

# CATEGORY 1

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DOCKET #  
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SUBJECT: Forwards Oconee Simulator malfunction test plan which has been modified to incorporate removal of malfunctions not used in simulator training exercise guides.

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Duke Power Company  
Oconee Nuclear Site  
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**DUKE POWER**

December 11, 1996

Frank Collins  
US NRC, Office of Nuclear Reactor Regulation  
O-10 D22  
Washington, DC 20555

**Subject:** Oconee Nuclear Station Simulator Unit 1 Change in four year test plan

Frank Collins,

Please find enclosed:

- Form 474
- Test Plan Change Summary
- New Malfunction List

The Oconee Simulator malfunction test plan has been modified to incorporate the removal of malfunctions that are not used in simulator training exercise guides. Also the present malfunctions that affect the operation of the Integrated Control System (ICS) have been consolidated to allow for more efficient use and control.

Please find attached our new malfunction list, a summary of the removed malfunctions, along with the four-year test plan.

Sincerely,

Keith Welch  
Simulator Support Engineer

1/1  
APP5

9701070218 961211  
PDR ADOCK 05000269  
P PDR

070068

# SIMULATION FACILITY CERTIFICATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 120 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0138), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

FACILITY <b>Oconee Unit 1 Nuclear Power Plant Simulator</b>	DOCKET NUMBER <b>50- 269</b>
LICENSEE <b>Duke Power Co, Charlotte NC</b>	DATE <b>12/11/96</b>

This is to certify that:

1. The above named facility licensee is using a simulation facility consisting solely of a plant-referenced simulator that meets the requirements of 10 CFR 55.45.
  2. Documentation is available for NRC review in accordance with 10 CFR 55.45(b).
  3. This simulation facility meets the guidance contained in ANSI/ANS 3.5, 1985, as endorsed by NRC Regulatory Guide 1.149.
- If there are any exceptions to the certification of this item, check here [ ] and describe fully on additional pages as necessary.

NAME (or other identification) AND LOCATION OF SIMULATION FACILITY

**Oconee Training Center M/C: ON04OT  
PO Box 1439  
Seneca, SC 29679**

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

DESCRIPTION OF PERFORMANCE TESTING COMPLETED (Attach additional page(s) as necessary, and identify the item description being continued)

SIMULATION FACILITY PERFORMANCE TESTING SCHEDULE ATTACHED. (For the conduct of approximately 25% of performance tests per year for the four year period commencing with the date of this certification.)

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

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

DESCRIPTION OF PERFORMANCE TESTING PLAN CHANGE (Attach additional page(s) as necessary, and identify the item description being continued)

**Malfunction Test Plan Change. See Attachments.**

RECERTIFICATION (Describe corrective actions taken, attach results of completed performance testing in accordance with 10 CFR § 55.45(b)(5)(iv). Attach additional page(s) as necessary, and identify the item description being continued.)

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

SIGNATURE - AUTHORIZED REPRESENTATIVE <i>K. H. P. Welch</i>	TITLE <i>Simulator Eng.</i>	DATE <i>12/11/96</i>
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In accordance with 10 CFR § 55.5, Communications, this form shall be submitted to the NRC as follows:

BY MAIL ADDRESSED TO: **Director, Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555**

BY DELIVERY IN PERSON  
TO THE NRC OFFICE AT:

**One White Flint North  
11555 Rockville Pike  
Rockville, MD**

# Test Plan Change Summary

The following changes are being incorporated into the Oconee Nuclear Station Unit 1 Simulator test plan:

- Consolidation of malfunctions that affect ICS. This includes the grouping malfunctions that "Fail Transmitters High" or malfunctions that "Fail Transmitters Low" into single malfunctions that fail transmitters based on a malfunction degradation value.
- Removal of malfunctions that are not incorporated into Simulator Training Exercise Guides. Malfunctions that fall into this category are administratively removed from the simulator active malfunction list. They are also removed from the test plan. At such time that these malfunctions are deemed necessary, a test will be developed, the malfunction will be revalidated, and the malfunction will be incorporated into the test plan before the malfunction will be used for training. The malfunctions listed below have been removed from service:

