. Select CP Mon ON to enable control panel monitoring.

   NOTE: CP Mon and MONV are mutually exclusive. If CP Mon is enabled, MONV will be stopped.

3. Select CP Mon OFF to disable control panel monitoring.

PROCEDURE 3 of 4 -- SELECTING COMMAND PRINTING

1. Select Expert Mode.

2. Select PRINT ON to enable command printing.

3. Select PRINT OFF to disable command printing.

PROCEDURE 4 of 4 -- USING BYPASS SWITCH CHECK

1. Select Expert Mode.

2. Initialize the simulator to an IC (i.e., INIT 16).

3. When the control panels alignment is satisfactory, select BYPASS SWITCH CHECK.

KEY SUMMARY

START/STOP MON CP -- Enables/disables control panel monitoring.

START/STOP PRINTING -- Enables/disables command printing to the line printer.

BYPASS SWITCH CHECK -- Bypasses switch check.

MONCP -- Toggles the control panel monitoring mode.

PRTCOM -- Enables command printing to a file on the sgi.

XPRTCOM -- Disables command printing.

BYPSWCK -- Bypass switch check.

Other Commands:

Many times the instructor will want to vary a parameter to enhance training. There are two ways of changing variables, the SET or SW command and the RAMP command.

SET/SW -- Each variable is defined within the computer as a word or bit/real or integer. A specific command such as SW will only work on a single word variable. Since it may be difficult to tell in what form a variable has been defined, the SET command is used most often. The SET command has the advantage of working on any type of variable. One disadvantage is its ability to change every word in an array if used carelessly.

Example:

SET JCRFDIS=1 will cause the rod control system to think all the lift coil disconnect switches are open.
SW JCRFDIS=1 won't work because JCRFDIS is a bit array not a word array.

RAMP -- Sometimes you may want to change a variable slowly. For example, you might want to decrease the water inventory in the VCT.

The RAMP command has the following form:

RAMP name, final value, ramp time, time delay, direct or conditional, conditional trigger, time or condition to clear
All the spaces next to the commas must be filled in and all times must be in seconds.

Example:

RAMP ACVCVCTW,5000,1200,60,c,smss.lt.1100,0

The water inventory in the VCT will change from its present value to 5000 pounds over a 1200 second interval starting 60 seconds after generator megawatts go less than 1100.

RAMP ACVCVCTW,5000,1200,60,C,SMSS.LT.1100,BPRSVS.LT.53

The water inventory in the VCT will change from its present value to 5000 pounds over a 1200 second interval starting 60 seconds after generator megawatts go less than 1100 and return to its pre-ramp value when pzr level goes less than 53%.

9.0 Malfunctions (MAL)

The MALF key selects the malfunction control feature. This feature allows the instructor to compose, activate, or terminate malfunctions simulated in the system. Normally, protected initial conditions are stored with no active or time delayed malfunctions. It is possible, however, for the instructor to store an initial condition with malfunctions activated or in time delay.

PROCEDURE 1 of 4 -- ACTIVATE MALFUNCTION USING MALFUNCTION MENU

1. Select the MAL key on the control CRT or press the L2 function key.

2. Select one of the malfunction systems on the control CRT or key in malfunction ID to reach the malfunction control menu directly (move to step 5).

3. Select one of the malfunctions.

4. Select one of the subsystems of selected malfunction, if applicable.

5. Set up the FINAL VALUE, if applicable.

6. Select a malfunction box, if applicable, to set FINAL VALUE.
7. Select the sliding bar, if applicable, to set FINAL VALUE.

8. Set up RAMP TIME, if applicable.

9. Set up TIME DELAY TO ACTIVATE, if applicable.

10. Set up TIME DELAY TO CLEAR, if applicable.

11. Select the DIRECT key to set up direct activation mode.

12. Select the CONDITION key to set up conditional activation mode.

9.1 Trigger String Setup

13. Set up a trigger string, if applicable (only 16 triggers can be used at once).

    a. To set up a trigger the instructor must first determine a datapool variable name that he/she wishes to use to trigger

the malfunction. A condensed listing of datapool variable names can be found in DATABOOK.

b. The selected datapool name is then compared to either a value or another datapool name. The comparison is constructed using Fortran like logical operators (please note the leading and following periods around the logical operators). Avoid the use of leading and trailing blanks in the conditional expression. You should also be cautioned against using the .EQ. expression as the comparison would have to be exact down to the last decimal place if you are dealing with real numbers (e.g., levels, flow rates, temperatures, and pressures).:

.GT. (greater than),
.EQ. (equal),
.LT. (less than),
.NE. (not equal),
.LE. (less than or equal),
.GE. (greater than or equal),
.OR. (or),
.AND. (and)
.NOT. (not) - activates when variable goes false

Examples of conditional triggers:

FNISPR(1).GT.90 (PR channel 41 > 90 % power)

BPRSVS(1).LT.25 (Pzr level transmitter less than 25 %)

JMLRCS6 (Logical variable for the status of malfunction RCS6. Triggering a malfunction from the status of another malfunction allows you to daisy chain malfunctions to one another. Note that all malfunctions have the following syntax: JMLXXXX, where XXXX is the malfunction name, so malfunction GEN4 variable for activation would be JMLGEN4. If the malfunction has an A,B,C selection then the name would end in (1) (2) or (3).
ex: MAL RCS3B variable would be JMLRCS3(2))

14. Select the ACTIVATE key to activate selected malfunction.

PROCEDURE 2 of 4 -- CLEAR SPECIFIC MALFUNCTION USING MALFUNCTION MENU

1. Repeat steps 1 to 4 of procedure 1 to compose the specific malfunction.

2. Select the CLEAR key to terminate this specific malfunction.

PROCEDURE 3 of 4 -- CLEAR ALL MALFUNCTIONS

1. Select the MAL key on the control CRT.

2. Select the CLEAR ALL key to clear all malfunctions which are currently active.

PROCEDURE 4 of 4 -- CHECK THE MALFUNCTIONS STATUS

1. Select the MAL key on the control CRT.

2. Select the MALF STATUS key to show up current malfunctions status.

KEY SUMMARY

SYSTEM MENU -- Activate MALFUNCTIONS SYSTEMS MENU display.

MALF STATUS -- Activate the malfunction status display.

CLEAR ALL -- Terminate all malfunction which are currently active.
DIRECT -- Select direct activation mode.

CONDITION -- Select conditional activation mode.

REMOTE -- Select remote activation mode.

CLEAR -- Terminate selected malfunction which is currently active.

ACTIVATE -- Activate selected malfunction.

TRIGGER LIBRARY/EXIT TRIGGER LIBRARY -- Enable/Disable TRIGGER LIBRARY feature.

EXIT -- Exit malfunction control menu without activating the malfunction.

9.2 Malfunction Expert Command Sequence

To execute a specific malfunction use the following sequence:

MAL malname ACT[,value1,value2,value3,value4,value5,value6]

which activates the specified malfunction; the arguments in [ ] can be appended to the command to compose and directly activate the malfunction with one step, where:

All parameters within brackets [ ] are optional. Default values are selected for any of these parameters if not specified.

MAL - sets up the malfunction mode.

malname - is the alphanumeric name of the malfunction.

Value1 is the selected severity value.

Value2 is the RAMP TIME in seconds (use a 0 if a ramp is not applicable, ie..breaker trip has no ramp, so a 0 would go in the value 2 spot.).

Value3 is the DELAY TIME in seconds.

Value4 is the method of activation;

D for direct,

C for conditional expression,

Value5 is the conditional Boolean expression (if value4 is C) or the TIME TO CLEAR in seconds if value4 is D.

Value6 is the TIME TO CLEAR in seconds or the Condition To Clear (trigger to clear failure, can not be same conditional expression that activates malfunction) , or is not used if value 4 is D.

For example:

MAL NIS6A ACT,120,1,10,D,900

Would cause power range channel 41 to fail to 120% power with a one second ramp time 10 seconds after activation, and to automatically clear 900 seconds after activation.

MAL NIS6A ACT,120,1,10,C,FNISPR(2).LT.10,900

Would cause power range channel 41 to fail to 120% power with a one second ramp time 10 seconds after power range channel 42 dropped below 10% power, and to automatically clear 900 seconds after activation.

MAL NIS6A ACT,120,1,10,c,jmlsei1,fnispr(4).lt.5

Would cause power range channel 41 to fail to 120% power with a one second ramp time 10 seconds after the seismic malfunction is activated, and to automatically clear when power range channel 44 goes less than 5 %

MAL malname CLR - clears the specified malfunction.

