COMMON SENSORS FAILURES

EVALUATION REPORT

APRIL 1983

PREPARED FOR

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
NUCLEAR PROJECT NO. 2

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COMMON SENSORS FAILURES EVALUATION REPORT FOR WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PROJECT NO. 2

1.0 OBJECT

This document constitutes:

- An analysis in response to the NRC concern that the failure of an instrument line which contains sensors to multiple control systems could result in consequences outside the bounds of the Washington Public Power Supply System Nuclear Project No. 2 (WNP-2) Final Safety Analysis Report (FSAR) Chapter 15 analysis and beyond the capabilities of operators or safety systems.

- A positive demonstration that adequate common sensor review and analysis has been performed to ensure that despite such failure the WNP-2 FSAR Chapter 15 analyses are bounding, and no consequences beyond the capability of operators or safety systems would result.

A comprehensive approach was developed to analyze the control systems capable of affecting reactor water level, pressure, or power in the Nuclear Plant No. 2 Evaluation Report for Control Systems Failures. This Common Sensor Report uses the knowledge of which systems affect reactor water level, pressure or power, gained in Evaluation Report for Control Systems Failures, for valid restriction of this analysis to only those systems.

This report was prepared by General Electric Company for Washington Public Power Supply System Nuclear Project No. 2 with a significant technical contribution from Burns & Roe, Incorporated (B&R Inc.), the Principal Architect Engineer.

2.0 CONCLUSIONS

This report, supplemented by existing FSAR Chapter 15 transient analysis, documents an evaluation of WNP-2 Nuclear Power Station for common sensor failures. No new transient category events have been postulated as a result of this study. All the uncovered consequences (Reactor Scram, Turbine trip, Feedwater increased/decreased flow) are bounded by FSAR Chapter 15 analysis.

3.0 ANALYSIS METHODOLOGY

The common sensor failure analysis was conducted in the following manner by GE and B&R Inc:

Activity	Assigned To
• Identify Common Sensors	B&R Inc & GE
• Determine Failure Mode	B&R Inc & GE
• Summarize Common Sensor Failures	GE
• Analyze Combined Effects	GE
• Compare Results to Chapter 15	GE
• Analyze Exceptions	GE
• Modify/Augment Chapter 15 if Necessary	GE

3.1 IDENTIFY COMMON SENSORS

The systems that effect reactor water level, pressure or power were analyzed for instrument lines with sensors for more than one system.

The Evaluation Report for Control Systems Failure identified those systems that effect reactor water level, pressure or power as follows:

MPL	Systems	MPL	Systems
NB	Nuclear Boiler	MS	Main Turbine Generator
RRC	Reactor Recirculation	CW	Circulating Water
CRD	CRD Hydraulic	SW	Service Water
RFT	Feedwater Turbine	CAS	Control and Service Air
NMS	Neutron Monitoring	AR	Air Removal
PRM	Process Radiation Monitoring	COND	Condensate
ARM	Area Rad Monitoring	DEH	Main Turbine Control
RWCU	Reactor Water Cleanup	TO	Main Turbine and Feedwater Turbines Lube Oil
MS	Main Steam		
ES	Exhaust Steam	SS	Seal Steam
BS	Bleed Steam-Extraction Steam	TG	Main Generator Cooling
HV	Heater Vents	GH	Main Generator Hydrogen and CO_2 Purge
HD	Heater Drains		
MD	Miscellaneous Drains	RCC	RB Cooling Water
MV	Miscellaneous Vents	TSW	TB Cooling Water

3.2 DETERMINE FAILURE MODE

The postulated probable failures are either that an instrument line is plugged (pinched) or broken.

The worst case would be any total combination of common sensor failures that can be postulated from a single failure.

3.3 SUMMARIZE COMMON SENSOR FAILURES

The common sensor failure table (attachment to this report) lists all the instrument lines with sensors and their failure modes. The combined failures are the consequences that the NRC is concerned with.

3.4 ANALYZE COMBINE EFFECTS

This step used two approaches.

The first approach totaled all effects as worst case failure of the instrument line. There were no single effects that mitigated the total failure consequences.

The second approach considered probable failures where the reactor scram had taken precedent over the other failure effects. In these instances the instrument line was analyzed as to whether a probable failure could be postulated without the reactor scramming. No such failure could be postulated.

3.5 COMPARE RESULTS TO CHAPTER 15

The combined effects as identified in common sensor table were reviewed and evaluated. Section 4 includes these evaluations, considering worst case effects.

3.6 ANALYZE EXCEPTIONS

There were no exceptions to FSAR Chapter 15 analysis.

3.7 MODIFY/AUGMENT CHAPTER 15 IF NECESSARY

This step was not necessary in the WNP-2 analysis.

4.0 COMMON SENSOR SUMMARY RESULTS AND CHAPTER 15 COMPARISONS

Instrument Line	Line Failure Consequences
No. 1	Line break initiates a decrease in feedwater flow and trip of Recirc Pump A. Reactor scram is a direct consequence. Reactor scram will not cause adverse consequences. Plugged line has no effect.
No. 2	Line break initiates increased feedwater flow, resulting in reactor scram. Reactor scram will not cause adverse consequences. Plugged line has no effect.
No. 3	No effect
No. 4	No effect
No. 5	No effect

Instrument Line	Line Failure Consequences
No. 6	Breaking of this instrument line initiates a Main Turbine Trip. A Main Turbine Trip event is analyzed in Chapter 15. Plugged line has no effect.
No. 7	No effect
No. 8	No effect
No. 9	No effect
No. 10	No effect
No. 11	No effect
No. 12	No effect
No. 13	Line break initiates a decrease in feedwater flow resulting in reactor scram. Reactor scram will not cause adverse consequences. Plugged line has no effect.
No. 14	Line break prevents automatic SRV initiation; this event is analyzed in Chapter 5. Plugged line has no effect.
No. 15	Line break initiates closure of all main steam line valves causing a reactor scram. Reactor scram takes precedence over other sensor failure consequences. Reactor scram will not cause adverse consequences. Plugged line has no effect.
No. 16	No effect
No. 17	Breaking this instrument line decreases feedwater flow resulting in Reactor Scram. Reactor scram will not cause adverse consequences. Plugged line has no effect.
No. 18	Same as No. 15
No. 19	Same as No. 17
No. 20	Same as No. 15
No. 21	Same as No. 17
No. 22	Same as No. 15
No. 23	Same as No. 17
No. 24	Same as No. 15

Instrument Line	Line Failure Consequences
No. 25	Same as No. 2
No. 26	No effect
No. 27	No effect
No. 28	Line break transfers Recirc Pumps A and B to low speed. A decrease in reactor flow is analyzed in Chapter 15. Plugged line has no effect.
No. 29	Same as No. 28
No. 30	No effect

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
NUCLEAR BOILER	B22-N051A	BROKEN	MINIMUM REACTOR PRESSURE SIGNAL	RECORDER R623A RED PEN INOPERATIVE	NONE
		PLUGGED	CONSTANT REACTOR PRESSURE SIGNAL	RECORDER R623A RED PEN AT CONSTANT READING	NONE
	B22-N023A	BROKEN	MINIMUM PRESSURE SIGNAL	RPS CHANNEL "A1" HIGH RPV PRESSURE TRIP INOPERATIVE	NONE
		PLUGGED	CONSTANT PRESSURE SIGNAL	RPS CHANNEL "A1" HIGH RPV PRESSURE TRIP INOPERATIVE	NONE
	B22-N020A	BROKEN	MINIMUM REACTOR PRESSURE SIGNAL	GIVES MSIV CLOSURE BYPASS SIGNAL TO SCRAM TRIP LOGIC "A1" ONLY IN SHUTDOWN, REFUEL, AND STARTUP	NONE: REACTOR MODE SWITCH IN "RUN" POSITION BLOCKS THE BYPASS SIGNAL
		PLUGGED	CONSTANT REACTOR PRESSURE SIGNAL	REACTOR HIGH PRESSURE TRIP OF MSIV CLOSURE SCRAM BYPASS IS INOPERATIVE	NONE: REACTOR MODE SWITCH IN "RUN" POSITION BLOCKS THE BYPASS SIGNAL
	B22-N026A	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	REACTOR LOW LOW WATER LEVEL ISOLATION LOGIC "A" TRIP IS INOPERATIVE	MAIN STEAM LINE ISOLATION VALVES CLOSURE 1/2 TRIP REMAINS OPERATIVE FROM CHANNEL "C" CIRCUITRY
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	REACTOR LOW LOW WATER LEVEL ISOLATION LOGIC "A" TRIP INOPERATIVE	NONE
	B22-N100A	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	DIV I HALF OF HPCS HIGH LEVEL SEAL-IN TRIPPED	NONE

INSTRUMENT LINE 1 340° N14 REFERENCE LEG (CONDENSING CHAMBER B22-D004A)
PAGE 1 OF 3

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	DIV I HALF OF HPCS HIGH LEVEL SEAL-IN INOPERATIVE	NONE
	B22-N031A AND B22-N031C	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	REACTOR HIGH PRESSURE CORE SPRAY DIVISION 1 LOW LEVEL TRIP INOPERATIVE	ALLOWS IMPROPER OPERATION OF HPCS PUMP DISCHARGE VALVE LOGIC RESET CIRCUIT
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	REACTOR HIGH PRESSURE CORE SPRAY DIVISION 1 LOW LEVEL TRIP INOPERATIVE	NONE
REACTOR RECIRC	B35-N038A	BROKEN	MINIMUM PRESSURE SIGNAL	RECIRC PUMP A TRIPS AND IS BLOCKED FROM TRANSFER TO LOW SPEED	RECIRC PUMP A IS INOPERATIVE
		PLUGGED	CONSTANT PRESSURE SIGNAL	IF PUMP B IS AT HIGH SPEED AND STOPS, NPSH INTERLOCK INOPERATIVE	NONE
REACTOR FEEDWATER	C34-N005	BROKEN	MINIMUM PRESSURE SIGNAL	C34-R605 HIGH LEVEL RECORDER INOPERATIVE	NONE
		PLUGGED	CONSTANT PRESSURE SIGNAL	C34-R605 HIGH LEVEL RECORDER INOPERATIVE	NONE
	C34-N008A	BROKEN	MINIMUM PRESSURE SIGNAL	RECORDER C34-R609 RED PEN INOPERATIVE	NONE
		PLUGGED	CONSTANT PRESSURE SIGNAL	RECORDER C34-R609 RED PEN AT CONSTANT READING	NONE

INSTRUMENT LINE 1 340° N14 REFERENCE LEG (CONDENSING CHAMBER B22-D004A)
PAGE 2 OF 3

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
REACTOR FEEDWATER	C34-N004A	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	C34-R606A WATER LEVEL RECORDER INOPERATIVE; REACTOR FEEDWATER DECREASED FLOW	FEEDWATER DECREASED FLOW
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	C34-R606A WATER LEVEL RECORDER AT CONSTANT READING; REACTOR FEED-WATER ERROR IN LEVEL FOLLOWING	NONE
	B22-N024A	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	RPS CHANNEL A1 LOW LEVEL SCRAM INOPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RPS CHANNEL A1 LOW LEVEL SCRAM INOPERATIVE	NONE

INSTRUMENT LINE 1 340° N14 REFERENCE LEG (CONDENSING CHAMBER B22-D004A)
PAGE 3 OF 3

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
NUCLEAR BOILER	B22-N101A	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	RCIC ISOLATION VALVE E51-F045 CLOSURE ON HIGH REACTOR LEVEL INOPERATIVE	RCIC ISOLATION VALVE E51-F045 CLOSURE ON MANUAL INITIATION ONLY
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RCIC ISOLATION VALVE E51-F045 CLOSURE ON HIGH REACTOR LEVEL INOPERATIVE	RCIC ISOLATION VALVE E51-F045 CLOSURE ON MANUAL INITIATION ONLY
	B22-N024A	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	RPS CHANNEL A1 LOW LEVEL SCRAM TRIP	1/2 REACTOR SCRAM
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RPS CHANNEL A1 LOW LEVEL SCRAM TRIP INOPERATIVE	NONE
	B22-N024B	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	RPS CHANNEL B1 LOW LEVEL SCRAM TRIP	1/2 REACTOR SCRAM
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RPS CHANNEL B1 LOW LEVEL SCRAM TRIP INOPERATIVE	NONE
	B22-N038A	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	1/3 DIVISION 1 AUTO DEPRESSURIZATION LOGIC TRIP	TWO ADDITIONAL RPV LOW LEVEL TRIPS NEEDED TO ALLOW ADS INITIATION FROM DIVISION 1
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	DIVISION 1 AUTO DEPRESSURIZATION LOGIC INOPERATIVE	ADS INITIATION AVAILABLE FROM DIVISION 2
	B22-N100A	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	DIVISION 1 HALF OF HPCS HIGH LEVEL SEAL-IN INOPERATIVE	NONE

INSTRUMENT LINE 2 10° N13 VARIABLE SIGNAL SENSING LINE
PAGE 1 OF 2

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	DIVISION 1 HALF OF HPCS HIGH LEVEL SEAL-IN INOPERATIVE	NONE
REACTOR FEEDWATER	C34-N004A	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	C34-R606A WATER LEVEL RECORDER INOPERATIVE; REACTOR FEEDWATER INCREASED FLOW	FEEDWATER INCREASED FLOW
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	C34-R606A WATER LEVEL RECORDER AT CONSTANT READING; REACTOR FEEDWATER ERROR IN LEVEL FOLLOWING	NONE