**MPI191 - FAILURE OF ICS RC FLOW A T-COMP TRANSMITTER Y1FT14A (0 - 1.1E8)**  
**MPI211 - FAILURE OF ICS RC FLOW B T-COMP TRANSMITTER Y1FT15A (0-7.183E7)**  
**MSI260 - TAVE A/M TRANSF SW(1717) FAILS TO SWITCH**  
**MPI282 - QUAD TILT CAUSED BY DTC CONTLR FAILS LO**  
**MPI340 - N2 LEAK FR CORE FL TK "A" TO ATMOSPHERE**  
**MPS380 - RC SYSTEM COLD LEG LEAK RCP A1 SUCTION**  
**MPS032 - DOUBLE END BRK OF COLD LEG PIPE LOOP A2**  
**MPS040 - PRIM LEAK ON HOT TUBE CRD GRP 6 ROD-3**  
**MPS330 - RBS PUMP FAIL TO RECEIVES ES SIGNAL**  
**MPS100 - RBCU B FAILS TO GO TO HI SPEED**  
**MPS340 - RBCU B FAIL TO RECEIVE ES SIGNAL**  
**MPS350 - RBCU A FAILS TO SWAP / LO SP ON ES**  
**MPS220 - HP-14 FAILS AS IS**  
**MPS230 - HP-16 FAILS AS IS**  
**MPS310 - HP-15 FAILS AS CLOSED**  
**MPS360 - HP-31 FAILS CLOSED**  
**MPS200 - HP-43 (LD RV) FAILS TO CLOSE AFTER LIFT**  
**MPS270 - RCP A2 LO OIL POT LEVEL**  
**MPS280 - RCP A1 FLOW DEGRADES**  
**MPS372 - PRESSURIZER HEATER GRPS (2,3,4) FAIL OFF**  
**MNI042 - NI-2 FAILS LO**  
**MNI060 - NI-7 FAILS LO**  
**MNI070 - NI-8 FAILS LO**  
**MRM090 - RIA-16 FAILS HI**  
**MSI310 - FAILURE OF MAIN FEEDWATER TEMPERATURE A TRANSMITTER Y1TT62 ( 0-500)**  
**MRM110 - RIA'S-47, 48, 49, & 49A FAILS TO 0**  
**MRM120 - RIA-43 FAILS TO 0**  
**MEL250 - MFB1 LOCKOUT**  
**MCR010 - RATCHET TRP GRPS 5 RODS DURING PT**  
**MCR080 - GROUP 6 SEQUENCE FAILURE**  
**MCR023 - ONE ROD OF ASPR FAILS TO START MOVING**  
**MCR026 - SINGLE ROD EJECT,ROD-,GROUP6**  
**MCR027 - SINGLE ROD EJECT,ROD-,GROUP7**  
**MCR024 - STUCK MOST REACTIVE ROD**  
**MCR025 - SLUGGISH ROD ( ROD 9 GROUP 5 DROP TO 50% SPEED)**  
**MRM030 - CONTAINMENT PENETRATION RUPTURE**  
**MCR040 - INABILITY TO INSERT CONTROL RODS**  
**MCR051 - FUEL FAILURE (CLAD RUPTURE)DURING LOCA'S**  
**MCR052 - FUEL CLAD FAIL DURING NORMAL OPERATION**  
**MCR061 - CONTINUOUS REG ROD GRPS WITHDRAWAL**  
**MCR062 - CONTINUOUS REG ROD GRPS INSERT**  
**MSI010 - HOTWELL LEVEL DECREASES/CONTROLLER FAILURE**  
**MSI020 - COLD REHEAT PRESSURE TRANSMITTER Y1PT127P (0-250)**  
**MSI030 - ICS TURB DEM SIG FAILS TO DR CV'S IN AUTO**