10.0 Local Operator Actions (LOA)

The LOA key selects the Local Operator Action (LOA) Control feature. This feature includes such auxiliary functions as valve manipulation, remote electrical operation, and other normal operation of equipment accomplished outside the control room. These LOAs are included for two purposes: to allow the operator to follow plant operating procedures which have visible effects in the control room, and to permit the operator to recover from malfunctions. This feature allows the instructor to change the status of the selected LOA.

PROCEDURE 1 of 2 -- ACTIVATE LOA USING LOA MENU

1. Select the LOA key on the control CRT or press the L3 function key.
2. Select one of the LOA systems on the control CRT or key in LOA ID to reach the LOA control menu directly (move to step 4).
3. Select one of the LOAs.
4. Set up the FINAL VALUE, if applicable.
5. Select an LOA box, if applicable, to set FINAL VALUE.
6. Select the sliding bar, if applicable, to set FINAL VALUE.
7. Set up RAMP TIME, if applicable.
8. Set up DELAY TIME, if applicable.
9. Select the DIRECT key to set up direct activation mode.
10. Select the CONDITION key to set up conditional activation mode.
11. Set up a TRIGGER string, if applicable. (only 16 triggers can be used at once) .
12. Set up TO CLEAR if applicable with a time to reset LOA or a trigger string to reset LOA after ramp is finished
13. Select the ACTIVATE key to activate selected LOA.

PROCEDURE 2 of 2 -- CHECK THE LOA STATUS

1. Select the LOA key on the control CRT.

2. Select the LOA STATUS key to show up current LOA's status.

KEY SUMMARY

SYSTEM MENU -- Activate LOA SYSTEMS MENU display.

LOA STATUS -- Activate the LOA's status display.

DIRECT -- Select direct activation mode.

CONDITION -- Select conditional activation mode.

TRIGGER LIBRARY/EXIT TRIGGER LIBRARY -- Enable/Disable TRIGGER LIBRARY feature.

ACTIVATE -- Activate selected LOA .

EXIT -- Exit LOA control menu without activating the LOA.

EXPERT COMMAND SYNTAX

LOA IDA string -- Execute specific LOA.

LOA name value1[,value2,value3,value4,value5] [#variable name]

All parameters within brackets [ ] are optional. Default values are selected for any of these parameters if not specified.

Value1 is the selected value.

Value2 is the ramp time in seconds

Value3 is the delay time in seconds.

Value4 is the optional method of activation;

D for direct,

C for conditional expression,

Value 5 is the conditional Boolean expression (if value4 is C). or the TIME TO STOP RAMP in seconds if value4 is D.

Value6 is the TIME TO STOP RAMP in seconds or the Condition To Clear (trigger to clear failure, can not be same conditional expression that activates LOA), or is not used if value 4 is D. Note that if a time or trigger is used (something other than 0) the LOA will reset to its original value prior to activation.

#variable name- the name of the variable that the loa controls, ie loa afw2 controls the variable rmsf152. This is useful to include in drill files because this variable name is the reference used to update drill files if the loa listing is renumbered. With this reference the drill file can automatically change the loa number to the correct one for that variable. This way your drill file will always perform the correct action, ie.. fcv-152 will always change whether it was originally afw2 and was then changed to afw15 in the loa listing.

LOA AFW5 0 - Activates AFW9 local operator action immediately.

LOA AFW5 0,8,30 - Activates AFW9 local operator action with an 8 second ramp after a 30 second delay.

LOA AFW5 0,8,0,C,JPPLFWIS - Activates LOA AFW5 when the logical variable JPPLFWIS (Low Tavg-Rx Trip feedwater isolation) is true. The valve (FW-121) will ramp closed over a 8 second interval as soon as a reactor trip related feedwater isolation occurs.

In a drill file the above commands would be written:

LOA AFW5 0 #rafv121

LOA AFW5 0,8,30 #rafv121

LOA AFW5 0,8,0,C,JPPLFWIS #rafv121

11.0 Plant Parameters (PLP)

The PLANT PARAM key selects the Plant Parameter (PLP) Control feature. This feature allows the instructor to change external and internal plant parameters. External plant parameters are those which are outside the control of the plant, but which have dynamic effects on the plant simulation.

PROCEDURE 1 of 1 -- ACTIVATE PLANT PARAM USING PLANT PARAM MENU

1. Select the PLANT PARAM key on the control CRT or press the L6 function key.
2. Select one of the PLANT PARAM systems on the control CRT or key in PLP ID to reach the PLP control menu directly (move to step 4). NOTE: AUX is currently the only system with PLANT PARAMs.
3. Select one of the PLANT PARAMs.
4. Set up the FINAL VALUE, if applicable.
5. Select the sliding bar, if applicable, to set FINAL VALUE.
6. Set up RAMP TIME, if applicable.
7. Set up DELAY TIME, if applicable.
8. Select the DIRECT key to set up direct activation mode.
9. Select the CONDITION key to set up conditional activation mode.
10. Set up a TRIGGER string, if applicable.
(only 16 triggers can be used at once) .
11. Set up TO CLEAR if applicable with a time to reset PLP or a trigger string to reset PLP after ramp is finished
12. Select the ACTIVATE key to activate selected PLANT PARAM.

KEY SUMMARY

SYSTEM MENU -- Activate PLANT PARAMETERS SYSTEMS MENU display.

ACTIVATE -- Activate selected PLANT PARAM.

DIRECT -- Select direct activation mode.

CONDITION -- Select conditional activation mode.

TRIGGER LIBRARY/EXIT TRIGGER LIBRARY -- Enable/Disable TRIGGER LIBRARY feature.

EXIT -- Exit PLANT PARAM control menu without activating the PLANT PARAM.

EXPERT COMMAND SYNTAX

PLP IDA string -- Execute specific PLANT PARAM.

PLP name value1,value2,value3,value4,value5 - adjust external parameter

where

name = alpha numeric name for the plant parameter

value1 = new parameter VALUE

value2 = RAMP TIME

value3 = DELAY TIME

Value4 is the optional method of activation;

D for direct,

C for conditional expression,

Value 5 is the conditional Boolean expression (if value4 is C) or Time or Condition to Clear if value 4 is D

Value6 is the TIME TO CLEAR in seconds or the Condition To Clear (trigger to clear failure, can not be same conditional expression that activates PLP), or is not used if value 4 is D. Note that if a time or trigger is used (something other than 0) the PLP will reset to its original value prior to activation.

For example:

PLP AUX1 60,3600,300,C,SMSS.LT.100 - five minutes after main generator megawatts go less than 100, the instructor system ramps ocean temperature for the next hour to a final value of 60 degF.

12.0 Global Component Failures (GCF)

The GCF key selects the Global Component Failure (GCF) Menu. This feature allows the instructor to fail heat exchangers, transmitters and bistables. The common modes of failure are:

Bistables (BST):

1. Trip
2. Reset
3. Fail as is
4. Loss of power

Controllers (CNH):

1. Fail as is
2. Fail to value
3. Fail power
4. Adjust gain
5. Adjust reset
6. fail auto mode
7. Max hi limit
8. Max low limit

Delay timers (DLY):

1. Fail true (SET)
2. Fail false (RST)RL
3. Fail as is
4. Fail timer

Heat exchangers (HTX):

1. Fail to value

Pumps (PMP):

1. Block auto start
2. Block man start
3. Block A/M start
4. Overcurrent trip

Transmitters (XMT):

1. Fail as is
2. Loss of power
3. Fail to value
4. Slow response
5. Set upper limit
6. Set lower limit

Control valves (CNV):

1. Fail as is
2. Fail to position

Non control valves (VLV):

1. Fail as is
2. Fail to position

PROCEDURE 1 of 3 -- ACTIVATE GCF USING GCF MENU

1. Select GCF key on the control CRT or press the L4 function key.
2. Select one of GCF systems on the control CRT or key in GCF type and ID to reach GCF menu directly (move to step 5).
3. Select one of GCF types (i.e., BST, CNH, DLY, HTX, PMP, XMT, CNV, or VLV).
4. Select one of the components to fail.
5. Set up FINAL VALUE.
6. Select common mode failure box, if applicable, to set FINAL VALUE (i.e., loss of power).
7. Select sliding bar, if applicable, to set FINAL VALUE.
8. Set up RAMP TIME, if applicable.
9. Set up DELAY TIME, if applicable.
10. Set up ANALOG VALUE, if applicable.
11. Select DIRECT key to set up direct activation mode.
12. Select CONDITION key to set up conditional activation mode.
13. Set up TRIGGER string, if applicable.
(only 16 triggers can be used at once).
14. Set up TO CLEAR if applicable with a time to reset or a trigger string to reset after ramp is finished
15. Select ACTIVATE key to activate selected GCF function.