INSTRUMENT LINE 2 10" N13 VARIABLE SIGNAL SENSING LINE
PAGE 2 OF 2

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
NUCLEAR BOILER	B22-N023C	BROKEN	MINIMUM PRESSURE SIGNAL	RPS, CHANNEL "A2" HIGH RPV PRESSURE TRIP INOPERATIVE	NONE
		PLUGGED	CONSTANT PRESSURE SIGNAL	RPS, CHANNEL "A2" HIGH RPV PRESSURE TRIP INOPERATIVE	NONE
	B22-N026C	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	REACTOR LOW LOW WATER LEVEL ISOLATION LOGIC "C" TRIP INOPERATIVE	MAIN STEAM ISOLATION VALVES CLOSURE 1/2 TRIP REMAINS INOPERATIVE FROM CHANNEL "A" CIRCUITRY
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	REACTOR LOW LOW WATER LEVEL ISOLATION LOGIC "C" TRIP INOPERATIVE	MAIN STEAM ISOLATION VALVES CLOSURE 1/2 TRIP REMAINS INOPERATIVE FROM CHANNEL "A" CIRCUITRY
	B22-N100B	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	DIVISION 2 HALF OF HPCS HIGH LEVEL SEAL-IN TRIPPED	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	DIVISION 2 HALF OF HPCS HIGH LEVEL SEAL IN INOPERATIVE	NONE
	B22-N020C	BROKEN	MINIMUM REACTOR PRESSURE SIGNAL	GIVES MSIV CLOSURE BYPASS SIGNAL TO SCRAM TRIP LOGIC "A2" ONLY IN SHUTDOWN, REFUEL, AND STARTUP MODE	NONE: REACTOR MODE SWITCH IN "RUN" POSITION BLOCKS THE BYPASS SIGNAL
		PLUGGED	CONSTANT REACTOR PRESSURE SIGNAL	REACTOR HIGH PRESSURE TRIP OR MSIV CLOSURE SCRAM BYPASS IS INOPERATIVE	NONE: REACTOR MODE SWITCH IN "RUN" POSITION BLOCKS THE BYPASS SIGNAL
	B22-N024C	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	RPS CHANNEL A2 LOW LEVEL SCRAM INOPERATIVE	NONE

INSTRUMENT LINE 3 160° N14 REFERENCE LEG (CONDENSING CHAMBER B22-D004C)
PAGE 1 OF 2

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RPS CHANNEL A2 LOW LEVEL SCRAM INOPERATIVE	NONE
	B22-N031B AND B22-N031D	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	REACTOR HIGH PRESSURE CORE SPRAY DIVISION 2 LOW LEVEL TRIP INOPERATIVE	ALLOWS IMPROPER OPERATION OF HPCS PUMP DISCHARGE VALVE LOGIC RESET CIRCUIT
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	REACTOR HIGH PRESSURE CORE SPRAY DIVISION 2 LOW LEVEL INOPERATIVE	NONE
REACTOR FEEDWATER	C34-N004C	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	C34-R606C WATER LEVEL RECORDER INOPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	C34-R606C WATER LEVEL RECORDER AT CONSTANT READING	NONE

INSTRUMENT LINE 3 160° N14 REFERENCE LEG (CONDENSING CHAMBER B22-D004C)
PAGE 2 OF 2

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
NUCLEAR BOILER	B22-N047A AND B22-N047C	BROKEN	LOSE DIVISION 1 HIGH DRYWELL PRESSURE SIGNAL	NONE - BACKED UP BY DIVISION 2	NONE
		PLUGGED	LOSE DIVISION 1 HIGH DRYWELL PRESSURE SIGNAL	NONE	NONE
REACTOR PROTECTION	C72-N002A	BROKEN	LOSE REACTOR SCRAM ON PRIMARY CONTAINMENT HIGH PRESSURE "A1"	NONE - BACKED UP BY B1, A2, AND B2 CIRCUITS	NONE
		PLUGGED	LOSE REACTOR SCRAM ON PRIMARY CONTAINMENT HIGH PRESSURE "A1"	NONE	NONE
	C72-N004	BROKEN	LOSE PRIMARY CONTAINMENT HIGH PRESSURE ALARM	NONE	NONE
		PLUGGED	LOSE PRIMARY CONTAINMENT HIGH PRESSURE ALARM	NONE	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
MAIN STEAM	MS-PTD-20A	BROKEN	LOSE TURBINE DEH FEEDBACK CONTROL SIGNAL	LARGER ERROR IN TURBINE OUTPUT POWER CONTROL, BUT DOES NOT SIGNIFICANTLY AFFECT TURBINE OPERATION	NONE
		PLUGGED	LOSE TURBINE DEH FEEDBACK CONTROL SIGNAL	LARGER ERROR IN TURBINE OUTPUT POWER CONTROL, BUT DOES NOT SIGNIFICANTLY AFFECT TURBINE OPERATION	NONE
REACTOR PROTECTION	C72-N003A	BROKEN	FIRST STAGE TURBINE PRESSURE SWITCH WILL NOT OPEN, SENSES 30% POWER	TURBINE CONTROL VALVE FAST CLOSURE, STOP VALVE AND RPT TRIP "A1" BYPASS INOPERATIVE	NONE
		PLUGGED	FIRST STAGE TURBINE PRESSURE SWITCH WILL NOT OPEN, SENSES 30% POWER	NONE	NONE
CONTROL ROD DRIVE HYDRAULICS	C12-N054A	BROKEN	MINIMUM FIRST STAGE TURBINE PRESSURE SIGNAL	ROD SEQUENCE CONTROL INITIATES ROD BLOCK DIVISION 1	NONE
		PLUGGED	CONSTANT FIRST STAGE TURBINE PRESSURE SIGNAL	LOW POWER ROD SEQUENCE CONTROL LOGIC DIVISION 1 INOPERATIVE	NONE

INSTRUMENT LINE 5
PAGE 1 OF 1

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
MAIN STEAM	MS-PTD-20B	BROKEN	MINIMUM FIRST STAGE TURBINE PRESSURE SIGNAL	METER MS-P1-20B INOPERATIVE	NONE
		PLUGGED	CONSTANT FIRST STAGE TURBINE PRESSURE SIGNAL	METER PS-P1-20B AT CONSTANT READING	NONE
	MS-PT-20BG	BROKEN	MINIMUM FIRST STAGE PRESSURE INDICATION	INDICATOR MS-P1-20BG INOPERATIVE	NONE
		PLUGGED	CONSTANT FIRST STAGE PRESSURE INDICATION	INDICATOR MS-P1-20BG AT CONSTANT READING	NONE
	MS-DPIS-63	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	MAIN TURBINE TRIPS AT LESS THAN 15 PSID	MAIN TURBINE TRIP
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	NO TRIP CAPABILITY ON LOW DIFFERENTIAL PRESSURE	NONE
REACTOR FEEDWATER	C34-N007	BROKEN	MINIMUM TURBINE STEAM FLOW SIGNAL	RECORDER C34-R609 BLACK PEN INOPERATIVE	NONE
		PLUGGED	CONSTANT TURBINE STEAM FLOW SIGNAL	RECORDER C34-R609 BLACK PEN AT CONSTANT READING	NONE
REACTOR PROTECTION	C72-N003C	BROKEN	FIRST STAGE TURBINE PRESSURE SWITCH WILL NOT OPEN, SENSES 30% POWER	TURBINE CONTROL VALVE FAST CLOSURE, STOP VALVE AND RPT TRIP "A2" BYPASS INOPERATIVE	NONE
		PLUGGED	FIRST STAGE TURBINE PRESSURE SWITCH WILL NOT OPEN, SENSES 30% POWER	NONE	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
	C72-N003D	BROKEN	FIRST STAGE TURBINE PRESSURE SWITCH WILL NOT OPEN, SENSES 30% POWER	TURBINE CONTROL VALVE FAST CLOSURE, STOP VALVE AND RPT TRIP "B2" BYPASS INOPERATIVE	NONE
CONTROL ROD DRIVE HYDRAULICS	C12-N054B	BROKEN	MINIMUM FIRST STAGE TURBINE PRESSURE SIGNAL	ROD SEQUENCE CONTROL INITIATES ROD BLOCK DIVISION 2	NONE
		PLUGGED	CONSTANT FIRST STAGE TURBINE PRESSURE SIGNAL	LOW POWER ROD SEQUENCE CONTROL LOGIC DIVISION 2 INOPERATIVE	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
NUCLEAR BOILER	B22-N047B AND B22-N047D	BROKEN	LOSE DIVISION 2 HIGH DRYWELL PRESSURE SIGNAL	NONE - BACKED UP BY DIVISION 1	NONE
		PLUGGED	LOSE DIVISION 2 HIGH DRYWELL PRESSURE SIGNAL	NONE	NONE
REACTOR PROTECTION	C72-N002C	BROKEN	LOSE REACTOR SCRAM ON PRIMARY CONTAINMENT HIGH PRESSURE	NONE - BACKED UP BY A1, B1, AND A2 CIRCUITS	NONE

INSTRUMENT LINE 7
PAGE 1 OF 1

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
BLEED STREAM	BS-PT-3B3	BROKEN	MINIMUM GLAND SEAL STEAM PRESSURE SIGNAL	LOW GLAND SEAL STEAM PRESSURE ALARM IN CONTROL ROOM	NONE
		PLUGGED	CONSTANT GLAND SEAL STEAM PRESSURE SIGNAL	NONE	NONE
MAIN STEAM	MS-DPIS-63	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	LOSE CAPABILITY TO TRIP MAIN TURBINE ON LOW PRESSURE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	LOSE CAPABILITY TO TRIP MAIN TURBINE ON LOW PRESSURE	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
NUCLEAR BOILER	B22-N032	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	RECORDER R613 CORE PLATE DIFF PRESSURE BLACK PEN INOPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RECORDER R613 CORE PLATE DIFF PRESSURE BLACK PEN CONSTANT INDICATION	NONE
	B22-N034 (A THRU W)	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	RECORDERS R608, R611A,B AND R613 RED PEN INOPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RECORDERS R608, R611A,B AND R613 RED PEN INOPERATIVE	NONE
REACTOR WATER CLEANUP	G33-N037	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	RECORDER R610 INOPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RECORDER R610 CONSTANT INDICATION	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
NUCLEAR BOILER	B22-N027	BROKEN	MAXIMUM REACTOR VESSEL LEVEL SIGNAL	B22-R605 METER INOPERATIVE OFF SCALE, HIGH LEVEL	NONE
		PLUGGED	CONSTANT REACTOR VESSEL LEVEL SIGNAL	B22-R605 METER AT CONSTANT READING	NONE
REACTOR FEEDWATER	C34-N017	BROKEN	MAXIMUM WIDE RANGE REACTOR LEVEL SIGNAL	C34-R608 RECORDER REGISTERS MAXIMUM SIGNAL	NONE
		PLUGGED	CONSTANT WIDE RANGE REACTOR LEVEL SIGNAL	C34-R608 RECORDER REGISTERS CONSTANT SIGNAL	NONE

INSTRUMENT LINE 10 VESSEL HEAD NOZZLE N8, REFERENCE LEG (CONDENSING CHAMBER B22-D002)
PAGE 1 OF 1

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
NUCLEAR BOILER	B22-N048A AND B22-N048C	BROKEN	DIVISION 1 AUTO DEPRESSURIZATION LOGIC INOPERATIVE	NONE - BACKED UP BY DIVISION 2	NONE
		PLUGGED	DIVISION 1 AUTO DEPRESSURIZATION LOGIC INOPERATIVE	NONE	NONE
REACTOR PROTECTION	C72-N002B	BROKEN	LOSE REACTOR SCRAM ON PRIMARY CONTAINMENT HIGH PRESSURE "B1"	NONE - BACKED UP BY A1, A2, AND B2 CIRCUITS	NONE
		PLUGGED	LOSE REACTOR SCRAM ON PRIMARY CONTAINMENT HIGH PRESSURE "B1"	NONE	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
NUCLEAR BOILER	B22-N048B AND B22-N048D	BROKEN	DIVISION 2 AUTO DEPRESSURIZATION LOGIC INOPERATIVE	NONE - BACKED UP BY DIVISION 1	NONE
		PLUGGED	DIVISION 2 AUTO DEPRESSURIZATION LOGIC INOPERATIVE	NONE	NONE
REACTOR PROTECTION	C72-N002D	BROKEN	LOSE REACTOR SCRAM ON PRIMARY CONTAINMENT HIGH PRESSURE "A2"	NONE - BACKED UP BY A1, A2, AND B2 CIRCUITS	NONE
		PLUGGED	LOSE REACTOR SCRAM ON PRIMARY CONTAINMENT HIGH PRESSURE "A2"	NONE	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
NUCLEAR BOILER	B22-N026D	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	REACTOR LOW LOW WATER LEVEL ISOLATION LOGIC D TRIP INOPERATIVE	MAIN STEAM ISOLATION VALVES CLOSURE 1/2 TRIP STILL OPERATIVE FROM CHANNEL "B" CIRCUITRY
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	REACTOR LOW LOW WATER LEVEL ISOLATION D LOGIC TRIP INOPERATIVE	MAIN STEAM ISOLATION VALVES CLOSURE 1/2 TRIP STILL OPERATIVE FROM CHANNEL "B" CIRCUITRY
	B22-N020D	BROKEN	MINIMUM REACTOR PRESSURE SIGNAL	GIVES MSIV CLOSURE BYPASS SIGNAL TO SCRAM TRIP LOGIC "B2" ONLY IN SHUTDOWN, REFUEL, AND STARTUP MODE	NONE: REACTOR MODE SWITCH IN "RUN" POSITION BLOCKS THE BYPASS SIGNAL
		PLUGGED	CONSTANT REACTOR PRESSURE SIGNAL	REACTOR HIGH PRESSURE TRIP OF MSIV CLOSURE SCRAM BYPASS IS INOPERATIVE	NONE: REACTOR MODE SWITCH IN "RUN" POSITION BLOCKS THE BYPASS SIGNAL
	B22-N023D	BROKEN	MINIMUM PRESSURE SIGNAL	RPS CHANNEL "B2" HIGH RPV PRESSURE TRIP INOPERATIVE	NONE
		PLUGGED	CONSTANT PRESSURE SIGNAL	RPS CHANNEL "B2" HIGH RPV PRESSURE TRIP INOPERATIVE	NONE
	B22-N045C	BROKEN	MINIMUM PRESSURE SIGNAL	RECIRC PUMP A, BKR 3A ATWS ½ HIGH PRESSURE TRIP; BACKED BY A AND B CIRCUITS	NONE
		PLUGGED	CONSTANT PRESSURE SIGNAL	RECIRC PUMP A, BKR 3A ATWS ½ HIGH PRESSURE TRIP; BACKED BY A AND B CIRCUITS	NONE