MSI042 - FDW DEMAND FAILS TO 0% AUTO/ONLY  
MSI320 - FAILURE OF MAIN FEEDWATER TEMPERATURE TRANSMITTER Y1TT63 ( 0-500)  
MSI151 - FAILURE OF ICS SG A SU FDW FLOW TRANSMITTER Y1FT24A (0.- 1.0E6)  
MSI191 - FAILURE OF ICS SG B SU FDW FLOW TRANSMITTER Y1FT25A ( 0-1.06E)  
MSI221 - FAILURE OF ICS A FDW VALVE DP TRANSMITTER (2) Y1PT33P (0-100)  
MSI241 - FAILURE OF ICS B FDW VALVE DP TRANSMITTER (2) Y1PT35P (0-100)  
MSS250 - MAIN FDW B CV (FDW-41) LEAKS BY  
MSS060 - SU FDW (FDW-35) FLS CLSD AUTO/ONLY  
MSS070 - SU FDW (FDW-44) FLS CLSD AUTO/ONLY  
MSS100 - MAIN FDW B BLK VALVE (FDW-40) FAILS CLSD IN AUTO  
MSS030 - FDW HTR A1 EXT VALVE (HPE-6) FLS CLSD  
MSS040 - FDW HTR A2 EXT VALVE (HPE-10) FLS CLSD  
MSS180 - TURB BYPASS VALVES FAIL CLSD - OLD ICS  
MSS210 - MT SV # 1 FAILS CLSD  
MPS160 - MT IV 1-6 FAIL CLSD  
MSS220 - MSDT A LEVEL CNTL FAIL CLSD  
MSS400 - MSDT A EMER LEVEL CNTL FAIL CLSD  
MSS140 - HWP A TRIP  
MSI250 - FAILURE OF POWDEX DP TRANSMITTER Y1PT51P (0-50)  
MSS230 - UST LEVEL DECREASE (C-187) OPEN  
MSS350 - FDW HTR C EXT VALVE (HPE-36) FAIL CLSD  
MEL190 - KEOWEE UNIT 2 FAIL NORM AUTO START  
MEL200 - NORM & SU FDR BKRS TO MFB2 TRIP  
MEL051 - ITC BUS LOCKOUT  
MEL052 - ITD BUS LOCKOUT  
MEL053 - ITE BUS LOCKOUT  
MEL120 - ITA RCP BUS LOCKOUT  
MEL140 - TIME DELAY TRIP CIRCUIT TO ITA FAIL  
MEL042 - DIA INVERTER TRIP  
MEL110 - GENERATOR EXCITATION FAIL  
MEL070 - TRANSFORMER 1T LOCKOUT  
MSS410 - BREAK BETWEEN VALVE FW-1 AND FW PUMP A.  
MEL210 - LOSS OF ICS EMERGENCY POWER

### FOUR YEAR TEST PLAN

Each year following initial certification/recertification test one malfunction from six (25%) of the malfunction categories as follows:

1995	1996	1997	1998
1	7	13	19
2	8	14	20
3	9	15	21
4	10	16	22
5	11	17	23
6	12	18	24

Malfunction categories:

1. Loss of coolant
2. Loss of instrument air to the extent that the whole system or individual headers can lose pressure and affect the plant's static or dynamic performance.
3. Loss or degraded electrical power to the station
4. Loss of forced core coolant flow due to single or multiple failure.
5. Loss of condenser vacuum including loss of condenser level control.
6. Loss of service water or cooling to individual components.
7. Loss of shutdown cooling.
8. Loss of component cooling system or cooling to individual components.
9. Loss of normal feedwater or normal feedwater system failure.

10. Loss of all feedwater (normal and emergency).
11. Loss of protective system channel.
12. Control rod failure.
13. Inability to drive control rods.
14. Fuel cladding failure resulting in high activity in reactor coolant off gas and the associated high radiation alarms.
15. Turbine trip.
16. Generator trip.
17. Failure in automatic control system(s) that affect reactivity and core heat removal.
18. Failure of reactor coolant pressure and volume control systems.
19. Reactor trip.
20. Main steam line as well as main feed line break (both inside and outside containment).
21. Nuclear instrumentation failure(s).
22. Process instrumentation, alarms, and control system failures.
23. Passive malfunctions in systems, such as engineered safety features, emergency feedwater systems.
24. Failure of the automatic reactor trip system.