PROCEDURE 2 of 3 -- CLEAR GCF USING GCF MENU

1. Repeat steps 1 to 4 of Procedure 1 to compose the specific GCF function.

2. Select CLEAR key to terminate this specific GCF function.

PROCEDURE 3 of 3 -- CHECK THE COMPONENT FAILURE STATUS

1. Select GCF key on the control CRT.

2. Select COMP FAIL STATUS key to show up current GCF status.

KEY SUMMARY

SYSTEM MENU -- Select system menu.

COMP FAIL STATUS -- Activate the component failure status display.

BISTABLEs -- Select bistables (BST) failure menu for currently selected system.

CNTLRs -- Select controllers (CNH) failure menu for currently selected system.

DELAY TIMERs -- Select delay timers (DLY) failure menu for currently selected system.

HEAT XCHGs -- Select heat exchanger (HTX) failure menu for currently selected system.

PUMPs -- Select pumps (PMP) failure menu for currently selected system.

XMTRs -- Select transmitter (XMT) failure menu for currently selected system.

VLVs CONTROL -- Select control valves (CNV) failure menu for currently selected system.

VLVs Non-CNTRL -- Select non-control valves (VLV) failure menu for currently selected system.

DIRECT -- Select direct activation mode.

CONDITION -- Select conditional activation mode.

TRIGGER LIBRARY/EXIT TRIGGER LIBRARY -- Enable/Disable TRIGGER LIBRARY feature.

CLEAR -- Terminate selected GCF function which is currently active.

ACTIVATE -- Activate selected GCF function.

EXIT -- Exit GCF control menu without activating the GCF function.

EXPERT COMMAND SYNTAX

BST IDA string -- Execute bistable GCF function.

CNH IDA string -- Execute controller GCF function.

DLY IDA string -- Execute timer GCF function.

HTX IDA string -- Execute heat exchanger GCF function.

PMP IDA string -- Execute pump GCF function.

XMT IDA string -- Execute transmitter GCF function.

CNV IDA string -- Execute control valve GCF function.

VLV IDA string -- Execute non-control valve GCF function.

Note: IDA string is a string that begins with XXXZ where XXX is one of the valid 3-character systems (i.e., AFW, CVC, RCS, ...) and Z is the numerical designator within the character system. What follows is dependent on the specific IDA.

Global component failure commands are of the following syntax:

XXX name option No [,value1,value2,value3,MAC,COND EXPR,CLEAR]

where

XXX is a three-letter component type (eg. BST, CNH, DLY, HTX, PMP, XMT, CNV, or VLV.)

Name is a valid (up to eight characters) component name.
Option No is a valid failure option number for the selected component.

Value1 is the selected component VALUE.

Value2 is the RAMP TIME in seconds (value1 and value2 are needed only for analog (real number representing level, temperature, boron concentration, et al) values).

Value3 is the DELAY TIME in seconds.

MAC is a single-character method of activation designator (D and C are valid designators).

COND EXPR is a valid logical expression used as a trigger to activate the global component failure when the conditional method of activation is specified.

CLEAR is the time delay or conditional expression to clear component failure after it is activated

All parameters within brackets [ ] are optional.

Default values are selected for any of these parameters if not specified.

A comma or space are valid delimiters for the parameters.

XXX name CLR - Clears previously activated global component failure.

Some examples of global component failure activation commands are:

BST CCW1 1 - Activates CCW1 bistable trip (option 1) immediately.

BST CCW1 4,0,0,30 - Activates CCW1 bistable loss of power(option 4) after a 30-second delay. (Note: this is a logical option, but ramp value and ramp time are filled in with 0.)

XMT AFW1 3, 50, 15, C, PCNM.GT. 20 - Activates AFW1 fail to value (option 3) when expression "PCNM.GT. 60" is true. At this time the component value is ramped for 15 seconds to reach a final value of 50 percent.

GLB or CLF commands - gives status of initiated global component failures.

ex: PMP CVC1 4,0,0,30,D,0
GLB
The following glb/clf's have been initiated:
MHF11 CHARGING PP 11 (CENT.) with option 4

13.0 Overrides (OVR)

The OVERRIDE key selects the Override (OVR) System Menu. A number of override features will be provided to simulate simple plant failures in control room equipment. These overrides include the following generic types:

- o SWITCHES , PUSHBUTTONS , METERS, STATUS LIGHTS (OVR)
  - Permanent failure of switches to a selectable position
  - Permanent failure of pushbuttons in the open or closed contact state
  - Simulates permanent failure of any METER, freezing the METER in the current value, or drifting to a specified value with a specified ramp time
  - Simulates failure of any on/off light in its current status or to cause the light to be permanently on or off
- o ALARM INPUTS (SER)
  - to simulate failure of any annunciator input, freezing the input its current position, or causing the alarm input to be failed on or off.
  - to simulate failure of any control board annunciator window, freezing in its current state or causing the window to be failed on

  or

  off

Exclusions from the override feature include the PPC, SPDS, digital displays, relay outputs, and DRPI front panel displays. The instructor may select any number of these overrides up to a maximum of 50 at one time.

PROCEDURE 1 of 3 -- ACTIVATE OVERRIDE USING OVERRIDE MENU

1. Select OVERRIDE on the control CRT or press the L5 function key.
2. Select one of the override panels on the control CRT or key in override ID to reach the override control menu directly (move to step 6).
3. Select one of the components for override.
   Note that the first 3 letters of the override description refer to the

system name of the component within that override panel.

4. Select one of the subsystems of selected override, if applicable.

5. Set up the FINAL VALUE, if applicable.

6. Select an override status box, if applicable, to set FINAL VALUE.

7. Select the sliding bar, if applicable, to set FINAL VALUE.

8. Set up RAMP TIME, if applicable.

9. Set up DELAY TIME, if applicable.

10. Select the DIRECT key to set up direct activation mode.

11. Select the CONDITION key to set up conditional activation mode. (only 16 triggers can be used at once) .

12. Set up a TRIGGER string, if applicable.

13. Set up TO CLEAR if applicable with a time to reset or a trigger string to reset after ramp is finished

14. Select the ACTIVATE key to activate selected override.

PROCEDURE 2 of 3 -- CLEAR OVERRIDE USING OVERRIDE MENU

1. Repeat steps 1 to 5 of Procedure 1 to compose the specific override.

2. Select CLEAR key to terminate this specific override.

PROCEDURE 3 of 3 -- CHECK THE OVERRIDE STATUS

1. Select OVERRIDE on the control CRT or press the L5 function key.

2. Select the OVERRIDE STATUS key to show up current override status.

KEY SUMMARY

OVERRIDE STATUS -- Activate the override status display.

SWITCHES/PBs -- Select hardwired control board override menu for currently selected system.

DIRECT -- Select direct activation mode.

CONDITION -- Select conditional activation mode.

TRIGGER LIBRARY/EXIT TRIGGER LIBRARY -- Enable/Disable TRIGGER LIBRARY feature.

ACTIVATE -- Activate selected override.

CLEAR -- Terminate selected override which is currently active.

EXIT -- Exit override control menu without activating the override.

EXPERT COMMAND SYNTAX

XXX name ACT value1, value2, value3, value4, value5 - composes and activates override; argument list is described below:

where XXX is the override type (OVR or SER)
OVR - overrrides control switches, pots, meters, lites
SER - overrides annunciator alarm inputs

XXX name ACT[,value1,value2,value3,value4,value5] - activates the specified override; the arguments in [ ] can be appended to the command to compose and directly activate the override with one step, where:

All parameters within brackets [ ] are optional. Default values are selected for any of these parameters if not specified.

Value1 is the selected severity VALUE.

Value2 is the RAMP TIME in seconds (value1 and value2 are needed only for analog options).

Value3 is the DELAY TIME in seconds.
Value4 is the optional method of activation;

C for conditional expression,

Value 5 is the conditional Boolean expression (if value4 is C) or Time or Condition to Clear if value 4 is D

Value6 is the TIME TO CLEAR in seconds or the Condition To Clear (trigger to clear failure, can not be same conditional expression that activates OVR), or is not used if value 4 is D.

For example:

OVR XV1D063M ACT 40,0,1,C,JPPLRT

Would cause containment pressure indicator PI-934 to fail to a 40% value one second after an automatic reactor trip signal was received.

SER 0502 ACT,1,0,0,C,XV4O186G,XV2O260G

Brings in alarm input 0502 RCP 11 fdr grd when the green lite for CWP 12 turns on, and clears alarm when the green lite for RCP 11 turns on

XXX name CLR - clears the specified override.