INSTRUMENT LINE 13 200° N14 REFERENCE LEG (CONDENSING CHAMBER B22-D004B)
PAGE 1 OF 4

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
	B22-N045D	BROKEN	MINIMUM PRESSURE SIGNAL	RECIRC PUMP B, BKR 3B ATWS ½ HIGH PRESSURE TRIP INOPERATIVE; BACKED BY A AND B CIRCUITS	NONE
		PLUGGED	CONSTANT PRESSURE SIGNAL	RECIRC PUMP B, BKR 3B ATWS ½ HIGH PRESSURE TRIP INOPERATIVE; BACKED BY A AND B CIRCUITS	NONE
	B22-N051B	BROKEN	MINIMUM REACTOR PRESSURE SIGNAL	RECORDER R623B RED PEN INOPERATIVE	NONE
		PLUGGED	CONSTANT REACTOR PRESSURE SIGNAL	RECORDER R623B RED PEN CONSTANT READING	NONE
	B22-N036C	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	RECIRC PUMP A, BKR 3A ATWS LOW LEVEL 2, 1/2 TRIP INOPERATIVE - CHANNEL A REMAINS OPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RECIRC PUMP A, BKR 3A ATWS LOW LEVEL 2, 1/2 TRIP INOPERATIVE - CHANNEL A REMAINS OPERATIVE	NONE
	B22-N036D	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	RECIRC PUMP B, BKR 3B ATWS LOW LEVEL 2, 1/2 TRIP INOPERATIVE - CHANNEL B REMAINS OPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RECIRC PUMP B, BKR 3B ATWS LOW LEVEL 2, 1/2 TRIP INOPERATIVE - CHANNEL B REMAINS OPERATIVE	NONE

INSTRUMENT LINE 13 200° N14 REFERENCE LEG (CONDENSING CHAMBER B22-D004B)
PAGE 2 OF 4

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR HPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
	B22-N037B AND B22-N037D	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	1/2 DIVISION 2 ADS - AND - RCIC LOGIC TRIP INOPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	1/2 DIVISION 2 ADS - AND - RCIC LOGIC INOPERATIVE	NONE
	B22-N044B	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	REACTOR WATER LVL INDICATOR R610 INOPERATIVE (SEE NOTE)	NOTE: THIS INSTRUMENT IS USED ONLY DURING POST ACCIDENT REACTOR SHUTDOWN AND WHEN RECIRC PUMPS ARE SECURED. DURING REACTOR OPERATION INSTRUMENT READS OFF SCALE, HIGH.
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	REACTOR WATER LVL INDICATOR R610 CONSTANT READING (SEE NOTE)	
	B22-N038B	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	DIVISION 2 AUTO DEPRESSURIZATION LOGIC TRIP INOPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	DIVISION 2 AUTO DEPRESSURIZATION LOGIC INOPERATIVE	NONE
	B22-N024D	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	RPS CHANNEL B2 LOW LEVEL SCRAM INOPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RPS CHANNEL B2 LOW LEVEL SCRAM INOPERATIVE	NONE
	B22-N101B	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	RCIC ISOLATION VALVE E51-F045 (HIGH LEVEL) 1/2 TRIP	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RCIC ISOLATION VALVE E51-F045 INOPERATIVE HIGH LEVEL TRIP	NONE

INSTRUMENT LINE 13 200° N14 REFERENCE LEG (CONDENSING CHAMBER B22-D004B)
PAGE 3 OF 4

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
REACTOR FEEDWATER	C34-N004B	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	C34-R606B WATER LEVEL RECORDER INOPERATIVE; REACTOR FEEDWATER DECREASED FLOW	FEEDWATER DECREASED FLOW
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	C34-R606B WATER LEVEL RECORDER AT CONSTANT READING; REACTOR FEEDWATER ERROR IN LEVEL FOLLOWING	NONE
REACTOR RECIRC	B35-N038C	BROKEN	MINIMUM PRESSURE SIGNAL	RECIRC PUMP B TRIPS AND IS BLOCKED FROM TRANSFER TO LOW SPEED	NONE
		PLUGGED	CONSTANT PRESSURE SIGNAL	(IF PUMP A IS AT HIGH SPEED) AND PUMP B STOPS, NPSH INTERLOCK INOPERATIVE	NONE

INSTRUMENT LINE 13 200° N14 REFERENCE LEG (CONDENSING CHAMBER B22-D004B)
PAGE 4 OF 4

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
NUCLEAR BOILER	B22-N036A	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	RECIRC PUMP A BKR "3A" ATWS LOW LEVEL 2, 1/2 TRIP INOPERATIVE - CHANNEL C REMAINS OPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RECIRC PUMP A BKR "3A" ATWS LOW LEVEL 2, 1/2 TRIP INOPERATIVE - CHANNEL C REMAINS OPERATIVE	NONE
	B22-N036B	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	RECIRC PUMP B BKR "3B" ATWS LOW LEVEL 2, 1/2 TRIP INOPERATIVE - CHANNEL D REMAINS OPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RECIRC PUMP B BKR "3B" ATWS LOW LEVEL 2, 1/2 TRIP INOPERATIVE - CHANNEL D REMAINS OPERATIVE	NONE
	B22-N026B	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	REACTOR LOW LOW WATER LEVEL ISOLATION LOGIC "B" TRIP INOPERATIVE	MAIN STEAM LINE ISOLATION VALVES CLOSURE 1/2 TRIP REMAINS OPERATIVE FROM CHANNEL "D" CIRCUITRY
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	REACTOR LOW LOW WATER LEVEL ISOLATION LOGIC "B" TRIP INOPERATIVE	MAIN STEAM LINE ISOLATION VALVES CLOSURE 1/2 TRIP REMAINS OPERATIVE FROM CHANNEL "D" CIRCUITRY
	B22-N037A AND B22-N037C	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	1/2 DIVISION 1 ADS, RCIC, LPCS LOGIC TRIP INOPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	1/2 DIVISION 1 ADS INOPERATIVE; LPCS LEVEL INOP; RCIC 1/2 LEVEL TRIP INOPERATIVE	NONE

INSTRUMENT LINE 14 20° N14 REFERENCE LEG (CONDENSING CHAMBER B22-D004D)
PAGE 1 OF 3

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
	B22-N101A	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	RCIC ISOLATION VALVE E41-F045 (HIGH LEVEL) 1/2 TRIP	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RCIC ISOLATION VALVE E41-F045 (HIGH LEVEL) TRIP INOPERATIVE	NONE
	B22-N024B	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	REACTOR CHANNEL B1 LOW LEVEL SCRAM TRIP INOPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	REACTOR CHANNEL B1 LOW LEVEL SCRAM TRIP INOPERATIVE	NONE
	B22-N039 (A THRU V)	BROKEN	MINIMUM PRESSURE SIGNAL	SAFETY RELIEF VALVES INITIATION CIRCUIT INOPERATIVE	SAFETY RELIEF VALVES INITIATION INOPERATIVE
		PLUGGED	CONSTANT PRESSURE SIGNAL	SAFETY RELIEF VALVES INITIATION CIRCUIT INOPERATIVE	NONE
	B22-N045A	BROKEN	MINIMUM PRESSURE SIGNAL	RECIRC PUMP 1A BKR "3A" ATWS HIGH PRESSURE TRIP INOPERATIVE; BACKED BY C AND D CIRCUITS	NONE
		PLUGGED	CONSTANT PRESSURE SIGNAL	RECIRC PUMP 1A BKR "3A" ATWS HIGH PRESSURE TRIP INOPERATIVE; BACKED BY C AND D CIRCUITS	NONE
	B22-N045B	BROKEN	MINIMUM PRESSURE SIGNAL	RECIRC PUMP 1B, BKR "3B" ATWS HIGH PRESSURE TRIP INOPERATIVE; BACKED BY C AND D CIRCUITS	NONE

INSTRUMENT LINE 14 20° N14 REFERENCE LEG (CONDENSING CHAMBER B22-D004D)
PAGE 2 OF 3

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
		PLUGGED	CONSTANT PRESSURE SIGNAL	RECIRC PUMP 1B, BKR "3B" ATWS HIGH PRESSURE TRIP INOPERATIVE; BACKED BY C AND D CIRCUITS	NONE
	B22-N023B	BROKEN	MINIMUM PRESSURE SIGNAL	RPS TRIP CHANNEL "B1" REACTOR TRIP ON HIGH RPV PRESSURE INOPERATIVE	NONE
		PLUGGED	CONSTANT PRESSURE SIGNAL	RPS TRIP CHANNEL "B1" REACTOR TRIP ON HIGH RPV PRESSURE INOPERATIVE	NONE
	B22-N020B	BROKEN	MINIMUM REACTOR PRESSURE SIGNAL	GIVES MSIV CLOSURE BYPASS SIGNAL TO SCRAM TRIP LOGIC "B1" ONLY IN SHUTDOWN, REFUEL, AND STARTUP MODE	NONE: REACTOR MODE SWITCH IN "RUN" POSITION BLOCKS THE BYPASS SIGNAL
		PLUGGED	CONSTANT REACTOR PRESSURE SIGNAL	REACTOR HIGH PRESSURE TRIP OF MSIV CLOSURE SCRAM BYPASS IS INOPERATIVE	NONE: REACTOR MODE SWITCH IN "RUN" POSITION BLOCKS THE BYPASS SIGNAL
	B22-N038A	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE	NONE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	NONE	NONE