TRANSIENT TEST		
PT/01/T/1		Anticipatory reactor trip on loss of main feedwater.
PT/02/T/2		Loss of main fdw with emergency feedwater overfeed.
PT/03/T/3		Loss of off site power.
PT/04/T/4		Trip of one RCP.
PT/05/T/5		Turbine trip from 30% power w/o automatic reactor trip.
PT/06/T/6		Power ramp.
PT/07/T/7		Large break LOCA with loop.
PT/08/T/8		Double-ended main steam line break from full power.
PT/09/T/9		Depressurization with pressurizer spray.
PT/10A/T/10A		SBLOCA with b & C HPIPs inoperable using RCPs.
PT/10B/T/10B		SBLOCA with b & C HPIPs inoperable using venting.
PT/11A/T/11A		SBLOCA without HPI - SG depressurization and RCP restart.
PT/11B/T/11B		SBLOCA without HPI - hpi eventually restored.
PT/12/T/12		Loss of all feedwater resulting in HPI cooling.
PT/13/T/13		TMI - 2 accident.
PT/14A/T/14A		Steam Generator tube rupture with no operator action.
PT/14B/T/14B		Steam Generator tube rupture with operator action.
PT/15/T/15		Dropped control rod.
PT/16/T/16		Loss of MFW transient.
NORMAL OPERATIONS TEST.		
PT/001/N/001		Start up from cold shutdown.
PT/002/N/002		Shutdown from 100% power.
PT/003/N/003		Drift test at 100% full power.
MALFUNCTION TEST.		
		<b>LOSS OF COOLANT</b>
		<b>SIGNIFICANT PWR OTSG LEAKS</b>
PT/066/M/MPS010	1	Primary to secondary leak Steam Generator A
PT/067/M/MPS020	1	Primary to secondary leak Steam Generator B
		<b>LBLOCA/INSIDE</b>
PT/069/M/MPS390	1	RCS Hot leg leak loop A
PT/071/M/MPS031	1	DBL end break of hot leg loop B
		<b>SBLOCA/INSIDE</b>
PT/070/M/MPS400	1	RCS cold leg leak RCP B1 discharge



PT/075/M/MPS060	1	Letdown leak in Reactor Building
PT/103/M/MPS242	1	RCP B2 seal #1 and 2 failure
PT/260/M/MPS405	1	Very Small Leak In the RCS
		<b>RCS LEAK OUTSIDE</b>
PT/074/M/MPS050	1	Leak on top of LDST
PT/261/M/MPS130	1	Letdown Leak After the Block Orifice
		<b>FAILURE OF SAFETY AND RELIEF VALVES</b>
PT/094/M/MPS170	1	RC-66 fails to close after lifting
PT/095/M/MPS180	1	RC-68 Fails to close after lifting
		<b>LOSS OF INSTRUMENT AIR</b>
PT/221/M/MSS310	2	Instrument Air failure
		<b>LOSS or DEGRADED ELECTRICAL POWER</b>
		<b>LOSS OF OFFSITE POWER</b>
PT/245/M/MEL090	3	Switchyard Isolation
		<b>LOSS OF EMERGENCY POWER</b>
PT/241/M/MEL130	3	Load Shed logic fail to initiate
PT/244/M/MEL080	3	Load Rejection ( PCB-20 and 21 trip)
PT/246/M/MEL160	3	Keowee Main Transformer lockout
PT/250/M/MEL100	3	Transformer CT-5 lockout
		<b>LOSS OF EMERGENCY GENERATORS</b>
PT/228/M/MEL020	3	Keowee unit 1 emer lockout
PT/229/M/MEL180	3	Keowee unit 2 emer lockout
		<b>LOSS OF POWER TO DISTRIBUTION BUSES</b>
PT/231/M/MEL030	3	Normal and SU FDR breakers to main feeder bus 1 trip
PT/238/M/MEL150	3	Main feeder bus 2 lockout
PT/242/M/MEL061	3	Red bus diff lockout
PT/243/M/MEL062	3	Yellow bus diff lockout
PT/247/M/MEL170	3	PCB-17 & 18 trip and lockout
PT/249/M/MEL070	3	Transformer 1T lockout
PT/255/M/MEL230	3	Loss of B3T 4160 Bus
PT/256/M/MEL240	3	Loss of B4T 4160 Bus
		<b>LOSS OF POWER TO INSTRUMENTATION BUS</b>
PT/225/M/MEL011	3	ICS hand power fail (Old ICS only)
PT/226/M/MEL012	3	ICS Auto power fail (Old ICS only)
PT/227/M/MEL013	3	ICS Power PNLBD (KI) fail (Old ICS only)
PT/000/M/MEL014	3	ICS Hand Power Fail (New ICS only)