14.0 Disconnects (DSCs)

The DSCs key selects the Disconnects (DSC) Control feature. This feature allows the instructor to change operate breakers or other switches at the 480V level and below. 4KV DC knife switches are still found under LOA's.

PROCEDURE 1 of 1 -- ACTIVATE DISCONNECTS USING THE DSCs MENU

1. Select the DSCs key on the control CRT or press the L6 function key.

2. Select one of the DSCs systems on the control CRT or key in DSC ID to reach the DSC control menu directly (move to step 4).

3. Select one of the DSCSs.

4. Set up the FINAL VALUE, if applicable.

5. Select the sliding bar, if applicable, to set FINAL VALUE.

6. RAMP TIME is not used with Disconnects, they are either opened or closed.

7. Set up DELAY TIME, if applicable.

8. Select the DIRECT key to set up direct activation mode.

9. Select the CONDITION key to set up conditional activation mode.

10. Set up a TRIGGER string, if applicable.
(only 16 triggers can be used at once).

11. Set up TO CLEAR if applicable with a time to reset DSC or a trigger string to reset DSC. Note that the state of the disconnect will not change after it is cleared, ie... if the DSC is closed, it will stay closed when the DSC clears.

12. Select the ACTIVATE key to activate selected DSCS.

KEY SUMMARY

SYSTEM MENU -- Activate DSCSETERS SYSTEMS MENU display.

ACTIVATE -- Activate selected DSCS.

DIRECT -- Select direct activation mode.

CONDITION -- Select conditional activation mode.

TRIGGER LIBRARY/EXIT TRIGGER LIBRARY -- Enable/Disable TRIGGER LIBRARY feature.

EXIT -- Exit DSCS control menu without activating the DSCS.

EXPERT COMMAND SYNTAX

DSC IDA string -- Execute specific DSCS.

DSC name value1,value2,value3,value4,value5 - adjust external parameter

where

name = alpha numeric name for the plant parameter

value1 = new parameter VALUE

value2 = RAMP TIME (always 0 for DSC's)

value3 = DELAY TIME

Value4 is the optional method of activation;

D for direct,

C for conditional expression,

Value 5 is the conditional Boolean expression (if value4 is C) or Time or Condition to Clear if value 4 is D

Value6 is the TIME TO CLEAR in seconds or the Condition To Clear (trigger to clear failure, can not be same conditional expression that activates DSC), or is not used if value 4 is D.

15.0 Instructor Directed Action Status Display (IDA)

The IDA STATUS key selects the Instructor Directed Action Status Display feature. This feature allows the instructor to view the current status of the simulator and to access a more detailed display of specific types of Instructor Actions. A SIM READY/NOT READY indicator notifies the instructor when the simulator is active and ready.

PROCEDURE 1 of 1 -- VIEW A MORE DETAILED STATUS DISPLAY

1. Select the IDA STATUS key from the action window on the first page of the control CRT or press the L1 function key while the cursor is on the control CRT.

2. Select the key which corresponds to the Status display of interest. Selection of this key will transfer control to the specified feature. See the help feature corresponding to the specified feature for additional help.

KEY SUMMARY

MAL STATUS -- Select the malfunction status screen.

LOA STATUS -- Select the LOA status screen.

OVERRIDE STATUS -- Select the override status screen.

GCF STATUS -- Select the global component failure status screen.

DSCS STATUS -- Select the plant parameters status screen.

EXPERT COMMAND SYNTAX

None.

16.0 Messages

The MESSAGES key selects the Message feature. This feature allows the instructor to view any messages that have arrived from the simulator. When messages arrive they are displayed in the alarm window, and are stored in a file which can be viewed by using the MESSAGES soft key. A CLEAR MESSAGES key is provided to enable the instructor to delete all messages from the message file when it increases beyond an acceptable size (typically 20 pages).

PROCEDURE 1 of 1 -- REVIEWING MESSAGES FROM THE SIMULATOR

1. Select MESSAGES key from the action window on the control CRT (page 3) or press the L3 function key while the cursor is on the control CRT. The page containing the most recent message will be displayed. Use the paging keys to access messages not on the last page.

2. If desired, delete all messages by selecting the CLEAR MESSAGES(F3) key.

KEY SUMMARY

CLEAR MESSAGES -- Deletes the contents of the message file.

EXPERT COMMAND SYNTAX

None.

17.0 Sound Generator

The SOUND GENERATOR ON/OFF toggle key on page 2 of the action menu on the control CRT controls an artificial noise generator. This artificial noise generator consists of speakers and associated electronics to produce sounds which are intended to simulate various background noises that might be heard in the control room.

PROCEDURE 1 of 1 -- SOUND GENERATOR ON/OFF

1. When the sound generator is off, select SOUND GENERATOR OFF/on to start the sound generator.

2. When the sound generator is on, select SOUND GENERATOR ON/off to stop the sound generator.

KEY SUMMARY

SOUND GENERATOR ON/OFF -- Controls the artificial sound generator.

EXPERT COMMAND SYNTAX

AUDIO -- Toggles the artificial sound generator on/off.

18.0 Remote Control Unit

The REMOTE CONTROL key on the control monitor selects the remote control feature. This feature permits the instructor to program the keys of the remote control unit.

PROCEDURE 1 of 1 -- ASSIGNING A FUNCTION TO A REMOTE CONTROL KEY

1. Select the REMOTE CONTROL key from the action window on the control CRT (page2) or press the L7 function key.

2. Manually enter the expert command string for the selected remote control key.

KEY SUMMARY

There are no keys in this feature.

EXPERT COMMAND SYNTAX

RFKn=string -- Program remote control function key number n to execute string.

19.0 Drill Library

The DRILLS key provides access to the Drill Library feature. This feature allows the instructor to select exercises from a library of preprogrammed lesson drills or exercises which will automatically step the simulator through a set of predefined operations and controls. The library can contain up to 9999 drills with up to 100 lines of actions and/or comments in each drill. Titles and comments can be included in drill files. A menu is provided that lists all the different exercises that have been composed to facilitate the selection of an exercise. These exercises can operate in two different modes; a fully automatic mode using the time stamp feature to control the execution of instructions, and a manual initiation mode where each instruction executes only on instructor command.

Each exercise program contains comments, time stamps and expert commands and must contain, at most, 100 statements. A Sun text editor may be used for the simple and convenient offline composition and modification of exercise programs. In addition, exercise programs may be created during normal operation of the simulator by entering drill creation mode. In this mode, expert commands transmitted to the simulator are captured and given time stamps and then stored in a file to be executed later. The first line of each drill must be a comment and is displayed as the drill title on the drill menu.

PROCEDURE 1 of 5 -- REVIEW OF A DRILL

1. Select the DRILLS key from the action window on the control CRT or press the L7 function key while the mouse cursor is on the control CRT. The drill menu will be displayed.

2. Choose the drill you wish to peruse (if necessary, use the paging keys to see all 100 drill titles) and then select it with the cursor on the activity drawport or by entering the drill number in the interaction area of the option drawport.

3. Select the REVIEW DRILL key from the option drawport or press the F3 key while the mouse cursor is on the control CRT. The contents of the drill will be displayed in the activity drawport.

4. At this point, you may choose to execute a drill (see procedures 2 or 3).

PROCEDURE 2 of 5 -- EXECUTE A DRILL IN MANUAL MODE

1. If you are reviewing a drill or have selected a drill on the drill menu, then enter MANUAL MODE using the MODE button (F4).

2. Start the drill by selecting the START (F5) button on the control drawport. The manual execution option drawport will appear and

the first executable command will be highlighted. In this mode, time stamps are not executed and are skipped as are all comments (lines beginning with an *).

3. You may choose to execute commands at any time using the EXECUTE COMMAND (F6) key. The next command to be executed will be highlighted.

4. You may choose to skip commands by using the SKIP COMMAND (F5) key. As above, the next command to be executed will be highlighted.

5. You may change a line in the drill by selecting the interaction area designated "ENTER NEW COMMAND" and entering the line number and new command separated by a space, e.g., "5 new command."

6. The drill can be terminated by selecting the TERMINATE(F4) key. The DRILL TERMINATED message will appear in the option drawport area.

7. When the last executable command in the drill has been executed or skipped, the message DRILL COMPLETED will appear in the option drawport area.

PROCEDURE 3 of 5 -- EXECUTE A DRILL IN AUTO MODE

1. If you are reviewing a drill or have selected a drill on the drill menu, then enter auto mode using the SELECT MODE button (F4) (if it is in the SELECT MANUAL MODE state, then you are in auto mode).