INSTRUMENT LINE 14 20° N14 REFERENCE LEG (CONDENSING CHAMBER B22-D004D)
PAGE 3 OF 3

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
REACTOR FEEDWATER	C34-N003A	BROKEN	MAXIMUM STEAM FLOW LINE "A" DIFF PRESSURE SIGNAL	C34-R603A STEAM FLOW METER INOPERATIVE; REACTOR FEEDWATER INCREASED FLOW	FEEDWATER INCREASED FLOW
		PLUGGED	CONSTANT STEAM FLOW LINE "A" DIFF PRESSURE SIGNAL	C34-R603A STEAM FLOW METER AT CONSTANT READING; REACTOR FEEDWATER ERROR IN STEAM FLOW FOLLOWING	NONE
LEAK DETECTION	E31-N008C E31-N008D	BROKEN	LOSS OF TWO OF FOUR HIGH FLOW HSIV DIVISION 2 ISOLATION SIGNALS	DIVISION 1 TURBINE STEAM LINE HIGH FLOW DIVISION 2 ISOLATION INITIATED	MAIN STEAM LINE VALVES CLOSURE
		PLUGGED	LOSS OF TWO OF FOUR HIGH FLOW HSIV DIVISION 2 ISOLATION SIGNALS	NONE	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
CONTROL ROD DRIVE HYDRAULICS	C12-N008	BROKEN	MAXIMUM DIFFERENTIAL PRESSURE SIGNAL	METER C12-R009 INOPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	METER C12-R009 AT CONSTANT READING	NONE
	C12-N011	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	METER C12-R005 INOPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	METER C12-R005 AT CONSTANT READING	NONE
NUCLEAR BOILER	B22-N032	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	RECORDER R613 CORE PLATE DIFF PRESSURE BLACK PEN INOPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RECORDER R613 CORE PLATE DIFF PRESSURE BLACK PEN CONSTANT INDICATION	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
REACTOR FEEDWATER	C34-N003A	BROKEN	MINIMUM STEAM FLOW LINE "A" DIFF PRESSURE SIGNAL	C34-R603A STEAM FLOW METER INOPERATIVE; REACTOR FEEDWATER DECREASED FLOW	FEEDWATER DECREASED FLOW
		PLUGGED	CONSTANT STEAM FLOW LINE "A" DIFF PRESSURE SIGNAL	C34-R603A STEAM FLOW METER INOPERATIVE; REACTOR FEEDWATER ERROR IN STEAM FLOW FOLLOWING	NONE
LEAK DETECTION	E31-N008A E31-N008B	BROKEN	LOSS OF TWO OF FOUR HIGH FLOW MSIV DIVISION 1 ISOLATION SIGNALS	DIVISION 1 TURBINE STEAM LINE HIGH FLOW DIVISION 1 ISOLATION DISABLED, BUT DIVISION 1 ISOLATION IS INTACT	NONE
		PLUGGED	LOSS OF TWO OF FOUR HIGH FLOW MSIV DIVISION 1 ISOLATION SIGNALS	NONE	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
REACTOR FEEDWATER	C34-N003A	BROKEN	MAXIMUM STEAM FLOW LINE "A" DIFF PRESSURE SIGNAL	C34-R603A STEAM FLOW METER INOPERATIVE; REACTOR FEEDWATER INCREASED FLOW	FEEDWATER INCREASED FLOW
		PLUGGED	CONSTANT STEAM FLOW LINE "A" DIFF PRESSURE SIGNAL	C34-R603A STEAM FLOW METER AT CONSTANT READING; REACTOR FEEDWATER ERROR IN STEAM FLOW FOLLOWING	NONE
LEAK DETECTION	E31-N008A E31-N008B	BROKEN	INITIATE TWO OF FOUR HIGH FLOW MSIV DIVISION 1 ISOLATION SIGNALS	DIVISION 1 TURBINE STEAM LINE HIGH FLOW DIVISION 1 ISOLATION INITIATED	MAIN STEAM LINE ISOLATION VALVES CLOSURE
		PLUGGED	LOSS OF TWO OF FOUR HIGH FLOW MSIV DIVISION 1 ISOLATION SIGNALS	NONE	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
REACTOR FEEDWATER	C34-N003B	BROKEN	MINIMUM STEAM FLOW LINE "B" DIFF PRESSURE SIGNAL	C34-R603B STEAM FLOW METER INOPERATIVE: REACTOR FEEDWATER DECREASED FLOW	FEEDWATER DECREASED FLOW
		PLUGGED	CONSTANT STEAM FLOW LINE "B" DIFF PRESSURE SIGNAL	C34-R603B STEAM FLOW METER INOPERATIVE: REACTOR FEEDWATER ERROR IN STEAM FLOW FOLLOWING	NONE
LEAK DETECTION	E31-N009A E31-N009B	BROKEN	LOSS OF TWO OF FOUR HIGH FLOW MSIV DIVISION 1 ISOLATION SIGNALS	DIVISION 1 TURBINE STEAM LINE HIGH FLOW DIVISION 1 ISOLATION DISABLED, BUT DIVISION 2 ISOLATION IS INTACT	NONE
		PLUGGED	LOSS OF TWO OF FOUR HIGH FLOW MSIV DIVISION 1 ISOLATION SIGNALS	NONE	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
REACTOR FEEDWATER	C34-N003B	BROKEN	MAXIMUM STEAM FLOW LINE "B" DIFF PRESSURE SIGNAL	C34-R603B STEAM FLOW METER INOPERATIVE REACTOR FEEDWATER INCREASED FLOW	FEEDWATER INCREASED FLOW
		PLUGGED	CONSTANT STEAM FLOW LINE "B" DIFF PRESSURE SIGNAL	C34-R603B STEAM FLOW METER AT CONSTANT READING; REACTOR FEEDWATER ERROR IN STEAM FLOW FOLLOWING	NONE
LEAK DETECTION	E31-N009A E31-N009B	BROKEN	INITIATE TWO OF FOUR HIGH FLOW MSIV DIVISION 1 ISOLATION SIGNALS	DIVISION 1 TURBINE STEAM LINE HIGH FLOW DIVISION 1 ISOLATION INITIATED	MAIN STEAM LINE ISOLATION VALVES CLOSURE
		PLUGGED	LOSS OF TWO OF FOUR HIGH FLOW MSIV DIVISION 1 ISOLATION SIGNALS	NONE	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
REACTOR FEEDWATER	C34-N003C	BROKEN	MINIMUM STEAM FLOW LINE "C" DIFF PRESSURE SIGNAL	C34-R603C STEAM FLOW METER INOPERATIVE; REACTOR FEEDWATER DECREASED FLOW	FEEDWATER DECREASED FLOW
		PLUGGED	CONSTANT STEAM FLOW LINE "C" DIFF PRESSURE SIGNAL	C34-R603C STEAM FLOW METER INOPERATIVE; REACTOR FEEDWATER ERROR IN STEAM FLOW FOLLOWING	NONE
LEAK DETECTION	E31-N010C E31-N010D	BROKEN	LOSS OF TWO OF FOUR HIGH FLOW MSIV DIVISION 2 ISOLATION SIGNALS	DIVISION 2 TURBINE STEAM LINE HIGH FLOW DIVISION 2 ISOLATION DISABLED, BUT DIVISION 1 ISOLATION IS INTACT	NONE
		PLUGGED	LOSS OF TWO OF FOUR HIGH FLOW MSIV DIVISION 2 ISOLATION SIGNALS	NONE	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
REACTOR FEEDWATER	C34-N003C	BROKEN	MAXIMUM STEAM FLOW LINE "C" DIFF PRESSURE SIGNAL	C34-R603C STEAM FLOW METER INOPERATIVE REACTOR FEEDWATER INCREASED FLOW	FEEDWATER INCREASED FLOW
		PLUGGED	CONSTANT STEAM FLOW LINE "C" DIFF PRESSURE SIGNAL	C34-R603C STEAM FLOW METER AT CONSTANT READING; REACTOR FEEDWATER ERROR IN STEAM FLOW FOLLOWING	NONE
LEAK DETECTION	E31-N010C E31-N010D	BROKEN	INITIATE TWO OF FOUR HIGH FLOW MSIV DIVISION 2 ISOLATION SIGNALS	DIVISION 2 TURBINE STEAM LINE HIGH FLOW DIVISION 2 ISOLATION INITIATED	MAIN STEAM LINE ISOLATION VALVES CLOSURE
		PLUGGED	LOSS OF TWO OF FOUR HIGH FLOW MSIV DIVISION 2 ISOLATION SIGNALS	NONE	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
REACTOR FEEDWATER	C34-N003D	BROKEN	MINIMUM STEAM FLOW LINE "D" DIFF PRESSURE SIGNAL	C34-R603D STEAM FLOW METER INOPERATIVE; REACTOR FEEDWATER DECREASED FLOW	FEEDWATER DECREASED FLOW
		PLUGGED	CONSTANT STEAM LINE FLOW "D" DIFF PRESSURE SIGNAL	NONE	NONE
LEAK DETECTION	E31-N011C E31-N011D	BROKEN	LOSS OF TWO OF FOUR HIGH FLOW MSIV DIVISION 2 ISOLATION SIGNALS	DIVISION 2 TURBINE STEAM LINE FLOW DIVISION 2 ISOLATION DISABLED, BUT DIVISION 1 ISOLATION IS INTACT	NONE
		PLUGGED	LOSS OF TWO OF FOUR HIGH FLOW MSIV DIVISION 2 ISOLATION SIGNALS	NONE	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
REACTOR FEEDWATER	C34-N003D	BROKEN	MAXIMUM STEAM FLOW LINE "D" DIFF PRESSURE SIGNAL	C34-R603D STEAM FLOW METER INOPERATIVE; REACTOR FEEDWATER DECREASED FLOW	FEEDWATER INCREASED FLOW
		PLUGGED	CONSTANT STEAM FLOW LINE "D" DIFF PRESSURE SIGNAL	C34-R603D STEAM FLOW METER INOPERATIVE; REACTOR FEEDWATER ERROR IN STEAM FLOW FOLLOWING	NONE
LEAK DETECTION	E31-N011C E31-N010D	BROKEN	INITIATE TWO OF FOUR HIGH FLOW MSIV DIVISION 2 ISOLATION SIGNALS	DIVISION 2 TURBINE STEAM LINE HIGH FLOW DIVISION 2 ISOLATION INITIATED	MAIN STEAM LINE ISOLATION VALVES CLOSURE
		PLUGGED	LOSS OF TWO OF FOUR HIGH FLOW MSIV DIVISION 2 ISOLATION SIGNALS	NONE	NONE

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
NUCLEAR BOILER	B22-N100B	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	DIVISION 2 HALF OF HPCS HIGH LEVEL SEAL IN INOPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	DIVISION 2 HALF OF HPCS HIGH LEVEL SEAL IN INOPERATIVE	NONE
	B22-N024C	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	RPS CHANNEL A2 LOW LEVEL SCRAM TRIP	1/2 REACTOR SCRAM
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RPS CHANNEL A2 LOW LEVEL SCRAM TRIP INOPERATIVE	NONE
	B22-N024D	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	RPS CHANNEL B2 LOW LEVEL SCRAM TRIP	1/2 REACTOR SCRAM
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RPS CHANNEL B2 LOW LEVEL SCRAM TRIP INOPERATIVE	NONE
	B22-N038B	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	1/3 DIVISION 2 AUTO DEPRESSURIZATION LOGIC TRIP	TWO ADDITIONAL RPV LOW LEVEL TRIPS NEEDED TO ALLOW ADS INITIATION FROM DIVISION 2
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	DIVISION 2 AUTO DEPRESSURIZATION LOGIC INOPERATIVE	ADS INITIATION AVAILABLE FROM DIVISION 1
	B22-N101B	BROKEN	MINIMUM DIFFERENTIAL PRESSURE	RCIC ISOLATION VALVE E51-F045 CLOSURE ON HIGH REACTOR LEVEL INOPERATIVE	RCIC ISOLATION VALVE E51-F045 CLOSURE ON MANUAL INITIATION ONLY

INSTRUMENT LINE 25 190° N13 VARIABLE SIGNAL SENSING LINE
PAGE 1 OF 2

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE	RCIC ISOLATION VALVE E51-F045 CLOSURE ON HIGH REACTOR LEVEL INOPERATIVE	RCIC ISOLATION VALVE E51-F045 CLOSURE ON MANUAL INITIATION ONLY
NUCLEAR BOILER	B22-N027	BROKEN	MINIMUM REACTOR VESSEL LEVEL SIGNAL	B22-R605 METER INOPERATIVE OFF SCALE, LOW LEVEL	NONE
		PLUGGED	CONSTANT REACTOR VESSEL LEVEL SIGNAL	B22-R605 METER AT CONSTANT READING	NONE
REACTOR FEEDWATER	C34-N004B	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	C34-R606B WATER LEVEL RECORDER INOPERATIVE; REACTOR FEEDWATER INCREASED FLOW	FEEDWATER INCREASED FLOW
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	C34-R606B WATER LEVEL RECORDER AT CONSTANT READING; REACTOR FEEDWATER ERROR IN LEVEL FOLLOWING	NONE
	C34-N004C	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	C34-R606C WATER LEVEL RECORDER INOPERATIVE	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	C34-R606C WATER LEVEL RECORDER AT CONSTANT READING	NONE
	C34-N017	BROKEN	MINIMUM WIDE RANGE REACTOR LEVEL SIGNAL	C34-R608 RECORDER REGISTERS MINIMUM SIGNAL	NONE
		PLUGGED	CONSTANT WIDE RANGE REACTOR LEVEL SIGNAL	C34-R608 RECORDER REGISTERS CONSTANT SIGNAL	NONE

INSTRUMENT LINE 25 190° N13 VARIABLE SIGNAL SENSING LINE
PAGE 2 OF 2

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
	B22-N031A AND B22-N031C	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	REACTOR HIGH PRESSURE CORE SPRAY DIVISION 2 LOW LEVEL TRIP	PREVENTS HIGH WATER LEVEL SEAL-IN OF HPCS PUMP DISCHARGE VALVE CIRCUITRY
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	REACTOR HIGH PRESSURE CORE SPRAY DIVISION 2 LOW LEVEL INOPERATIVE	NONE
	B22-N026A	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	REACTOR LOW LOW WATER LEVEL MAIN STEAM ISOLATION LOGIC A TRIP	MAIN STEAM ISOLATION VALVES CLOSURE 1/2 TRIP
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	REACTOR LOW LOW WATER LEVEL MAIN STEAM ISOLATION LOGIC A TRIP INOPERATIVE	MAIN STEAM ISOLATION VALVES CLOSURE 1/2 TRIP STILL OPERATIVE FROM CHANNEL "C" CIRCUITRY

INSTRUMENT LINE 26 240° N12 VARIABLE SIGNAL SENSING LINE
PAGE 1 OF 1

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
	B22-N031B AND B22-N031D	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	REACTOR HIGH PRESSURE CORE SPRAY DIVISION 2 LOW LEVEL TRIP	PREVENTS HIGH WATER LEVEL SEAL-IN OF HPCS PUMP DISCHARGE VALVE CIRCUITRY
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	REACTOR HIGH PRESSURE CORE SPRAY DIVISION 2 LOW LEVEL INOPERATIVE	NONE
	B22-N026C	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	REACTOR LOW LOW WATER LEVEL MAIN STEAM ISOLATION LOGIC C TRIP	MAIN STEAM ISOLATION VALVES CLOSURE 1/2 TRIP
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	REACTOR LOW LOW WATER LEVEL MAIN STEAM ISOLATION LOGIC C TRIP INOPERATIVE	MAIN STEAM ISOLATION VALVES CLOSURE 1/2 TRIP STILL OPERATIVE FROM CHANNEL "A" CIRCUITRY

INSTRUMENT LINE 27 160° N12 VARIABLE SIGNAL SENSING LINE
PAGE 1 OF 1

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
NUCLEAR BOILER	B22-N026B	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	REACTOR LOW LOW WATER LEVEL MAIN STEAM ISOLATION LOGIC "B" TRIP	MAIN STEAM ISOLATION VALVES CLOSURE 1/2 TRIP
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	REACTOR LOW LOW WATER LEVEL MAIN STEAM ISOLATION LOGIC "B" TRIP INOPERATIVE	MAIN STEAM ISOLATION VALVES CLOSURE 1/2 TRIP STILL OPERATIVE FROM CHANNEL "D" CIRCUITRY
	B22-N036A	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	RECIRC PUMP A, BKR 3A ATWS LOW LEVEL 2 TRIPS	RECIRC PUMPS A AND B AT LOW SPEED OPERATION
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RECIRC PUMP A, BKR 3A ATWS LOW LEVEL 2, 1/2 TRIP INOPERATIVE - CHANNEL C REMAINS OPERATIVE	NONE
	B22-N036B	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	RECIRC PUMP B, BKR 3B ATWS LOW LEVEL 2 TRIPS	RECIRC PUMPS A AND B AT LOW SPEED OPERATION
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RECIRC PUMP B, BKR 3B ATWS LOW LEVEL 2, 1/2 TRIP INOPERATIVE - CHANNEL D REMAINS OPERATIVE	NONE
	B22-N037A AND B22-N037C	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	DIVISION 2 AUTO DEPRESSURIZATION LOGIC PARTIAL TRIP; LPCS INITIATED; RCIC INITIATED	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	DIVISION 2 AUTO DEPRESSURIZATION LOGIC INOPERATIVE; LPCS LEVEL TRIP INOPERATIVE	NONE