PT/000/M/MEL015	3	ICS Auto Power Fail (New ICS only)
PT/253/M/MEL210	3	ICS Emergency Power Failure
PT/254/M/MEL220	3	ICS Emergency Feedwater Power Failure
		<b>LOSS OF FORCED COOLING FAILURES</b>
PT/099/M/MPS260	4	RCP A2 High vibration
PT/101/M/MPS241	4	RCP B2 seal #1 failure
PT/102/M/MPS251	4	RCP B2 seal # 2 failure
PT/251/M/MPS410	4	RCP B2 High Vibration
		<b>LOSS OF CONDENSER VACUUM</b>
PT/212/M/MSS200	5	Loss of vacuum to main condenser
		<b>LOSS OF SERVICE WATER</b>
PT/223/M/MSS290	6	CCW intake canal level decreases
PT/224/M/MSS340	6	CCW-8 fails as is
		<b>LOSS OF SHUTDOWN COOLING</b>
PT/076/M/MPS070	7	LPI Pump A trip
PT/077/M/MPS080	7	LPI Pump B fails to start on ES
		<b>LOSS OF COMPONENT COOLING</b>
PT/081/M/MPS290	8	CC pump A trip
PT/082/M/MPS300	8	CC Pump B trip
		<b>LOSS OF NORMAL FDW or FDW SYS FAILURES</b>
PT/146/M/MSI041	9	Total FDW demand fails to 9.16 mpph
PT/155/M/MSI101	9	ICS SG A SU level fails
PT/160/M/MSI131	9	ICS SG B SU level fails
PT/166/M/MSI161	9	ICS SG A MAIN FDW FT fails
PT/168/M/MSI181	9	ICS FDW Temp fails
PT/172/M/MSI201	9	ICS SG B Main FDW FT fails
PT/174/M/MSI211	9	ICS A FDW valve DP 1 fails
PT/178/M/MSI231	9	ICS B FDW valve DP 1 fails
PT/182/M/MSS240	9	Main FDW A CV (FDW-32) leaks by
PT/186/M/MSS080	9	Main FDW B CV (FDW-41) fail as is
PT/187/M/MSS090	9	Main FDW A CV (FDW-31) fails closed
PT/191/M/MSS050	9	FWPT A swap to manual
PT/192/M/MSS010	9	FWPT A trip (see 10 also)
PT/193/M/MSS020	9	FWPT B trip (see 10 also)
		<b>LOSS OF ALL FDW (NORMAL and EMERGENCY)</b>
PT/192/M/MSS010	10	FWPT A trip (see 9 also)

PT/193/M/MSS020	10	FWPT B trip (see 9 also)
PT/189/M/MSS110	10	FDW-315 fails closed in auto only
PT/190/M/MSS120	10	FDW-316 fails closed in auto only
PT/194/M/MSS330	10	EFWPT fails to start
PT/195/M/MSS260	10	MDEFWP A fails to start
PT/196/M/MSS270	10	MDEFWP B fails to start
		<b>LOSS OF PROTECTIVE SYSTEM CHANNEL</b>
PT/240/M/MELO41	11	DIB inverter trip
		<b>STUCK CONTROL RODS</b>
		<b>UNCOUPLED CONTROL RODS</b>
		<b>DRIFTING CONTROL RODS</b>
		<b>DROPPED CONTROL RODS</b>
PT/128/M/MCR021	12	Drop rod 6, group 6
PT/129/M/MCR070	12	Drop Group 6 rods
PT/130/M/MCR022	12	Drop rod 3, group 6
		<b>INABILITY TO DRIVE CONTROL RODS</b>
		<b>FUEL CLADDING FAILURES</b>
		<b>TURBINE TRIP</b>
PT/208/M/MSS190	15	Turbine Trip
		<b>GENERATOR TRIP</b>
		<b>FAILURE OF REACTIVITY CONTROL SYSTEMS</b>
PT/060/M/MPI310	17	Failure RX MSTR to follow Neutron power
PT/061/M/MPI320	17	Block neutron error to CRD
PT/062/M/MPI330	17	Block auto runback of ICS
PT/199/M/MSS160	17	Turbine bypass valves bias fails to 0
PT/200/M/MSS280	17	Turbine bypass valves (A-header) fail open
		<b>FAILURE OF RCS PRESSURE CONTROL SYS</b>
PT/096/M/MPS190	18	RC-1 fails as is
PT/106/M/MPS371	18	Pressurizer heater GRPs (2,3,4) fail on
		<b>FAILURE OF RCS VOLUME CONTROL SYSTEMS</b>