2. Start the drill by selecting the START (F5) button on the control drawport. The auto execution option drawport will appear and commands will be executed sequentially. Comments will be skipped. Time stamp statements, which are of the form MTIME = will cause execution to pause until the value displayed in the SIMTIME window has passed that which has been specified in the time stamp statement.

3. The drill can be terminated by selecting the TERMINATE (F4) key. The DRILL TERMINATED message will appear in the option drawport area.

4. When the last executable command in the drill has been executed or skipped, the message "DRILL COMPLETED" will appear in the option drawport area.

PROCEDURE 4 of 5 -- AUTOMATICALLY CREATING A NEW DRILL

1. Select the CREATE DRILL key from the option window on the control CRT or hit the F7 key while the mouse cursor is on the control CRT. The drill creation option drawport will be displayed.

2. Choose a new title (or description) for your drill and enter it in the interaction area. The title should include the lesson number or other relevant data. This step is optional, if you do not choose a new title, the drill will be called "* new description".

3. Enter your name or initials so you can be contacted if someone has questions about your drill. The present date will be pre-appended to this line.

4. Normally you will want comments added before the actions in a drill. The comments come from the description of the selected failure with an asterisk at the beginning of the comment. If comments are not desired select the WITH COMMENTS ADDED box or hit the F6 key to toggle comments off.

5. If time stamping each action with simulator time is desired select the NO TIME STAMP key to toggle time stamping on. Usually time stamping is left off since time delays can be set in the failures.

6. When you are ready to start saving drill commands, select the START NEW DRILL (F3) key. The blank NEW DRILL CREATION screen will appear.

7. All instructor actions that send expert commands to the simulator will be captured together with appropriate time stamps and will appear on the drill creation screen (if it is active). If you page away to another feature, the drills feature will remain in drill creation mode and if the DRILLS key is then selected, the DRILL CREATION screen will be redisplayed. This mode can be exited only by using the STOP (F3) key.

8. When sufficient commands have been collected(the total will not exceed 100), select the STOP (F3) button. The DRILL LIBRARY menu will re-appear.

9. Select a drill file into which the newly created commands are to be stored either by using the mouse cursor on the activity drawport or by entering the drill number in the interaction area designated "ENTER PERMANENT DRILL NUMBER."

10. The drill creation process is now complete.

PROCEDURE 5 of 5 -- OFFLINE CREATION OF A NEW DRILL

1. To modify a drill offline, hold down right mouse button on blue section of CRT and select Programs > Drill Maint..., then let go of the button. A Drill Maintenance Menu will come up in a Shelltool Window.

2. Select the appropriate task from the Drill Maintenance Menu:
   1. Edit a drill file.
   2. Directory of Drill Files.
   3. Print a Drill File.
   4. Copy a drill file TO Diskette.
   5. Copy a drill file FROM Diskette.
   6. Eject Diskette.
   7. Format Diskette.
   8. Restore drillfile from drillfile.bak.
   9. Exit.

NOTE: The first line is the title of the file and should begin with an * . All other comment lines should begin with an *.

NOTE: All files must end with a command line and NOT A COMMENT LINE.

KEY SUMMARY

REVIEW DRILL -- Display the selected drill in the activity drawport.

AUTO/MANUAL MODE -- Selects automatic or manual mode for drill execution.

START -- Starts execution of the drill.

CREATE DRILL -- Enter drill creation mode.

SELECT NEW DRILL -- Display the drill menu.

TERMINATE -- Halt execution of the drill.

SKIP COMMAND -- Skip to the next command without executing the currently highlighted command.

EXECUTE COMMAND -- Execute the command that is currently highlighted.

START NEW DRILL -- Start the collection of expert commands sent by the instructor system to form a new drill.

NO TIME STAMP -- Toggles whether a simulator time stamp is added prior to each action in a new simulator drill file.

WITH COMMENTS ADDED -- Toggles whether descriptive comments are added prior to each action in a new drill file.

STOP NEW DRILL -- Stop the collection of expert commands and display the drill menu so the drill can be saved.

EXPERT COMMAND SYNTAX

None.

20.0 Time Scaling

The TIME SCALES key selects the Time Scaling feature. This feature allows the instructor to slow all plant dynamics or accelerate specific plant dynamics.

PROCEDURE 1 of 2 -- SELECT SLOW TIME

1. Select TIME SCALES key from the second page action window of the control CRT (page 2) or press the L8 function key while the cursor is on the second page of the control CRT.

2. Select percent of real time by slider or by manual entry.

3. Select ACTIVATE key.

PROCEDURE 2 of 2 -- SELECT FAST TIME FOR SPECIFIC PLANT DYNAMICS

1. Select any combination of plant dynamics by slider or by manual entry.

2. Select ACTIVATE key.

KEY SUMMARY

ACTIVATE -- Activates selections.

EXPERT COMMAND SYNTAX

SIMSPEED # -- Set the simulator to operate at selected integer percent of real time.
example: **simspeed 50** sets simspeed to 50% of normal.
caution: **do not** set simspeed above 200%

SW SPEEDCY = # -- Set the decay heat rate to operate at the selected factor of real time.

SW SPEEDXE = # -- Set the xenon concentration to operate at the selected factor of real time.

SW SPEEDSM = # -- Set the samarium concentration to operate at the selected factor of real time.

THESE COMMANDS ARE NOT IMPLEMENTED ON THE SGI

SW FSTHTUP = # -- Set the secondary side heatup rate to operate at the selected factor of real time.

SW FSTCLDN = # -- Set the secondary side cooldown rate to operate at the selected factor of real time.

21.0 Diagnostics

The DIAG TESTS key selects the Diagnostics feature. This feature allows the instructor to verify the proper operation of I/O equipment. The system is frozen while testing is active.

PROCEDURE 1 of 1 -- ACTIVATE A DIAGNOSTIC TEST

1. Select the DIAG TESTS key from the action window on the control CRT (page 3) or press the L4 key on the third page of the control CRT.

2. Select a panel number and test by manual entry.

KEY SUMMARY

There are no keys associated with this feature.

EXPERT COMMAND SYNTAX

DIAG -- Inform simulator that Diagnostic feature is running.

SET DIAGTEST = n -- Execute the selected test, n, on all panels.

where:

n =	1	- All Lights Off, Analog Output at 0%
	2	- Digital Output Test, Stepped
	3	- Digital Output Test, All Lights on
	4	- Digital Input Test
	5	- Analog Output Test, 25% of Scale
	6	- Analog Output Test, 50% of Scale
	7	- Analog Output Test, 75% of Scale
	8	- Analog Output Test, 100% of Scale
	9	- Analog Output Test, Slow Sweep
	10	- Analog Output Test, Fast Sweep
	11	- Analog Input Test

22.0 Trending

The TRENDS key provides access to the Trending feature. This feature allows the instructor to monitor trends of four variables versus time distributed over 20 pages, four variables on each page. A four hour historical data file with values stored at one second increments is available with each variable. The trending task continually updates when the simulator is in the run mode. When a trend page is selected from the trend menu, the following information is provided in the activity drawport:

Color coded four variable trend plot

A changing time scale for run time, labeled in an hour:minute format with 12 major time divisions

A static y-axis labeled 0-10

A color coded y-axis for each variable, providing the low limit, high limit, variable name, tick marks for major divisions, and a bar chart indicating its present value.

The instructor may review the historical data anytime for any of the following fixed page trend plots:

20 pages of 12 minute windows

10 pages of 24 minute windows

4 pages of 1 hour windows

2 pages of 2 hour windows

1 page with a four hour window

The existing time window for the trends shown in the activity drawport is represented by a bar in the option drawport. The instructor may change the monitored variables, their range, their units, or their alarm setpoints at any time through the option drawport. The trend colors were selected for optimum visual clarity and are not selectable by the instructor. To aid the instructor in selecting a parameter, the parameter DATABOOK is available. The instructor can also access any of twenty pre-established variable monitor files for trend setup.

PROCEDURE 1 of 7 -- REVIEW THE TREND MENU

1. Select the TRENDS key from the action window on the monitor CRT (page 2) or press the L4 key while the cursor is on the monitor CRT. Review the menu.

2. If a trend is being displayed in the activity drawport, select the TREND MENU key from the option drawport on the monitor CRT or press the F5 function key while the cursor is on the monitor CRT. Review the menu.

PROCEDURE 2 of 7 -- DISPLAY A TREND

1. To display a trend, first review the trend menu. Having decided which trend you wish to display, use the mouse and double click on the box of 4 variables you wish to view. The trend will be displayed in the activity drawport. The four paging keys may be used to display different trends from the trending menu.