INSTRUMENT LINE 28 20° N12 VARIABLE SIGNAL SENSING LINE
PAGE 1 OF 1

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
NUCLEAR BOILER	B22-N026D	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	REACTOR LOW LOW WATER LEVEL MAIN STEAM ISOLATION LOGIC "D" TRIP	MAIN STEAM ISOLATION VALVES CLOSURE 1/2 TRIP
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	REACTOR LOW LOW WATER LEVEL MAIN STEAM ISOLATION LOGIC "D" TRIP INOPERATIVE	MAIN STEAM ISOLATION VALVES CLOSURE 1/2 TRIP STILL OPERATIVE FROM CHANNEL "B" CIRCUITRY
	B22-N036C	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	RECIRC PUMP A, BKR 3A ATWS LOW LEVEL 2 TRIP	RECIRC PUMPS A AND B AT LOW SPEED OPERATION
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RECIRC PUMP A, BKR 3A ATWS LOW LEVEL 2 TRIP INOPERATIVE	NONE
	B22-N036D	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	RECIRC PUMP B, BKR 3B ATWS LOW LEVEL 2 TRIP	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	RECIRC PUMP B, BKR 3B ATWS LOW LEVEL 2 TRIP INOPERATIVE	NONE
	B22-N037B AND B22-N037D	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	1/3 DIVISION 2 AUTO DEPRESSURIZATION LOGIC TRIP	NONE
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	DIVISION 2 AUTO DEPRESSURIZATION LOGIC INOPERATIVE	NONE

INSTRUMENT LINE 29 200° N12 VARIABLE SIGNAL SENSING LINE
PAGE 1 OF 1

HANFORD COMMON SENSOR FAILURE TABLE

SYSTEM ID	COMMON TAP SENSOR MPL	FAILURE TYPE (BROKEN OR PLUGGED)	PRIMARY EFFECT	SECONDARY EFFECT	COMBINED EFFECT
NUCLEAR BOILER	B22-N044B	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	REACTOR WATER LEVEL INDICATOR R610 SHOWS MINIMUM LEVEL	NOTE: THIS INSTRUMENT IS USED ONLY DURING REACTOR SHUTDOWN AND WHEN RECIRC PUMPS ARE SECURED. A BROKEN INSTRUMENT LINE WILL GIVE A ZERO OR MINIMUM VESSEL WATER LEVEL READING.
		PLUGGED	CONSTANT DIFFERENTIAL PRESSURE SIGNAL	REACTOR WATER LEVEL INDICATOR R610 CONSTANT	NONE
	B22-N033B	BROKEN	MINIMUM DIFFERENTIAL PRESSURE SIGNAL	JET PUMP FLOW CIRCUITRY INOPERATIVE	NONE
		PLUGGED	ERRATIC DIFFERENTIAL PRESSURE SIGNAL	JET PUMP FLOW CIRCUITRY INOPERATIVE	NONE

INSTRUMENT LINE 30 VARIABLE SIGNAL SENSING LINE (HIGH PRESSURE
PAGE 1 OF 1 CONNECTION JET PUMP) (B22-N033B HIGH SIDE) .

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
PP-7A-A	1	TCS1-006 TCS1-007 RCS1-037 RCS1-038 SCS1-037 SCS1-038	TRANSMITTER FOR SW-SPV-38A CONTROL RECEIVERS AND SUPV. RELAYS FOR SW-PCV-38A POS. IND.	SOLENOID VALVE WILL REMAIN ENERGIZED KEEP SW-PCV-38A CLOSED. LOSS OF POS. IND.	LOSS OF RHR "A" AND DIV 1 HVAC FROM LOSS OF SSW LOOP A	"SSW A SUPV. SYSTEM TROUBLE" "SSW A OUT-OF-SERVICE" NOTE 2
PP-7A-A	1	RCS1-005 RCS1-006 RCS1-007 RCS1-008 RCS1-020 RCS1-032 SCS1-005 SCS1-006 SCS1-007 SCS1-008 SCS1-020 SCS1-032	SUPV. RELAYS AND RECEIVERS FOR SW-V-69A POS. SWITCHES	SUPV. RELAYS DEENERGIZE.LOSS OF POS. INDICATION AND VALVE WILL FAIL-AS-IS (N.O.)	NONE.	"SSW A SUPV. SYSTEM TROUBLE" "SSW A OUT-OF-SERVICE" NOTE 2
PP-7A-A	1	RCS1-009 RCS1-010 RCS1-011 RCS1-012 RCS1-023 RCS1-033 SCS1-009 SCS1-010 SCS1-011 SCS1-012 SCS1-023 SCS1-033	RECEIVERS AND SUPV. RELAYS FOR SW-V-70B POS. SWITCHES	SUPV. RELAYS DEENERGIZE LOSS OF POS. INDICATION AND VALVE WILL FAIL-AS-IS (N.O.)	NONE.	"SSW A SUPV. SYSTEM TROUBLE" "SSW A OUT-OF-SERVICE" NOTE 2

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
PP-7A-A	1	TCS1-004 TCS1-005 SCS1-026 SCS1-061 SCS1-062 RCS1-026 RCS1-061 RCS1-062	TRANSMITTER FOR LOCAL OPERATING INDICATION SUPV. RELAYS AND RECEIVERS FOR CONTROL OF PRA-FN-1A	RECEIVERS AT PUMP HOUSE WILL NOT CHANGE STATE AND LOCAL OPER. IND. WOULD NOT CHANGE. SUPV. RELAYS WOULD DEENERGIZE CAUSING THE FAN TO FAIL TO OPERATE	LOSS OF SSW LOOP "A" PUMP LOSS OF RHR "A"	"SSW A SUPV. SYSTEM TROUBLE" "SSW A OUT-OF-SERVICE" "SSW PP HOUSE A PRA-FN-A LOW FLOW"
MC-7A	1	SW-V-2A	SW-P-1A DISCHARGE VALVE	MOV FAILS-AS-IS (N.C.)	LOSS OF RHR "A" AND DIV 1 HVAC	RG 1.47 BISI "MOV NETWORK POWER LOSS/OL" "SSW A OUT-OF-SERVICE"
MC-7A	1	SW-V-12A	LOOP A WATER RETURN TO SPRAY POND "B" ISOL. VALVE	MOV FAILS-AS-IS (N.C.)	LOSS OF SSW "A" RETURN TO SPRAY POND "B", BUT RETURN TO COOLING TOWERS REMAINS OPERABLE	"MOV NETWORK POWER LOSS/OL" "SSW A OUT-OF-SERVICE"
MC-7A	1	SW-V-69A	SSW LOOP "A" RETURN TO COOLING TOWER ISOL. VALVE	MOV FAILS-AS-IS (N.O.)	NONE	"MOV NETWORK POWER LOSS/OL" "SSW A OUT-OF-SERVICE"
MC-7A	1	SW-V-70B	SSW LOOP "B" RETURN TO COOLING TOWERS ISOLATION VALVE	MOV FAILS-AS-IS (N.O.) LOSS OF POS. INDICATION	NONE	"MOV NETWORK POWER LOSS/OL" "SSW A OUT-OF-SERVICE" NOTE 2
MC-7A-A	1	PRA-FN-1A	SSW PUMP HOUSE "A" FAN COIL UNIT MOTOR	FAN FAILS TO OPERATE AND LOSS OF POS. INDICATION OF MCC	LOSS OF SSW LOOP "A" PUMP LOSS OF RHR "A"	"PRA-FN-1A POWER LOSS" "SSW A OUT-OF-SERVICE" RG 1.47 BISI ALARMS ON ANY SYSTEM SUPPLIED BY SSWA

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
MC-7B-A	1	E12-F042A	RHR INJECTION VALVE	MOV FAILS AS IS (N.C.)	LOSS OF LPCI A INJECTION VALVE	1) "MOV NETWORK PWR LOSS/OL" LIGHT 2) "LPCS/RHR A OUT OF SERVICE" ANNUN.
MC-7B	1	SW-V-24A	SSW SHUTOFF VALVE FROM RHR-P-2A AND RRA-FC-2	MOV FAILS-AS-IS (N.C.) LOSS OF POS. IND.	LOSS OF RHR-P-2A AND RRA-FC-2	RG 1.47 BISI "RHR PUMP 2A ROOM HVAC OUT-OF-SERVICE" "RHR A OUT-OF-SERVICE" NOTE 2
MC-7B	1	RRA-FN-2	HVAC FOR UNIT FOR RHR-P-2A ROOM	LOSS OF POWER AND CONTROL TO FAN. LOSS OF LOCAL INDICATION	LOSS OF RHR-P-2A	"RHR PUMP RM-2 RRA-FC-2 TRIP" RG 1.47 BISI "RHR PUMP 2A RM HVAC OUT-OF-SERVICE" "RHR A OUT-OF-SERVICE"
MC-7B-A	D1	E12-F004A	MOV PUMP SUCTION FROM SUPPRES. POOL	MOV FAILS AS IS, (N.O.)	NONE.	1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) RHR A/LPCS OUT OF SERVICE ANNUNC.
		E12-F024A	RHR LOOP "A" TEST VALVE	MOV FAILS AS IS, (N.C.)	USED FOR SUPPRESSION POOL COOLING	1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) RHR A/LPCS OUT OF SERVICE ANNUNC.
		E12-F064A	RHR PUMP AS MIN. FLOW VALVE	MOV FAILS AS IS, (N.C.)	VALVE USED FOR START-UP OF SYSTEM. NO EFFECT.	1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) RHR A/LPCS OUT OF SERVICE ANNUNC.

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
MC-7B-B	D1	E12-F073A	RHR HX "A" OUTLET VENT	MOV FAILS AS IS, (N.C.)	HEAT X. VENT CAPABILITY LOST. NO EFFECT.	1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) RHR A/LPCS OUT OF SERVICE ANNUNC.
		E12-F074A	RHR HX "A" INBOARD VENT	MOV FAILS AS IS, (N.C.)	HEAT X. VENT CAPABILITY LOST. NO EFFECT.	1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) RHR A/LPCS OUT OF SERVICE ANNUNC.
		E12-F048A	RHR HX "A" BYPASS	FAILS AS IS, (N.O.)	LOSE COOLDOWN RATE CONTROL	1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) RHR A/LPCS OUT OF SERVICE ANNUNC.
MC-7B-B	D1	E12-F068A	RHR HX "A" SW OUTLET	MOV FAILS AS IS, (N.C.)	HEAT EXCHANGER COOLING LOST	1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) RHR A/LPCS OUT OF SERVICE ANNUNC.
		E12-F047A	MOV HT EXCH INLET	FAILS AS IS, (N.O.)	NONE.	1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) RHR A/LPCS OUT OF SERVICE ANNUNC.
		E12-F003A	MOV HT EXCH OUTLET	FAILS AS IS, (N.O.)	NONE.	1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) RHR A/LPCS OUT OF SERVICE ANNUNC.
		E12-F016A	MOV CONTAINMENT SPRAY (OUTBOARD)	FAILS AS IS, (N.C.)	NONE.	1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) RHR A/LPCS OUT OF SERVICE ANNUNC.
		E12-F017A	MOV CONTAINMENT SPRAY (INBOARD)	FAILS AS IS, (N.C.)	NONE.	1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) RHR A/LPCS OUT OF SERVICE ANNUNC.

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
MC-S2-1A	1	RCIC-V-19	RCIC MINIMUM FLOW VALVE	MOV VALVE FAILS AS IS, (N.C.)	NONE.	1) BISI LIGHT ON P601, (BATT B2-1) OUT OF SERVICE). 2) ANNUNC "RCIC DIV 1 OUT OF SERVICE" 3) "MOV NETWORK PWR LOSS/OL" LIGHT
		RCIC-V-22	RCIC TEST BYPASS VALVE	MOV VALVE FAILS AS IS, (N.C.)	NONE.	1) BISI LIGHT ON P601, (BATT B2-1) OUT OF SERVICE). 2) ANNUNC "RCIC DIV 1 OUT OF SERVICE" 3) "MOV NETWORK PWR LOSS/OL" LIGHT
		RCIC-V-59	RCIC TEST BYPASS	MOV VALVE FAILS AS IS, (N.C.)	NONE.	1) BISI LIGHT ON P601, (BATT B2-1) OUT OF SERVICE). 2) ANNUNC "RCIC DIV 1 OUT OF SERVICE" 3) "MOV NETWORK PWR LOSS/OL" LIGHT
		RCIC-P-2	RCIC VACUUM PUMP	LOSS OF PUMP	LOSS OF VACUUM	1) BISI LIGHT ON P601, (BATT B2-1) OUT OF SERVICE). 2) ANNUNC "RCIC DIV 1 OUT OF SERVICE" 3) "MOV NETWORK PWR LOSS/OL" LIGHT
		E51-F045	STEAM TO TURBINE	MOV VALVE FAILS AS IS, (N.C.)	LOSS OF STEAM TO RCIC TURBINE	1) BISI LIGHT ON P601, (BATT B2-1) OUT OF SERVICE). 2) ANNUNC "RCIC DIV 1

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
MC-S2-1A	1	RCIC-V-1	TRIP THROTTLE VALVE STEAM INLET	VALVE FAILS AS IS, (N.O.)	NONE.	1) BISI LIGHT ON P601, (BATT B2-1) OUT OF SERVICE). 2) ANNUNC "RCIC DIV 1 OUT OF SERVICE" 3) "MOV NETWORK PWR LOSS/OL" LIGHT
		E51-F013	PUMP DISCHARGE	MOV VALVE FAILS AS IS, (N.C.)	RCIC INOPERABLE	1) BISI LIGHT ON P601, (BATT B2-1) OUT OF SERVICE). 2) ANNUNC "RCIC DIV 1 OUT OF SERVICE" 3) "MOV NETWORK PWR LOSS/OL" LIGHT
		RCIC-V-64	STEAMLINE ISOLATION VALVE	FAILS AS IS, (N.O.)		
		RCIC-V-69	VACUUM PUMP DISH VALVE	FAILS AS IS, (N.O.)		
		RCIC-P-4	RCIC COND. PUMP	INOPERATIVE	LOSS OF RCIC CONDENSER OPERATION	
MC-7B	1	RRA-FN-12	DC MCC RM HVAC FAN UNIT	LOSS OF POWER AND CONTROL FOR FAN. LOSS OF CONTROL ROOM AND LOCAL INDICATION	LOSS OF VAC-S2-1A (RCIC AND RHR SHUT-DOWN COOLING)	RG 1.47 BISI "RRA-FN-12 POWER LOSS" "RCIC DIV 1 OUT-OF-SERVICE" "MOV NETWORK POWER LOSS/OL"
		ROA-SPV-12	AC MCC RUN DAMPER OPERATOR SOLENOID VALVE	LOSS OF POWER TO SOLENOID VALVE WHICH CLOSES AIR DAMPER	LOSS OF NORMAL HVAC FOR MCC ROOM	"DC MCC-RM AOA-AO-12 INLET DAMPER CLOSE"
MC-7B	1	E51-C003	WATER LEG PUMP	LOSS OF PUMP	NONE	1) "RCIC-P-3 PWR LOSS" LIGHT 2) "RCIC DIV 1 OUT-OF-SERVICE" ANN.