PT/078/M/MPS120	18	HPI Pump A fails
PT/079/M/MPS150	18	HPI Pump C fails to start on ES
PT/086/M/MPS140	18	HP-26 fails as is
PT/087/M/MPS110	18	HP-5 fails closed
PT/088/M/MPS090	18	HP-120 fails closed
PT/098/M/MPS210	18	Seal Supply Filter A clogs
		<b>REACTOR TRIP</b>
PT257	19	Reactor Trip (Manual)
		<b>STEAM LINE BREAK INSIDE CONTAINMENT</b>
PT/202/M/MSS151	20	MS line A rupture ( in containment)
PT/203/M/MSS360	20	MS line A leak ( in containment)
PT/204/M/MSS152	20	MS line B rupture (in containment)
PT/205/M/MSS370	20	MS line B leak (in containment)
		<b>STEAM LINE BREAK OUTSIDE CONTAINMENT</b>
PT/206/M/MSS380	20	MS line A leak ( out of containment)
PT/207/M/MSS390	20	MS line B leak ( out of containment)
PT/211/M/MSS170	20	MS 2 RVs fail to close
		<b>FEEDWATER LINE BREAK</b>
		<b>NUCLEAR INSTRUMENTATION FAILURES</b>
PT-23/MNIO31-081	21	NI-5 & NI-9 Fail High (New ICS)
PT-24/MNIO32-082	21	NI-5 & NI-9 Fail Low (New ICS)
PT/112/M/MNIO31	21	NI-5 fails high
PT/113/M/MNIO32	21	NI-5 fails low
PT/114/M/MNIO41	21	NI-1 Fails low
PT/120/M/MNIO81	21	NI-9 fails high
PT/121/M/MNIO82	21	NI-9 fails low
		<b>PROCESS INSTRUMENT &amp; CONTROL FAILURES</b>
PT/000/M/MCS001	22	Failure of MS THP (New ICS)
PT/000/M/MCS002	22	Failure of TPB-Primary (New ICS)
PT/000/M/MCS003	22	Failure of TPB - Secondary (New ICS)
PT/000/M/MCS004	22	Failure of Tave (New ICS)
PT/000/M/MCS005	22	Failure of NR Th Loop A (New ICS)
PT/000/M/MCS006	22	Failure of NR Th Loop B (New ICS)
PT/000/M/MCS007	22	Failure of NR Tc Loop A (New ICS)
PT/000/M/MCS008	22	Failure of NR Tc Loop B (New ICS)