PROCEDURE 3 of 7 -- CHOOSE A TIME WINDOW

1. When a trend is first displayed, the default time window is the last 12 minutes of 1 second data. This is displayed graphically by the bar chart in the option drawport. To choose a different time window, select the TIME WINDOW key in the option drawport or hit the F3 key when the cursor is on the monitor CRT.

2. Next, choose the interval length by selecting the 12 mins, 24 mins, 1 hour, 2 hour or 4 hour keys. Then use the mouse to select the interval you wish to view from the bar chart or use the STEP FORWARD or STEP BACK keys.

3. To display the trend you have chosen, select the ACTIVATE key from the option drawport or hit the F7 key while the cursor is on the monitor CRT.

4. If you decide that, after all, you do not wish to display the new interval then select the CONTINUE key from the option drawport or hit the F6 key while the cursor is on the monitor CRT.

PROCEDURE 4 of 7 -- CHANGE A VARIABLE

1. Select the CHANGE VARIABLES key from the option drawport when a trend is being displayed. The variable selection screen will be displayed.

2. Enter the new data in the appropriate interaction areas.

3. Select the ACTIVATE key to activate the variable changes.

4. Select the CONTINUE key to ignore the changes and continue trending as before.

PROCEDURE 5 of 7 -- SELECT A PROCESS OR STATUS VARIABLE THROUGH DATABOOK

1. Select a trend from the trend menu.

2. Select the CHANGE VARIABLES key.

3. Select the PROCESS DATABOOK or STATUS DATABOOK keys.

4. Select a system.

5. Select a databook variable. If the desired variable is not displayed on the screen, use the paging keys until it appears.

6. Select the variable from the current set (in the option window) which is to be replaced by the newly selected databook variable. Any or all of the variables may be changed in this manner.

7. Select VARIABLE MENU to return to the VARIABLE SELECTION menu.

8. If desired, modify any or all of the variables, using manual entry or the databook feature.

9. Select the ACTIVATE key to activate the variable changes.

PROCEDURE 6 of 7 -- SELECT A VARIABLE SET

1. Select a trend from the trending feature and then select the CHANGE VARIABLES key.

2. Select the SELECT VARIABLE SET key. Upon selection of this key, a menu will display containing descriptions from the twenty pre-established variable monitor files.

3. Select a file. Upon selection of a file, a menu displaying the variables from the selected file will display.

4. If desired, modify any or all of the variables, using manual entry or the databook feature.

5. Select the ACTIVATE key to activate the variable changes.

PROCEDURE 7 of 7 -- PAGING

1. When a trend is being displayed in the activity drawport, the paging keys at the bottom right of the option drawport may be used to conceptually "page around" in the trend menu. The page right and left keys cause the alternate page of the same trend to be displayed. The page up and down keys cause the same page of the trend, whose number is one higher or lower, to be displayed.

KEY SUMMARY

TIME WINDOW -- Display the time window option drawport.

STEP FORWARD -- Choose a time window one interval to the left of that already chosen in the time window option drawport.

STEP BACK -- Choose a time window one interval to the right of that already chosen in the time window option drawport.

CONTINUE -- Continue to plot the current trend regardless of any new time window chosen.

ACTIVATE -- Activate the changes.

CHANGE VARIABLES -- Display the change variables menu.

DATABOOK -- Display menu to select a variable through either PROCESS VARIABLES or STATUS VARIABLES

SELECT VARIABLE SET -- Display menu to select a complete variable set.

TREND MENU -- Display the trend menu.

EXPERT COMMAND SYNTAX

None.

23.0 PLANT STATUS DISPLAYS

The PLANT STATUS DISPLAYS key selects the PLANT STATUS DISPLAYS feature. The PLANT STATUS DISPLAYS feature allows the instructor to view status information for plant system variables. The instructor will be able to access 92 groups of up to twenty variables each. Eight additional variables which can be modified by the instructor will also be available for viewing.

PROCEDURE 1 of 2 -- SELECT A GROUP OF VARIABLES

1. Select the PLANT STATUS DISPLAYS key from the action window on the monitor CRT (page 2) or press the L2 key while the cursor is on the monitor CRT.

2. Select the paging keys to page through the 92 groups variables or select the PSD MENU key. Selection of the PSD MENU key will display the titles of the 92 groups of variables. Select the page from the activity window.

PROCEDURE 2 of 2 -- CHANGE ONE OR ALL OF THE ADDITIONAL VARIABLES

1. Select the CHANGE VARIABLES key. The instructor will be able to access the parameter databook and variable selection features to change the additional variables. See the help instruction corresponding to these features for additional help.

KEY SUMMARY

PSD MENU -- Permit direct selection of a page of twenty variables.

CHANGE VARIABLES -- Permit access to the parameter databook and variable selection features to modify the additional variables.

PAGEUP (up arrow) -- Page backward through twenty pages of variables (wraparound will occur at beginning of list).

PAGEDOWN (down arrow) -- Page forward through twenty pages of variables (wraparound will occur at end of list).

EXPERT COMMAND SYNTAX

SW PSMADDR(n)=variable name -- Set the nth variable line of the additional variable section to display the named variable.

24.0 Monitor Simulator Variables

The MON SIM key selects the Monitor Simulator Variables feature. This feature allows the instructor to monitor up to 64 parameters per page (128 total) on the monitor CRT. The parameters will update on the CRT at an instructor selected frequency (default is once per second) whenever the simulator is in the RUN mode. The instructor can also optionally print the data on the system line printer.

If printing of variables on the line printer is selected, a pause in simulation can be observed if the number of variables being printed is large. If a line printer failure occurs while monitored variables are being printed, simulation will stop until the line printer becomes operable or the print operation is terminated.

PROCEDURE 1 of 3 -- SELECT MONITOR SIMULATOR VARIABLES

1. Select MON SIM key from the action window on the monitor CRT or press the L9 function key while the cursor in on the monitor CRT.

2. Enable the feature by selecting the MON OFF/on key.

PROCEDURE 2 of 3 -- SELECT A GROUP OF VARIABLES FOR MONITORING

1. From the expert window, select a group for monitoring by using the command:

   USEM vargroup

   where vargroup can be a previously defined group of variables such as MONPLANT, MONITOR1, MONITOR2, MONITOR3, MONITOR4, MONITOR 5, MONGARY, etc.

PROCEDURE 3 of 3 -- SELECT VARIABLES FOR MONITORING

1. From the expert window, select variables for monitoring by using the command:

   MONV varlist

   where varlist can be a list of one or more variables.

2. To delete variables from monitoring, use the command:

DELM varlist

where varlist is a list of one or more variables currently being monitored, or

DELM ALL

which will cause all variables which are being monitored to be deleted from the MONV varlist

KEY SUMMARY

MON SIM ON/OFF -- Enables/disables the Datapool monitor feature.

PRINT ON/OFF -- Enables/disables the Datapool monitor line printer.

EXPERT COMMAND SYNTAX

PRTMON filename-- Enable monitoring to designated file

XPRTMON -- Disable line printer monitoring.

MCRT # -- Select CRT update rate (also enables monitoring).

MPRT # -- Select line printer update rate.

MONV varlist -- Selects one or more Datapool variables for monitoring.

DELM varlist -- Deletes one or more variables from monitoring.

SAVEM filename -- Saves the currently selected Datapool variables into the specified file name (the file must already exist).

USEM filename -- Retrieves a set of variables from the specified file.

DELM ALL -- Sets the number of Datapool monitor points to zero.

25.0 Parameter Databook

The DATABOOK key selects the Parameter Databook feature. This feature allows the instructor to view parameter variables and their corresponding plant tags and descriptions. When this feature is entered via the PROCESS DATABOOK or STATUS DATABOOK keys in the Trending, Logs, or Strip Chart Recorder features, the instructor will also have the capability of selecting individual variables to be accessed by these features.

PROCEDURE 1 of 2 -- VIEW VARIABLES FROM A SYSTEM

1. Select the DATABOOK key from the action window on the monitor CRT (page 2) or press the L1 key while the cursor is on the monitor CRT.

2. Select either the PROCESS VARIABLES or the STATUS VARIABLES key. Selection of either of these keys will cause a menu of systems to display.

3. Select a system. Selection of a system will cause the process variables associated with this system to display.

4. Select paging keys to page through the variables.
5. To return to the system menu, select the SYSTEM MENU key.

PROCEDURE 2 of 2 -- SELECT A VARIABLE TO BE ACCESSED BY THE TRENDING, PLANT STATUS DISPLAYS, OR STRIP CHART RECORDER FEATURE

1. Select the PLANT STATUS DISPLAYS, TRENDS, or RECORDER key to enter the desired feature.

2. When in the PLANT STATUS DISPLAYS or TRENDS feature, select the CHANGE VARIABLES key. When in the RECORDER feature, the PROCESS DATABOOK and STATUS DATABOOK keys are available for immediate selection.