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
MC-8B	2	BRA-FN-6	HVAC FAN UNIT FOR RCIC ROOM	LOSS OF POWER AND CONTROL FOR FAN. LOSS OF LOCAL INDICATION	LOSS OF RCIC SYSTEM OPERATION	"RCIC PUMP RM 3 BRA-FC-6 TRIP" RG 1.47 BISI "RCIC PUMP RM HVAC OUT-OF-SERVICE" "RCIC DIV 2 OUT-OF-SERVICE"
MC-8B-A	2	E51-F076 E51-F063	STEAM SUPPLY LINE ISOLATION	MOV VALVE FAILS AS IS, (N.O.)	NONE.	1) "MOV NETWORK PWR LOSS/OL" 2) RCIC DIV 2 OUT OF SERVICE" ANNUNC.
DP-81-1A	1	H13-P601 125 VDC BUS "A"	CONTROL CIRCUIT FEED FOR TURBINE SUPERVISORY LIGHTS & AOV's	LOSS OF TURBINE SUPERVISORY LIGHTS & DRAIN & DISCHARGE AOV'S	LOSS OF RCIC TURBINE STATUS	1) RCIC INVERTER PWR FAILURE LIGHT ON P601 2) RCIC DIV 1 OUT OF SERVICE ANNUNC. 3) LOSS OF POSITION IND. LIGHTS FOR E51-F025, E51-F004, E51-F054, E51-C003
		H13-P621 125 VDC BUS "A"	CONTROL CIRCUIT FEED FOR RELAY LOGIC	AUTO FOR VALVES E51-F008, F010, F013 AND F045. LOSS OF REMOTE TURBINE TRIP.	LOSS OF RCIC AUTO INITIATION AND MANUAL INITIATION FROM CONTROL ROOM.	1) LOGIC BUS A POWER FAILURE LIGHT ON P601 2) RCIC DIV 1 OUT OF SERVICE ANNUNC.

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
MC-S1-1D	1	E51-F008	STEAM SUPPLY LINE ISOLATION	MOV VALVE FAILS AS IS, (N.O.)	NONE.	1) MOV NETWORK POWER LOSS LIGHT ON P601 2) RCIC DIV 1 OUT OF SERVICE ANNUNC. 3) LOSS OF VALVE POSITION IND. ON P601
		E51-F068	TURBINE EXHAUST TO SUPPRESSION CHAMBER	MOV VALVE FAILS AS IS, (N.O.)	NONE.	1) MOV NETWORK POWER LOSS LIGHT ON P601 2) RCIC DIV 1 OUT OF SERVICE ANNUNC. 3) LOSS OF VALVE POSITION IND. ON P601
MC-S1-1D	I	E51-F031	PUMP SUCTION FROM SUPPRESSION POOL	MOV VALVE FAILS AS IS, (N.C.)	ISOLATES SUPPRESSION POOL SUCTION PATH	1) MOV NETWORK POWER LOSS LIGHT ON P601 2) RCIC DIV 1 OUT OF SERVICE ANNUNC. 3) LOSS OF VALVE POSITION IND. ON P601
		E51-F010	PUMP SUCTION FROM CONDENSATE STORAGE TANK	MOV VALVE FAILS AS IS, (N.O.)	NONE.	1) MOV NETWORK POWER LOSS LIGHT ON P601 2) RCIC DIV 1 OUT OF SERVICE ANNUNC. 3) LOSS OF VALVE POSITION IND. ON P601
		RCIC-V-46	TURBINE COOLING WATER SUPPLY VALVE	MOV VALVE FAILS AS IS, (N.C.)	LOSS OF RCIC TURBINE	1) MOV NETWORK POWER LOSS LIGHT ON P601 2) RCIC DIV 1 OUT OF SERVICE ANNUNC. 3) LOSS OF VALVE POSITION IND. ON P601

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
		RCIC-V-110	TURB. EXH TO SUPPRESSION ISOLATION	MOV FAILS AS IS N.O. (N.O.)		1) MOV NETWORK POWER LOSS LIGHT ON P601 2) RCIC DIV 1 OUT OF SERVICE ANNUNC. 3) LOSS OF VALVE POSITION IND. ON P601
DP-S1-2A	2	H13-P601 125 VDC BUS "B"	CONTROL CIRCUIT FEED FOR TURBINE SUPV LIGHT AND AOV'S	LOSS OF TURBINE SUPV LIGHTS AND DRAIN AND DISCHARGE AOV'S	LOSS OF RCIC TURBINE STATUS	1) LOSS OF POSITION IND. FOR E41-F026, E51-F005
		H13-P618 125 VDC BUS "B"	CONTROL CIRCUIT FEED FOR RELAY LOGIC	AUTO ISOLATION FOR VALVE E51-F063	NONE.	1) LOGIC BUS B POWER FAILURE LIGHT ON P601 2) RCIC DIV 2 OUT OF SERVICE ANNUNC.
DP-S1-1D	1	MC-S2-1A	CONTROL POWER FOR BREAKERS RCIC-V-19; 22; 59; 45; 1; 2; 13; 64; 69; 8; 68; 31; 10; 46; RCIC-P-2; 4	MOV'S FAIL AS IS. (SEE MC-S2-1A ON SHEET 28) AND MC-S1-1D PUMPS ARE LOST	RCIC DIV 1 OUT OF SERVICE	1) MOV NETWORK POWER LOSS LIGHT ON P601 2) RCIC DIV 1 OUT OF SERVICE ANNUNC. 3) LOSS OF VALVE POSITION INDICATING LIGHTS AND PUMP STATUS LIGHTS ON P601
MC-S1-2D	2	RCIC-V-86	VACUUM BREAKER ISOLATION VALVE	MOV'S FAIL AS IS (N.O.)		1) MOV NETWORK POWER LOSS LIGHT ON P601 2) RCIC DIV 2 OUT OF SERVICE ANNUNC.
SM-8	2	SW-P-1B	STANDBY SERVICE WATER PUMP	LOSS OF PUMP POWER	LOSS OF RHR "B" HEAT EXCHANGER AND CRITICAL DIV 2 HVAC (PARTIAL)	BKR TRIP AND UNDER-VOLTAGE ANNUNC.

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
DP-S1-2D	2	125 VDC CONTROL POWER TO SM-7	SW-P-1B BREAKER CONTROL VOLTAGE	PUMP MOTOR WILL NOT HAVE TRIPPERS, OR CLOSING CONTROL VOLTAGE. LOSS OF IND. LIGHTS. CAN BE CONTROLLED AT REMOTE SHUTDOWN PANEL	NO BREAKER CLOSURE. LOSS OF RHR "B" HEAT EXCHANGER AND DIV 2 HVAC (RCIC)	RG 1.47 BISI "BKR CB-SW1B OUT-OF-SERVICE" "SSW "B" OUT-OF-SERVICE" NOTE 2
PP-2A-G	2	TS2-21	TRANSMITTER FOR SW-LS-1B3	LOSS OF LOW WATER TRIP OF SW-P-1B	NONE	RG 1.47 BISI "SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE"
PP-8A-G	2	TS2-003 TS2-004 TS2-001 TS2-002 TS2-031 TS2-022	TRANSMITTER FOR SW-V-2B POS. SWITCHES	RECEIVERS IN CONTROL ROOM WILL NOT CHANGE STATE. POS. INDICATOR AND INTERLOCKS TO SW-P-1B AND SW-PCV-38B	LOSS OF INTERLOCK TO SW-PCV-38B, KEEPING THIS VALVE CLOSED. LOSS OF SSW "B" LOOP	"STANDBY SW "B" SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE"
PP-8A-G	2	SW-SPV-38B	SOLENOID VALVE FOR SW-PCV-38B BACK PRESSURE CONTROL VALVE	SOLENOID VALVE WILL DEENERGIZE AND SW-PCV-38B WILL THROTTLE OPEN	NONE	NONE
		TS2-037 TS2-038 RS2-013 RS2-014 SS2-013 SS2-014	TRANSMITTERS FOR SW-PCV-38B POS. IND. RECEIVERS AND SUPV. RELAYS FOR CONTROL OF SW-SPV-38B	SUPV. RELAYS DEENERGIZE, THEREFORE DEENERGIZING SW-SPV-38B TO THROTTLE OPEN. POS. IND. WILL NOT CHANGE	NONE	"SSW B SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE"
PP-8A-G	2	TS2-026 TS2-061 TS2-062 SS2-004 SS2-005 RS2-004 RS2-005	TRANSMITTERS FOR CONTROL OF PRA-FN-1B SUPV. RELAYS AND RECEIVERS FOR LOCAL OPEN INDICATION	RECEIVERS IN CONTROL ROOM WILL NOT CHANGE STATE (FAN WOULD AUTO OPERATE) SUPV. RELAYS WOULD DEENERGIZE, THUS LOSS OF LOCAL OPER. INDICATION	NONE	"SSW B SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE"

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
PP-8A-F	2	SCS2-021 RCS2-021	RECEIVER AND RELAY FROM SW-LS-1B3	LOSS OF LOW WATER TRIP OF SW-P-1B	NONE	RG 1.47 BISI "SUPV SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE"
PP-8A-F	2	RCS2-003 RCS2-004 RCS2-001 RCS2-002 RCS2-022 RCS2-031 SCS2-003 SCS2-004 SCS2-001 SCS2-002 SCS2-022 SCS2-031	SUPV. RELAYS AND RECEIVER FOR SW-V-2B POS SWITCHES	SUPV. RELAYS DEENERGIZE.LOSS OF POS. INDICATION AND VALVE WILL FAIL-AS-IS (N.C.)	LOSS OF SSW LOOP "B"	"STANDBY SW "B" SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE" NOTE 2
PP-8A-F	2	TCS2-013 TCS2-014 RCS2-037 RCS2-038 SCS2-037 SCS2-038	TRANSMITTERS FOR SW-SPV-38B CONTROL RECEIVERS AND SUPV. RELAYS FOR SW-PCV-38B POS. IND.	RECEIVER IN PUMP HOUSE WILL NOT CHANGE STATE AND KEEPING SOLENOID VALVE NORMALLY ENERGIZED KEEPING SW-PCV-38B CLOSED. LOSS OF POS. IND.	LOSS OF RHR "B" AND DIV 2 HVAC FROM LOSS OF SSW LOOP B	"SSW B SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE" NOTE 2
PP-8A-F	2	TCS2-004 TCS2-005 RCS2-026 RCS2-061 RCS2-062 SCS2-026 SCS2-061 SCS2-062	TRANSMITTERS FOR LOCAL OPERATING INDICATION. SUPV. RELAYS AND RECEIVERS FOR CONTROL OF PRA-FN-1B	RECEIVER AT PUMP HOUSE WILL NOT CHANGE STATE, THUS LOCAL OPER. IND. WOULD NOT CHANGE. SUPV. RELAYS WOULD DEENERGIZE CAUSING THE FAN TO FAIL TO OPERATE	LOSS OF SSW LOOP "B" PUMP. LOSS OF RHR "B" AND RCIC HVAC	"SSW B SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE" "SSW PP HOUSE B PRA-FN-1B LOW FLOW"

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
MC-8A	2	SW-V-2B	SW-P-1B DISCHARGE VALVE	MOV FAILS-AS-IS (N.C.)	LOSS OF SSW B THUS LOSS OF RHR "B" AND DIV 2 HVAC (RCIC)	RG 1.47 BISI "MOV NETWORK POWER LOSS/OL" "SSW B OUT-OF-SERVICE" NOTE 2
MC-8A-A	2	PRA-FN-1B	SSW PUMP HOUSE "B" FAN COIL UNIT MOTOR	FAN FAILS TO OPERATE AND LOSS OF POS. INDICATION AT MCC	LOSS OF SSW LOOP "B" PUMP LOSS OF RHR "B" AND RCIC HVAC	"PRA-FN-1B POWER LOSS" "SSW B OUT-OF-SERVICE"
PP-7CA-A	A	SW-SV-34	SSW SHUTOFF VALVE FROM RRA-FC-6 FOR RCIC ROOM	SOLENOID VALVE FAILS OPEN. LOSS OF POS. IND.	NONE - OPERATION IS AVAILABLE FROM THE REMOTE SHUTDOWN PANEL, IF REQUIRED	NOTE 2