PT/000/M/MCS009	22	Failure of Final FDW Temp (New ICS)
PT/000/M/MCS010	22	Failure of A SG SU Level (New ICS)
PT/000/M/MCS011	22	Failure of B SG SU level (New ICS)
PT/000/M/MCS012	22	Failure of MS Outlet Press Loop A (New ICS)
PT/000/M/MCS013	22	Failure of MS Outlet Press Loop B (New ICS)
PT/000/M/MCS014	22	Failure of MS TBVs (New ICS)
PT/000/M/MCS015	22	Failure of MS TBVs (New ICS)
PT/000/M/MCS017	22	Failure of SG A Oper Level (New ICS)
PT/000/M/MCS018	22	Failure of SG B Oper Level (New ICS)
PT/000/M/MCS021	22	Failure of FDW Flow Loop A (New ICS)
PT/000/M/MCS022	22	Failure of FDW Flow Loop B (New ICS)
PT-1/MPI070-130	22	"A" RCS Flow xmts Fail Low (New ICS)
PT-2/MPI070-130	22	"A" RCS Flow xmts Fail High (New ICS)
PT-4/MPI080-050	22	"B" RCS Flow xmts Fail Low (New ICS)
PT-5/MPI080-050	22	"B" RCS Flow xmts Fail High (New ICS)
PT-7/MPI171-500	22	RC Th "A" Temp xmts Fail High (New ICS)
PT-8/MPI201-510	22	RC Th "B" Temp xmts Fail High (New ICS)
PT-9/MP371-221	22	RC Tc "A" Temp xmts Fail High (New ICS)
PT-10/MPI381-231	22	RC Tc "A" Temp RCP Start Intl xmts Fail Low (New ICS)
PT-11/MPI391-241	22	RC Tc "B" Temp xmts Fail High (New ICS)
PT-12/MPI491-251	22	RC Tc "B" Temp RCP Start Intl xmts Fail Low (New ICS)
PT-13/MPI091-101	22	RC Press xmts Fail Low (New ICS)
PT-14/MPI091-101	22	RC Press xmts Fail High (New ICS)
PT-15/MSI051-061	22	ICS THP xmts Fail Low (New ICS)
PT-16/MSI280	22	Final FDW Temp xmt Fails High (New ICS)
PT-17/MSI070-261	22	ICS SG "A" Outlet Press xmts Fail Low (New ICS)
PT-18/MSI270-080	22	ICS SG "B" Outlet Press xmts Fail Low (New ICS)
PT-19/MSI101-330	22	ICS SG "A" SU Level xmts Fail High (New ICS)
PT-20/MSI131-340	22	ICS SG "A" SU Level xmts Fail High (New ICS)
PT-21/MSI350-360	22	ICS SG "A" Outlet Temp xmts Fail High (New ICS)
PT-22/MSI370-380	22	ICS SG "B" Outlet Temp xmts Fail High (New ICS)
PT-25/MSI290	22	Final FDW Temp xmt Fails High (New ICS)
PT-26/MSI300	22	Final FDW Temp xmt Fails High (New ICS)
PT/000/M/MPI161	22	Failure of RP-B RC Press Xmt Y1PT18P (New ICS)
PT/001/M/MPI121	22	Pressurizer lvl (1) xm ( 1lt-41p ) fails
PT/009/M/MPI091	22	RP-A RC press xm ( 1pt-17p ) fails

PT/015/M/MPI130	22	RP-A RC Flow fails
PT/016/M/MPI050	22	RP-A RC Flow fails
PT/018/M/MPI060	22	RP-B RC Flow B fails
PT/019/M/MPI011	22	ES-A WR Press Fails
PT/021/M/MPI021	22	ES-C WR press fails
PT/023/M/MPI101	22	CH-E RC Press fails
PT/025/M/MPI171	22	ICS RC TH A Temp (1) fails
PT/027/M/MPI500	22	ICS RC TH A Temp (2) fails
PT/028/M/MPI201	22	ICS RC TH B Temp (1) fails
PT/030/M/MPI510	22	ICS RC TH B Temp (2) fails
PT/037/M/MPI241	22	ICS RC B2 TC fails
PT/048/M/MPI080	22	ICS RC Flow B fails
PT/054/M/MPI271	22	Tave Input to ICS fails high (Old ICS only)
PT/055/M/MPI272	22	Tave Input to ICS fails low (Old ICS only)
PT/056/M/MPI281	22	DTC CNTRL fails
PT/148/M/MSI051	22	ICS turbine header pressure A fails
PT/152/M/MSI070	22	ICS SG A out pressure fails
PT/153/M/MSI080	22	ICS SG B out pressure fails
PT/262/M/MPI520	22	ICCM Train "B" Failure
		<b>PASSIVE MALFUNCTIONS IN SYSTEMS</b>
PT/064/M/MPI350	23	Water leak from CFT B to atmosphere
PT/065/M/MPI360	23	Loss of OAC System
PT/105/M/MPS320	23	Gas decay tank A leak
PT/222/M/MSS320	23	Turbine building flood
		<b>FAILURE OF AUTO REACTOR TRIP SYSTEMS</b>
PT/058/M/MPI290	24	Block all turbine trips except manual
PT/059/M/MPI300	24	Block all reactor trips except manual