3. Select the PROCESS DATABOOK or STATUS DATABOOK key. Selection of this key will cause the system menu to display.

4. Select a system from the system menu.

5. Select a databook variable. If desired variable is not displayed on the screen, use the paging keys to page until it appears.

6. Select the variable from the current set (in the option window) which is to be replaced by the newly selected databook variable. Any or all of the variables may be changed in this manner.

7. Select VARIABLE MENU to return to the feature through which parameter databook was activated.

8. If desired, modify any or all of the variables.

9. Select the ACTIVATE key to activate the variable set. To reset variables to original values when in the Logs and Trends features, select the CONTINUE key. To reset variables to original values when in the Strip Chart Recorder feature, select the RECORDER key from the action window. Once changes have been activated, original values can be restored by the variable selection process.

KEY SUMMARY

PROCESS VARIABLES -- Access the process databook viewing capability.

STATUS VARIABLES -- Access the status databook viewing capability.

SYSTEM MENU -- Access the system menu.

PAGEUP (up arrow) -- Page backward through available variables (wraparound will occur at beginning of buffer).

PAGEDOWN (down arrow) -- Page forward through available variables (wraparound will occur at end of buffer).

CHANGE VARIABLES -- Access the variable selection feature.

PROCESS DATABOOK -- Access the process databook selection capability.

STATUS DATABOOK -- Access the status databook selection capability.

VARIABLE MENU -- Access the variable menu for the calling feature.

CONTINUE -- Restore original variables.

ACTIVATE -- Activate changes to variables.

EXPERT COMMAND SYNTAX -- None.

26.0 Strip Chart Recorder

NOT USED ON DCPP SIMULATOR

The RECORDER key selects the Strip Chart Recorder feature. This feature allows the instructor to assign eight variables to an eight pen strip chart recorder.

PROCEDURE 1 of 3 -- MODIFY A VARIABLE

1. Select the RECORDER key from the action window on the monitor CRT (page 2) or press the L3 key on the monitor CRT.
2. Select the new data by manual entry. Any or all of the variables may be changed.
3. Select the ACTIVATE key to activate the variable changes.

PROCEDURE 2 of 3 -- SELECT A VARIABLE THROUGH PROCESS DATABOOK OR STATUS DATABOOK

1. Select the PROCESS DATABOOK or STATUS DATABOOK key.
2. Select a system.
3. Select a databook variable. If desired variable is not displayed on the screen, use the paging keys until it appears.
4. Select the variable from the current set (in the option window) which is to be replaced by the newly selected databook variable. Any or all of the variables may be changed in this manner.
5. Select VARIABLE MENU to return to the Strip Chart Recorder menu.
6. If desired, modify any or all of the variables, using manual entry or the Databook feature.
7. Select the ACTIVATE key to activate the variable changes.

PROCEDURE 3 of 3 -- SELECT A VARIABLE SET

1. Select the SELECT VARIABLE SET key. Upon selection of this key, a menu will display containing descriptions from the twenty pre-established variable monitor files.

2. Select a file. Upon selection of a file, a menu displaying the variables from the selected file will display.

3. If desired, modify any or all of the variables, using manual entry or the Databook feature.

4. Select the ACTIVATE key to activate the variable changes.

KEY SUMMARY

PROCESS DATABOOK -- Display menu to select a variable through Process Databook.

STATUS DATABOOK -- Display menu to select a variable through Status Databook.

SELECT VARIABLE SET -- Display menu to select a complete variable set.

ACTIVATE -- Activate any changes to variable set.

EXPERT COMMAND SYNTAX

INSTRPEN pen, variable, range, low limit -- Set the selected pen (1 - 8) to record the indicated variable with the indicated range and low limit.

27.0 Variable Selection

The VARIABLE SELECTION key provides access to the Variable Selection feature. This key is available when a trend is being plotted using TRENDS or when the PLANT STATUS DISPLAYS feature is in use. This feature is also available for use when RECORDER is selected from the action menu on the monitor CRT. It is used to change variable names, upper and lower limits, upper and lower alarms, units, descriptions and the title of the group of variables.

To aid the instructor in changing variables, the parameter databook feature is available. The instructor can also access any of twenty pre-established variable monitor files.

PROCEDURE 1 of 3 -- CHANGE A VARIABLE

1. Select the CHANGE VARIABLES key from the option drawport when a trend is being displayed. The variable selection screen will be displayed.

2. Enter the new data in the appropriate interaction areas.

3. Select the ACTIVATE key to activate the variable changes.

4. Select the CONTINUE key to ignore the changes and continue trending as before.

PROCEDURE 2 of 3 -- SELECT A VARIABLE THROUGH PROCESS OR STATUS DATABOOK

1. Select a trend from the trend menu.

2. Select the CHANGE VARIABLES key.

3. Select the PROCESS DATABOOK or STATUS DATABOOK keys.

4. Select a system.

5. Select a databook variable. If the desired variable is not displayed on the screen, use the paging keys until it appears.

6. Select the variable from the current set (in the option window) which is to be replaced by the newly selected databook variable. Any or all of the variables may be changed in this manner.

7. Select VARIABLE MENU to return to the VARIABLE SELECTION menu.

8. If desired, modify any or all of the variables, using manual entry or the databook feature.

9. Select the ACTIVATE key to activate the variable changes.

PROCEDURE 3 of 3 -- SELECT A VARIABLE SET

1. Select a trend from the trending feature and then select the CHANGE VARIABLES key.

2. Select the SELECT VARIABLE SET key. Upon selection of this key, a menu will display containing descriptions from the twenty pre-established variable monitor files.

3. Select a file. Upon selection of a file, a menu displaying the variables from the selected file will display.

4. If desired, modify any or all of the variables, using manual entry or the databook feature.

5. Select the ACTIVATE key to activate the variable changes.

KEY SUMMARY

CHANGE VARIABLES -- Display the change variables menu.

PROCESS DATABOOK -- Display menu to select a variable through Process Databook

STATUS DATABOOK -- Display menu to select a variable through status databook

EXPERT COMMAND SYNTAX

None.

28.0 Triggers

The TRIGGERS key provides access to the Triggers feature. This feature allows the instructor to maintain ten sets of ten triggers on a disk file. These triggers can be used in the conditional execution of malfunctions (MAL), global component failures (GCF) and local operator actions (LOA). This feature also displays all active triggers and their Boolean values.

The Instructor System limits the instructor to using a maximum of ten active triggers. This means that if you use the same trigger ten times you will not be able to set up any other active conditional instructor directed actions. If additional actions need to be used later in the exercise then the previously executed instructor directed actions will have to be cleared to free up the needed number of triggers. Therefore, while developing the scenario please keep in mind that many malfunctions, if activated with a conditional expression, will tie up that trigger until the simulator is initialized to a new IC set.

PROCEDURE 1 of 4 -- REVIEW ACTIVE TRIGGERS

1. Select the TRIGGERS key from the action drawport on the monitor CRT(page 2) or press the L5 function key while the cursor is on the monitor CRT.

2. Review the active triggers.

PROCEDURE 2 of 4 -- REVIEW THE TRIGGER LIBRARY

1. Select the TRIGGERS key from the action drawport on the monitor CRT or press the L5 function key while the cursor is on the monitor CRT.

2. Select the TRIGGER LIBRARY MAIN MENU button from the activity drawport. A menu with the titles of the 10 trigger sets will be displayed.

3. Select the set, using the mouse, whose contents you wish to review. The trigger set will be displayed in the activity drawport.

PROCEDURE 3 of 4 -- EDIT A TRIGGER

1. Execute steps 1 through 3 of Procedure 2 above.

2. Select the EDIT SELECTED TRIGGER button from the activity drawport.

3. Use the mouse to select the trigger you wish to edit. An interactive area will pop up at the bottom of the activity drawport and the cursor will position itself in this area.

4. Select this area, enter the new trigger, and hit RETURN. The new trigger will be displayed on the drawport.

5. To make the change permanent, select the STORE CHANGES button from the activity drawport.

PROCEDURE 4 of 4 -- EDIT A TITLE

1. Execute steps 1 through 3 of Procedure 2 above.

2. Select the EDIT GROUP TITLE button from the activity drawport.

3. An interactive area will pop up at the bottom of the activity drawport and the cursor will position itself in this area.

4. Select this area, enter the new title, and hit RETURN. The new title will be displayed on the drawport.

5. To make the change permanent, select the STORE CHANGES button from the activity drawport.

KEY SUMMARY

TRIGGER LIBRARY MAIN MENU -- Display the trigger library main menu.