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
DP-S1-1A BKR NO	D1	B22-F013 A,B,C,D,E F,G,H,J,K,L	SAFETY RELIEF VALVES	NORMALLY CLOSED, (N.C.) CANNOT BE OPENED ELECTRICALLY TO PERFORM ADS	NONE VALVES WILL STILL OPEN MECHANICALLY	1) "ADS A/C LOGIC POWER FAIL" LIGHT 2) "ADS A/C OUT OF SERVICE" ANNUNC 3) LOSS OF POS. IND. ON P601
		B22-F013 A,B,C,D,E F,G,H,J,K,L	ADS VALVES	NORMALLY CLOSED, (N.C.) CANNOT BE OPENED WITH "B" POWER TO PERFORM ADS	NONE "B" POWER IS USED	1) "ADS A/C LOGIC POWER FAIL" LIGHT 2) "ADS A/C OUT OF SERVICE" ANNUNC 3) LOSS OF POS. IND. ON P601

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
REFER TO GROUP 'H' FOR PUMPS, VALVES AND CONTROLS THAT ARE ALSO NEEDED FOR SUPPRESSION POOL COOLING 'A'.						
MC-7B-A	D1	E12-F027A	RHR LOOP "A" DISCHARGE TO SUPPRESSION POOL SPRAY	MOV FAILS AS IS, (N.C.) LOSS OF INDICATION	VALVE USED FOR RETURN TO SUPPRESSION POOL	1) NOTE 3. GROUP L LOSS OF POSITION IND. ON P601 2) "MOV NETWORK PWR LOSS/OL" LIGHT 3) "LPCS/RHR A OUT OF SERVICE" ANNUNC.

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
SM-8	D2	E12-C002B	RHR PUMP "B"	PUMP INOPERABLE	LOOP "B" OF RHR INOPERABLE	TWO BREAKER TRIP AND BUS UNDERVOLTAGE ANNUNCIATION
		E12-C002C	RHR PUMP "C"	PUMP INOPERABLE	LOOP "C" OF RHR INOPERABLE	TWO BREAKER TRIP AND BUS UNDERVOLTAGE ANNUNCIATION
SM-8	2	SW-P-1B	STANDBY SERVICE WATER PUMP	LOSS OF PUMP POWER	LOSS OF RHR "B" HEAT EXCHANGER AND CRITICAL DIV 2 HVAC (RCIC)	BKR TRIP AND UNDER-VOLTAGE ANNUNC.
MC-8B	2	RRA-FN-1	HVAC FAN UNIT FOR RHR-P-2C ROOM	LOSS OF POWER AND CONTROL TO FAN. LOSS OF LOCAL INDICATION	LOSS OF RHR-P-2C	"RHR PUMP RM-4 RRA-FC-1 TRIP" RG 1.47 BISI "RHR C PUMP RM HVAC OUT-OF-SERVICE" "RHR C OUT-OF-SERVICE"
		RRA-FN-3	HVAC FAN UNIT FOR RHR-P-2B ROOM	LOSS OF POWER & CONT. TO FAN. LOSS OF LOCAL IND.	"RHR PUUP RM-1 FC-3 TRIP" RG 1.47 BISI "RHR B PUMP RM HVAC OOS" "RHR B OUT-OF-SERVICE
MC-8B-A		E12-F004B	MOV PUMP SUCTION FROM SUPPRESSION POOL	MOV FAILS AS IS, (N.O.)	NONE - REQUIRED TO BE CLOSED DURING SHUT-DOWN COOLING	LOSS OF VALVE POSITION INDICATION ON P601
		E12-F016B	MOV CONTAINMENT SPRAY (OUTBOARD)	MOV FAILS AS IS, (N.C.)	NONE.	1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) "RHR B/C OUT OF SERVICE" ANNUNC.
		E12-F017B	MOV CONTAINMENT SPRAY (INBOARD)	MOV FAILS AS IS, (N.C.)	NONE.	1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) "RHR B/C OUT OF

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
		E12-F024B	PUMP "B" TEST VALVE	MOV FAILS AS IS, (N.C.)	USED FOR SUPPRESSION POOL COOLING	1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) "RHR B/C OUT OF SERVICE" ANNUNC.
MC-8B-A	2	SW-V-24B	SSW SHUTOFF VALVE FROM RHR-P-2B AND RRA-FC-3	MOV FAILS-AS-IS (N.C.) LOSS OF POS. IND.	LOSS OF RHR-P-2B AND RRA-FC-3	RG 1.47 BISI "RHR PUMP 2B ROOM HVAC OUT-OF-SERVICE" "RHR B OUT-OF-SERVICE" NOTE 2
		SW-V-24C	SSW SHUTOFF VALVE FROM RHR-P-2C AND RRA-FC-1	MOV FAILS-AS-IS (N.C.) LOSS OF POS. IND.	LOSS OF RHR-P-2C AND RRA-FC-1	"RHR C PMP RM HVAC OOS" RG 1.47 BISI "RHR C OUT-OF-SERVICE" NOTE 2
MC-8B-B	D2	E12-F073B	RHR HX "B" OUTBOARD VENT	MOV FAILS AS IS, (N.C.)	HEAT X VENT CAPABILITY LOST. NO EFFECT.	LOSS OF VALVE POSITION INDICATION ON P601.
		E12-F074B	RHR HX "B" INBOARD VENT	MOV FAILS AS IS, (N.C.)	HEAT X VENT CAPABILITY LOST. NO EFFECT.	LOSS OF VALVE POSITION INDICATION ON P601.
MC-8B-B	D2	E12-F048B	RHR HX "B" BYPASS	MOV FAILS AS IS, (N.O.)	LOSS OF COOLDOWN RATE CONTROL AND EFFICIENCY	LOSS OF VALVE POSITION INDICATION ON P601.
		E12-F068B	RHR HX "B" SW OUTLET	MOV FAILS AS IS, (N.C.)	HEAT EXCHANGER "B" COOLING LOST	LOSS OF VALVE POSITION INDICATION ON P601.
		E12-F047B	MOV HEAT EXCH INLET	MOV FAILS AS IS, (N.O.)	NONE.	LOSS OF VALVE POSITION INDICATION ON P601.
		E12-F003B	MOV HEAT EXCH OUTLET	MOV FAILS-AS-IS (N.O.)	NONE	NONE
DP-S1-2D	2	125 VDC CNTL FEED TO SWGR	C002B&C SWITCHGEAR BREAKER CONTROL VOLTAGE	PUMP MOTOR BKR WILL NOT CLOSE AND TRIPPING CONTRL VOLTAGE LOST	NO PUMP BKR CLOSURE THEREFORE LOOP "B" AND "C" OF RHR IS INOPERABLE	1) "CB-RHR 2B OUT-OF-SERVICE" LIGHT 2) "CB-RHR 2C OUT-OF-SERVICE" LIGHT 3) "RHR B/C OUT-OF-SERVICE" ANN.

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
DP-S1-2D	2	125 VDC CONTROL POWER TO SM-7	SW-P-1B BREAKER CONTROL VOLTAGE	PUMP MOTOR WILL NOT HAVE TRIPPING OR CLOSING CONTROL VOLTAGE. LOSS OF IND. LIGHTS. CAN BE CONTROLLED AT REMOTE SHUTDOWN PANEL	NO BREAKER CLOSURE LOSS OF RHR "B" HEAT EXCHANGER AND DIV 2 HVAC (RCIC)	RG 1.47 BISI "BKR CB-SWIB OUT-OF-SERVICE" "SSW B OUT-OF-SERVICE" NOTE 2
RPS BUS "B" C72-P001	-	HB-P622 120V REACTOR PROTECTION BUS "B"	RHR SYSTEM INBOARD CONTROL RELAY FEED	LOSS OF F009 OPENING MODE. WILL FAIL THE VALVE CONTROL CIRCUITRY AND CLOSE THE VALVES	S/D COOLING SUCTION FROM RECIRC LINE FOR RHR LOOP A & B LOST.	1) LOSS OF VALVE POSIT. IND. FOR E12-F060A AND B ON P601 2) REACTOR SCRAM WITH ASSOC. ALARMS
MC-8B-A	D2	E12-F042B	RHR INJECTION VALVE	MOV FAILS IN POSITION, (N.C.)	LOSS OF "B" LPCI INJECTION VALVE	NOTE 2. 1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) "RHR B/C OUT OF SERVICE" ANNUNC.
		E12-F042C	RHR INJECTION VALVE	MOV FAILS IN POSITION, (N.C.)	LOSS OF "C" LPCI INJECTION VALVE	NOTE 2. 1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) "RHR B/C OUT OF SERVICE" ANNUNC.
DP-S1-2A	2	H13-P601 125 VDC	RHR ANALOG POSITION IND. FOR RHR-V-73B AND 74B	LOSS OF VALVE POSIT. INDICATION ON P601 - FAIL DOWN SCALE	NONE.	NONE.
DP-S1-2A	2	H13-P618 125 VDC BUS B	CONTROL CKT FEED FOR RELAY LOGIC RHR LOOPS B&C VALVE AND PUMP CONTROL	VALVE AUTO CKTS WILL FAIL. VALVES WILL NOT OPEN IN AUTO (SEE ANALYSIS FOR VALVES) PUMP WILL NOT AUTO START	LOOP "B" BLOCKED LOSS OF RHR LOOPS B&C	1) "RHR B/C LOGIC PWR FAIL" LIGHT 2) "RHR B/C OUT OF SERVICE" ANNUNC.

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
PP-8A-F	2	SCS2-021 RCS2-021	RECEIVER AND RELAY FROM SW-LS-1B3	LOSS OF LOW WATER TRIP OF SW-P-1B	NONE	RG 1.47 BISI "SUPV. SYS TROUBLE" "SSW B OUT-OF-SERVICE"
PP-8A-F	2	RCS2-013 RCS2-014 RCS2-015 RCS2-016 RCS2-017 RCS2-024 SCS2-013 SCS2-014 SCS2-015 SCS2-016 SCS2-017 SCS2-024	SUPV. RELAYS AND RECEIVERS FOR SW-V-12B POS. SWITCHES	SUPV. RELAYS DEENERGIZE. LOSS OF POS. INDICATION AND VALVE WILL FAILS-AS-IS (N.C.)	LOSS OF SSW "B" RETURN TO SPRAY POND "A", BUT RETURN TO COOLING TOWER REMAINS OPERABLE	"STANDBY SW "B" SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE" NOTE 2
PP-8A-F	2	TCS2-013 TCS2-014 RCS2-037 RCS2-038 SCS2-037 SCS2-038	TRANSMITTERS FOR SW-SPV-38B CONTROL RECEIVERS AND SUPV. RELAYS FOR SW-PCV-38B POS. IND.	RECEIVERS IN PUMP HOUSE WILL NOT CHANGE STATE AND KEEPING SW-PCV-38B CLOSED LOSS OF POS. IND.	LOSS OF RHR "B" AND DIV 2 HVAC FROM LOSS OF SSW LOOP B	"SSW B SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE" NOTE 2
PP-8A-F	2	RCS2-005 RCS2-006 RCS2-007 RCS2-008 RCS2-020 RCS2-032 SCS2-005 SCS2-006 SCS2-007 SCS2-008 SCS2-020 SCS2-032	SUPV. RELAYS AND RECEIVERS FOR SW-V-69B POS. SWITCHES	SUPV. RELAYS DEENERGIZE. LOSS OF POS. INDICATION AND VALVE WILL FAIL-AS-IS (N.O.)	NONE	"SSW B SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE" NOTE 2

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
PP-8A-F	2	RCS2-009 RCS2-010 RCS2-011 RCS2-012 RCS2-023 RCS2-033 SCS2-009 SCS2-010 SCS2-011 SCS2-012 SCS2-023 SCS2-033	SUPV. RELAYS AND RECEIVERS FOR SW-V-70A POS. SWITCHES	SUPV. RELAYS DEENERGIZE LOSS OF POS. INDICATION AND VALVE WILL FAIL-AS-IS (N.O.)	NONE	"SSW B SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE" NOTE 2
PP-8A-F	2	TCS2-004 TCS2-005 RCS2-026 RCS2-061 RCS2-062 SCS2-026 SCS2-061 SCS2-062	TRANSMITTERS FOR LOCAL OPERATING INDICATION SUPV. RELAYS AND RECEIVERS FOR CONTROL OF PRA-FN-1B	RECIEVER OF PUMP HOUSE WILL NOT CHANGE STATE, THUS LOCAL OPER. IND. WOULD NOT CHANGE. SUPV. RELAYS WOULD DEENERGIZE CAUSING THE FAN TO FAIL TO OPERATE	LOSS OF SSW LOOP B PUMP LOSS OF RHR "B" AND RCIC HVAC	"SSW B SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE" "SSW PP HOUSE B PRA-FN-1B LOW FLOW"
PP-8A-G	2	TS2-21	TRANSMITTER FOR SW-LS-1B3	LOSS OF LOW WATER TRIP OF SW-P-1B	NONE.	RG 1.47 BISI "SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE"
PP-8A-G	2	TS2-013 TS2-014 TS2-015 TS2-016 TS2-017 TS2-024	TRANSMITTER FOR SW-V-12B POS. SWITCHES	RECIEVERS IN CONTROL ROOM WILL NOT CHANGE STATE. POS. INDICATION WILL NOT CHANGE	NONE	"SSW B SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE"