ACTIVE TRIGGER MENU -- Display the active trigger menu.

EDIT SELECTED TRIGGER -- Enter the mode in which a trigger can be edited.

EDIT GROUP TITLE -- Causes an interactive area to pop up in order to enter a new group title.

STORE CHANGES -- Stores changes to a disk file.

EXPERT COMMAND SYNTAX

None.

29.0 Archives

NOT USED ON DCPP SIMULATOR

Archive feature is not used at DCPP. The TEAM commands from the **EXPERT MENU** are used for instructor data collection. TEAM will take commands, as described in section 6.2.15, which initialize values and files necessary to collect data and store that data onto permanent files.

When the TEAM FILE command is issued the base or setup file is read from the directory /usr/sim/team. The file read is the file name specified. It can only be six (6) characters long. It can contain any combination of letters and numbers but should avoid using the "_" (underscore) character as that character can then be used for maintenance of the team directory. (Old data files should be deleted when the data are sent to the OPERAS system or when no longer needed.)

When the FILE command is issued, an ASCII base file is created. This file contains all of the lines read from the base file but also includes the names of any datapool variables contained in any VAR command issued up until the point that a SENDFILE or CLOSE command is issued. The MDHMMSS filename extension is the date and time of creation in a special (weird) format. (See section 10 for details.)

The base data file contains the values of the variables collected at the FREQ frequency. (See section 9 for details.) It contains a record of the times, values, and nature of certain events as they occur on the simulator. Such things as panel/annunciator overrides, instructor malfunctions, bistable overrides, control panel digital and analog state changes, and annunciator alarm changes are recorded in this file. (See section 9 for details.)

This file collects the data necessary for the OPERAS system or for instructor evaluation. The files are written to by the TEAMPER program when TEAM is ON, that is active. When a CLOSE command is issued the base data file is closed. This allows a new set of files to be created when a subsequent FILE command is issued. Each data file will have a unique name based upon the setup or base file name and as determined by the MDHMMSS extension.

A brief list of the most used expert commands is included here:

TEAM FILE=XXXXXX -- will load the base (or setup) file /usr/sim/team/XXXXXX information. This function will also create an additional file that begins with the same XXXXXX characters as the base file name. These files will have additional characters appended onto the XXXXXX character string that designates their time of create and purpose. (This is described later.) If a base file does not exist then the data file will still be created using the name supplied after the "=" character. If more than six characters are used in the file name, they are ignored; if less than six characters are used the character "X" will be appended to that entered to make a total of six characters.

TEAM MCP ON — instructs the system to collect control board digital input, analog input, and annunciator (SER) changes of state.

TEAM MCP OFF — instructs the system to stop collecting the above data.

TEAM MONV ON — instructs the system to collect the values of the VAR variables at the FREQ times.

TEAM MONV OFF — instructs the system to stop collecting the above data.

TEAM ON — is a master on/off switch. If toggled from off to on, this command will also set MCP and MONV on. Thus, MONV and MCP must be used after this command to be effective.

TEAM OFF — will turn all data collection off.

TEAM FREQ=XXX — will set the collection frequency for the VAR points to be XXX seconds. XXX must be less than 300. No decimal point is allowed, however, 0 is allowed and will set the frequency of collection to 0.5 seconds. The frequency of collection can be changed at any time, including during data collection.

TEAM CLOSE — closes all of the files and writes end of file marks to these files. All of the default values are reinstated. This command is performed automatically when the simulator is re-initialized.

30.0 Sleep

The SLEEP key selects the Simulator Sleep feature. This feature allows the instructor to shutdown the simulator software or remove I/O to the control boards. Once the simulator is shutdown, it can easily be restarted using the startup sequence. Either sleep mode will turn off all lights and meters. Recorder drives will remain OFF in the sleep mode.

PROCEDURE 1 of 2 -- SELECTING SLEEP MODE

1. Select SLEEP from the action window (page 2) on the control CRT.

2. Select the Normal SLEEP key in the option window. This will place the simulator into the sleep mode which turns off all lites and meters. The simulator can be restarted just by re-initing to the desired IC set..

3. If TOTAL shutdown is selected, the tasks SUNSIM and HSDLINK are shutdown on the sgi. The Start Simulator line must be selected from the WINDOWS shell menu by clicking on the right mouse button on the blue windows screen

PROCEDURE 2 of 2 -- EXITING WINDOWS ON THE SUN WORKSTATION

1. With the mouse arrow located in the blue background area, press and hold the right mouse button.

2. Move the mouse and select: Exit Window Mgr, then release the mouse button.

3. Confirm exit from the Windows system by clicking on the displayed Exit button.

4. You should end up with a white screen with a prompt that says:

   st login:

KEY SUMMARY

SLEEP -- The normal sleep request. Just removes I/O to the control boards, does not shutdown simulator task.

TOTAL -- Abnormal sleep request. The tasks SUNSIM and HSDLINK are shutdown on the sgi.

NO -- Aborts sleep request and returns to SUN menu.

EXPERT COMMAND SYNTAX

TERM -- Terminates the simulator.

QUIT -- Terminates the simulator

EXIT -- Terminates the simulator

31.0 Replay

The REPLAY key selects the Replay feature. This feature allows the instructor to freeze the simulator and replay a period of recent history, up to one hour, of simulator operation on all control panel readouts. Upon selection of replay, the current simulator condition is stored in IC 83 for return after replay completion. Manual and Automatic Scan of the available ICs are available to help the instructor select the starting point for the replay operation. The instructor will have the option of selecting an IC to be previewed by number, elapsed time, or run time.

The ICs are the only available starting points for the Replay feature. It is quite possible that you will only get one chance to Replay, so choose your starting point carefully.

When Replay ends, either at the end of the recorded time or manually, you must re-Init the Simulator to the desired conditions to continue.

PROCEDURE 1 of 4 -- SELECTING AN IC FOR REPLAY

1. Select the REPLAY key from the action window on the control CRT or press the R6 function key.

2. Select an IC by:

   a. clicking on the IC from the activity window,
   b. manual entry of an IC number in the option window at the "REPLAY FROM IC" prompt,
   c. elapsed time in the format HH:MM:SS at the "BY ELAPSED TIME" prompt, or
   d. run time in the format HH:MM:SS at the "BY RUN TIME" prompt.

3. Select the START REPLAY key. Upon selection of this key, the boards will "wink and blink" for the required setup.

4. After aligning the control boards, type BYPSWCK on the expert screen.

5. The RUN/FRZ key is available for simulation control.

6. To stop replay, select the STOP REPLAY key.

PROCEDURE 2 of 4 -- PRINT REPLAY DATA

1. Select an IC by the above procedure.

2. Select START REPLAY to start the replay procedure.

3. At any time during replay, select the START PRINTER key. The entire replay file of data will be printed.

PROCEDURE 3 of 4 -- MANUAL SCANNING

1. Select the IC to be scanned.

2. Select the scan direction by selecting the REVERSE/FORWARD toggle key (selection of this key will have no affect on the current execution of manual scanning. However, this indicates the next IC to be scanned, forward or backward, when SCAN STEP is selected subsequently).

3. Select the SCAN STEP key (manual and automatic scanning cannot be active concurrently; if automatic scanning is active when manual scanning is selected, an error message will appear on the screen and automatic scanning will need to be disabled before manual scanning can be initiated). The simulator will be frozen, if it is running, and preview that IC.

4. To continue scanning, select the SCAN STEP key again. The next IC will be scanned according to the scan direction.

PROCEDURE 4 of 4 -- AUTOMATIC SCANNING

1. Select the first IC to be scanned.

2. Select the scan direction by selecting the REVERSE/FORWARD toggle key.

3. Select the START/STOP AUTO SCAN key. The simulator will be frozen, if it is running, and preview the selected IC for five seconds. After five seconds, the simulator will preview the next IC, according to the scan direction.

4. To stop automatic scanning, select the START/STOP AUTO SCAN key again.

KEY SUMMARY

START REPLAY -- Start replay using selected IC.

SCAN STEP -- Scan the selected IC.

START/STOP AUTO SCAN -- Start or stop automatic scanning.

REVERSE/FORWARD -- Set the scan direction.

PAGEUP (up arrow) -- Page backward through available ICs (wraparound will occur at beginning of buffer).

PAGEDOWN (down arrow) -- Page forward through available ICs (wraparound will occur at end of buffer).

START PRINTER -- Print replay data.

EXPERT COMMAND SYNTAX

FRZ -- Freeze the simulator.

REPLAY n -- Replay IC n.