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
PP-8A-G	2	SW-SPV-38B	SOLENOID VALVE FOR SW-PCV-38B BACK PRESSURE CONTROL VALVE	SOLENOID VALVE WILL DEENERGIZE AND SW-PCV-38B WILL THROTTLE OPEN	NONE	NONE
		TS2-037 TS2-038 RS2-013 RS2-014 SS2-013 SS2-014	TRANSMITTERS FOR SW-PCV-38B POS. IND. RECEIVERS AND SUPV. RELAYS FOR CONTROL OF SW-SPV-38B	SUPV. RELAYS DEENERGIZE, THEREFORE DEENERGIZING SW-SPV-38B TO THROTTLE OPEN. POS. IND. WILL NOT CHANGE.	NONE	"SSW B SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE"
PP-8A-G	2	TS2-005 TS2-006 TS2-007 TS2-008 TS2-020 TS2-030	TRANSMITTERS FOR SW-V-69B POS. SWITCHES	RECEIVERS IN CONTROL ROOM WILL NOT CHANGE STATE. POS. INDICATION WILL NOT CHANGE	NONE	"SSW B SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE"
PP-8A-G	2	TS2-009 TS2-010 TS2-011 TS2-012 TS2-023 TS2-033	TRANSMITTERS FOR SW-V-70A POS. SWITCHES	RECEIVERS IN CONTROL ROOM WILL NOT CHANGE STATE. POS. INDICATION WILL NOT CHANGE	NONE	"SSW B SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE"
PP-8A-G	2	TS2-026 TS2-061 TS2-062 SS2-004 SS2-005 RS2-004 RS2-005	TRANSMITTERS FOR CONTROL OF PRA-FN-1B SUPV. RELAYS AND RECEIVERS FOR LOCAL OPER. INDICATION	RECEIVERS FOR CONTROL ROOM WILL NOT CHANGE STATE (FAN WOULD AUTO OPERATE) SUPV. RELAYS WOULD DEENERGIZE, THUS LOSS OF LOCAL OPER. INDICATION	NONE	"SSW B SUPV. SYSTEM TROUBLE" "SSW B OUT-OF-SERVICE"
MC-8A	2	SW-V-12B	LOOP B WATER RETURN TO SPRAY POND "B" ISOL. VALVE	MOV FAILS-AS-IS, (N.C.) LOSS OF POS. IND.	LOSS OF SSW "B" RETURN TO SPRAY POND A; BUT RETURN TO COOLING TOWER REMAINS OPERABLE	"MOV NETWORK POWER LOSS/OL" "SSW B OUT-OF-SERVICE"

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
MC-8A	2	SW-V-69B	SSW LOOP B RETURN TO COOLING TOWER ISOL. VALVE	MOV FAILS-AS-IS (N.O.) LOSS OF POS. IND.	NONE	"MOV NETWORK POWER LOSS/OL" "SSW B OUT-OF-SERVICE" NOTE 2
MC-8A	2	SW-V-70A	SSW LOOP A RETURN TO COOLING TOWERS ISOLATION VALVE	MOV FAILS-AS-IS (N.O.)	NONE	"MOV NETWORK POWER LOSS/OL" "SSW B OUT-OF-SERVICE"
MC-8A-A	2	PRA-FN-1B	SSW PUMP HOUSE "B" FAN COIL UNIT MOTOR	FAN FAILS TO OPERATE AND LOSS OF POS. IND. AT MCC	LOSS OF SSW LOOP "B" PUMP LOSS OF RHR "B" AND RCIC HVAC	"PRA-FN-1B POWER LOSS" "SSW B OUT-OF-SERVICE"

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
SM-4	2	E22-C001	HPCS PUMP	LOSS OF HPCS PUMP	HPCS INOPERATIVE	TWO BREAKER TRIP ANNUNCIATION
MC-4A	3	E22-C003	STANDBY WATER LEG PUMP	LOSS OF PUMP	NONE.	1) HPCS-P-3 POWER LOSS LIGHT ON P601 2) MOV NETWORK POWER LOSS LIGHT ON P601 3) HPCS OUT OF SERVICE ANNUNCIATOR 4) LOSS OF VALVE POSIT. IND. ON P601 FOR E22-F001; F004; F015; F012; F023.
MC-4A	3	SW-V-29	HPCS-P-2 DISCHARGE VALVE	MOV FAILS-AS-IS (N.C.)	LOSS OF HPCS	"HPCS SW OUT-OF-SERVICE" "HPCS OUT-OF-SERVICE"
MC-4A	3	SW-V-54	SSW SHUTOFF VALVE FOR HPCS ROOM RRA-FC-4	MOV FAILS-AS-IS (N.C.) LOSS OF POS. IND.	LOSS OF HPCS PUMP ROOM HVAC, THEREBY DEFEATING HPCS	RG 1.47 BISI "HPCS PUMP RM HVAC OUT-OF-SERVICE" "HPCS OUT-OF-SERVICE" NOTE 2
		HPCS-P-2	HPCS SERVICE WATER PUMP	PUMP INOPERATIVE LOSS OF LOCAL PLUS CONTROL ROOM POS. IND.	LOSS OF HPCS SSW, THEREBY DEFEATING HPCS	RG 1.47 BISI "HPCS SW OUT-OF-SERVICE" "HPCS OUT-OF-SERVICE"
MC-4A	3	RRA-FN-4	HVAC FAN UNIT FOR HPCS PUMP ROOM	LOSS OF POWER AND CONTROL TO FAN. LOSS OF LOCAL INDICATION	LOSS OF HPCS PUMP	"HPCS PUMP RM 6 RRA-FC-4 TRIP" RG 1.47 BISI "HPCS PUMP RM HVAC OUT-OF-SERVICE" "HPCS OUT-OF-SERVICE"

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
(AC)		E22-F001	PUMP SUCTION FROM CONDENSATE STORAGE TANK	VALVE FAILS AS IS, (N.O.)	NONE.	1) HPCS-P-3 POWER LOSS LIGHT ON P601 2) MOV NETWORK POWER LOSS LIGHT ON P601 3) HPCS OUT OF SERVICE ANNUNCIATOR 4) LOSS OF VALVE POSIT. IND. ON P601 FOR E22-F001; F004; F015; F012; F023.
		E22-F004	HPCS PUMP DISCHARGE	VALVE FAILS AS IS, (N.C.)	HPCS INOPERATIVE	1) HPCS-P-3 POWER LOSS LIGHT ON P601 2) MOV NETWORK POWER LOSS LIGHT ON P601 3) HPCS OUT OF SERVICE ANNUNCIATOR 4) LOSS OF VALVE POSIT. IND. ON P601 FOR E22-F001; F004; F015; F012; F023.
MC-4A	3	E22-F015	PUMP SUCTION FROM SUPPRESSION POOL	VALVE FAILS AS IS, (N.C.)	USE SUCTION FROM CONDENSATE TANK	1) HPCS-P-3 POWER LOSS LIGHT ON P601 2) MOV NETWORK POWER LOSS LIGHT ON P601 3) HPCS OUT OF SERVICE ANNUNCIATOR 4) LOSS OF VALVE POSIT. IND. ON P601 FOR E22-F001; F004; F015; F012; F023.

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
		E22-F011 E22-F012 E22-F010 E22-F023		MOV FAILS AS IS, (N.C)	NONE.	1) HPCS-P-3 POWER LOSS LIGHT ON P601 2) MOV NETWORK POWER LOSS LIGHT ON P601 3) HPCS OUT OF SERVICE ANNUNCIATOR 4) LOSS OF VALVE POSIT. IND. ON P601 FOR E22-F001; F004; F015; F012; F023.
		ENGINE & GENERATOR LOAD PANEL BATT CHGR CIRCUIT	S1-HPCS BATTERY	LOSS OF BATTERY CHARGER	NONE.	1) HPCS-P-3 POWER LOSS LIGHT ON P601 2) MOV NETWORK POWER LOSS LIGHT ON P601 3) HPCS OUT OF SERVICE ANNUNCIATOR 4) LOSS OF VALVE POSIT. IND. ON P601 FOR E22-F001; F004; F015; F012; F023.
S1-HPCS	3	H13-P625	RELAY LOGIC FOR MANUAL AND AUTO INITIATION	LOSS OF VALVE AND PUMP CONTROL	HPCS INOPERATIVE	1) HPCS LOGIC POWER FAILURE LIGHT ON P601 2) HPCS OUT OF SERVICE ANNUNCIATOR
S1-HPCS		H13-P601	E22-F010, E22-F011 VALVE POSIT. INDICATORS	VALVE POSITION IND. INDICATE DOWNSCALE	NONE - DOES NOT AFFECT VALVE POSITION	

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
PP-4A	3	H13-P625	HPCS ANALOG LOOP POWER SUPPLY	LOSS OF HPCS FLOW AND PRESSURE INDICATION	CANNOT VERIFY PROPER SYSTEM OPERATION	
		H13-P601	E22-F005	TESTABLE CHECK VALVE CANNOT BE TESTED	NONE.	LOSS OF VALVE POSITION LIGHTS ON P601
			E22-F009A E22-F009B E22-F003B	MANUAL VALVE POSIT. INDICATION	NONE.	LOSS OF VALVE POSITION LIGHTS ON P601
PP-4A	3	TS3-001 TS3-002 TS3-003 TS3-004 TS3-005 TS3-006 RCS3-001 RCS3-002 RCS3-003 RCS3-004 RCS3-005 RCS3-006 SCS3-001 SCS3-002 SCS3-003 SCS3-004 SCS3-005 SCS3-006	TRANSMITTERS, SUPV. RELAYS AND RECEIVERS FOR SW-V-29 POS. SWITCHES AND SW-P3-40B	SUPV. RELAYS DEENERGIZE LOSS OF POS. INDICATION AND VALVE WILL FAIL-AS-IS (N.C.)	LOSS OF HPCS	NOTE 2

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
DP-S1-2A	D2		ADS VALVES	(N.C.) LOSS OF DIV 2 POWER CAN BE OPENED WITH "A" POWER TO PERFORM ADS	NONE. 'A' POWER IS USED.	1) "ADS B/D LOGIC POWER FAIL" LIGHT 2) "ADS B/D OUT OF SERVICE" ANNUNC.

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
REFER TO GROUP 'Q' FOR PUMPS, VALVES AND CONTROLS THAT ARE ALSO REQUIRED FOR SUPPRESSION POOL COOLING 'B'.						
MC-8B-A	D2	E12-F027B	RHR LOOP "B" DISCHARGE TO SUPPRESSION POOL MOV	MOV FAILS AS IS,(N.C.)	VALVE USED FOR RETURN TO SUPPRESSION POOL FLOW	1) "MOV NETWORK POWER LOSS/OL" LIGHT 2) "RHR B/C OUT OF SERVICE" ANNUNC.

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
MC-2P**	11	CAS-C-1C	CAS COMPRESSOR 1C	LOSS OF CAS-C-1C AND INDICATION	REMAINING COMPRESSORS HAVE ADEQUATE CAPACITY	LOSS OF COMPRESSOR STATUS LIGHTS ON BD-A
		TSW-SV-1C	PLANT SERVICE WATER TO CAS-C-1C	TSW-SV-1C DISABLED (CLOSES IF OPEN)	LOSS OF 1 COMPRESSOR CAS-C-1C	
MC-7A**	1	CAS-C-1A	CAS COMPRESSOR 1A	LOSS OF CAS-C-1A AND INDICATION	REMAINING COMPRESSORS HAVE ADEQUATE CAPACITY	LOSS OF COMPRESSOR STATUS LIGHTS ON BD-A
		TSW-SV-1A	PLANT SERVICE WATER TO CAS-C-1A	TSW-SV-1A DISABLED (CLOSES IF OPEN)	LOSS OF 1 COMPRESSOR CAS-C-1A	LOSS OF COMPRESSOR STATUS LIGHTS ON BD-A
MC-8A**	1	CAS-C-1B	CAS COMPRESSOR 1B	LOSS OF CAS-C-1B AND INDICATION	REMAINING COMPRESSORS HAVE ADEQUATE CAPACITY	LOSS OF COMPRESSOR STATUS LIGHTS ON BD-A
		TSW-SV-1B	PLANT SERVICE WATER TO CAS-C-1B	TSW-SV-1B DISABLED (CLOSES IF OPEN)	LOSS OF 1 COMPRESSOR CAS-C-1B	LOSS OF COMPRESSOR STATUS LIGHTS ON BD-A **STANDBY COMPRESSION WILL START WHEN PRESSURE DROPS TO 90 PSIG. THIS WILL ANNUNCIATE IN THE CONTROL ROOM. IF BKRS TRIPS DUE TO A GROUND OR OVERLOAD THIS WILL BE ANNUNCIATED.
MC-7A-A	1	PRA-FN-1A	SW-HVAC	FAN DISABLED SSW A LOOP LOSS	PRA-FN-1A PWR LOSS. SSW A OUT OF SERVICE.	NOTE 1.
PP-7A-G	1	TS1-21	SW-SUPV CONTROL SW-SPV	LOSS OF SSW LOOP	STANDBY SW A SUPV SYSTEM TROUBLE SSW A-005	

BUS NUMBER	BUS DIV	DEVICE NUMBER	DEVICE DESCRIPTION	PRIMARY EFFECT ON DEVICE	PRIMARY EFFECT ON SYSTEM	ALARM POINT
MC-8A-A	2	PRA-FN-1B	SW-HVAC	FAN DISABLED SSW B LOOP LOSS	PRA-FN-ITS PWR LOSS SSW B OUT OF SERVICE.	NOTE 1.

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