LR-N17-0002

Attachment 5

HCGS EAL supporting documentation

HC.OP-AR.ZZ-0013(Q), OVERHEAD ANNUNCIATOR WINDOW BOX D1, Rev. 27

(39 pages)

HOPE CREEK GENERATING STATION

HC.OP-AR.ZZ-0013(Q) - Rev. 27

OVERHEAD ANNUNCIATOR WINDOW BOX D1

USE CATEGORY: II

- Packages and Affected Document Numbers incorporated into this revision:
  CP No. 80109711 CP Rev. 0 AD No. _____ Rev No. ____ None ____
- The following OPEX were incorporated into this revision: None
- The following OTSCs were incorporated into this revision: None

REVISION SUMMARY

70163944-0020

Attachments A5 and B5 – Incorporates spent fuel pool level instrument (LIT-4670A/B) installed by DCP-80109711. Instruments were installed to comply with NRC Order EA-12-051.

IMPLEMENTATION REQUIREMENTS **Effective date: 5 May 15**

None

OVERHEAD ANNUNCIATOR WINDOW BOX D1

TABLE OF ATTACHMENTS

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A-	RRCS POTENTIAL ATWS	RRCS FW RUNBACK INITIATED	TIP SHEAR VALVE CLOSED/INOP	BOP SAFETY SYS OUT OF SVCE	FUEL POOL LEVEL HI/LO
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B-	RRCS CONFIRMED ATWS		CONTAINMENT ISOLATION VALVE O/PF		FUEL POOL COOLING SYS LEAKAGE HI
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C-	RRCS RWCU ISLN INITIATED		EXCESS FLOW CHECK VALVE CLOSED		FUEL POOL F/D PANEL 10C305
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D-	RRCS MANUAL INIT ENABLED		EXCESS FLOW CHK VLV SW IN RESET		FUEL POOL COOLING SYS TROUBLE
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E-	RRCS TROUBLE	OPT ISLN PNL 10C663 TROUBLE			
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F-	RRCS OUT OF SVCE	DGTL LOGIC ASSEMBLY TROUBLE	ANLG LOGIC ASSEMBLY TROUBLE		
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ATTACHMENT A1

RRCS

POTENTIAL

ATWS

Window Location **D1-A1**

OPERATOR ACTION:

1. **CONFIRM** that the RRCS POTENTIAL ATWS setpoint(s) have been reached.
2. **CONFIRM** AUTOMATIC ACTION.
3. **REFER TO** HC.OP-EO.ZZ-0101(Q) Reactor Pressure Vessel (RPV) Control.

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D2194 D2189 RRCS CHANNEL A ARI INITIATED; ARI VALVE OPEN status lights on 10C651	RRCS POTENTIAL ATWS DIVISION 1 RRCS ARI INITIATED DIVISION 1	1. Reactor Recirc Pumps AP201 AND BP201 trip after a 9 second time delay due to low RX water level (-38"). 2. Reactor Recirc Pumps AP201 AND BP201 trip due to high RX Steam Dome pressure (1071 psig). 3. ARI Valves SV-F160A, SV-F162A, SV-F163A, and SV-F162C open.

REFERENCES J-109-0, Sht. 2 & 4 PN1-C22-1050-0022
E-6798-0

ATTACHMENT A1

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D2197 D2203 RRCS CHANNEL B ARI INITIATION ARI VALVE OPEN status lights on 10C651	RRCS POTENTIAL ATWS DIVISION 2 RRCS ARI INITIATED DIVISION 2	1. Reactor Recirc Pumps AP201 AND BP201 trip after a 9 second time delay due to low RX water level (-38"). 2. Reactor Recirc Pumps AP201 AND BP201 trip due to high RX Steam Dome pressure (1071 psig). 3. ARI Valves SV-F160B, SV-F162B, SV-F163B, and SV-F162D open.

ATTACHMENT A2

RRCS

FW RUNBACK

INITIATED

Window Location **D1-A2**

OPERATOR ACTION:

1. **MONITOR** Reactor water level, pressure
   AND **ENSURE** power is decreasing.
2. **ENSURE** AUTOMATIC ACTION has occurred.
3. **REFER TO** HC.OP-EO.ZZ-0101(Q) Reactor Pressure Vessel (RPV) Control.

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D2193 RRCS CHANNEL A FEEDWATER RUNBACK INITIATED status light on 10C651	RRCS FW RUNBACK INIT DIV 1	The Feedwater Control System will limit feedwater flow to 0% and cannot be overridden for 30 seconds.
D2207 RRCS CHANNEL B FEEDWATER RUNBACK INITIATED status light on 10C651	RRCS FW RUNBACK INIT DIV 2	The Feedwater Control System will limit feedwater flow to 0% and cannot be overridden for 30 seconds.

REFERENCES J-109-0, Sht. 3; Sht. 4
E-6798-0
N1-C22-1050-22, Sht. 29; Sht. 31

ATTACHMENT A3

TIP SHEAR

VALVE

CLOSED/INOP

Window Location **D1-A3**

OPERATOR ACTION:

1. **OBSERVE** Panel 10C607 for amber Squib Monitor or Shear Valve Monitor light.
2. **REFER TO** HC.OP-AB.CONT-0002(Q) Primary Containment.
3. **REFER TO** T/S 3.6.3.

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
Amber Squib Monitor or Shear Valve Monitor light ON	Tip Shear Valve closed or discontinuity	Alarm only

REFERENCES N1-C51-1060-23(3)-14
E-6774-0, Sht. A

ATTACHMENT A3

CONDITION	TIP SHEAR VALVE CLOSED/INOP	**SETPOINT**	N/A
INDICATION	Amber Squib Monitor or Shear Valve Monitor light ON	**ORIGIN**	N/A

AUTOMATIC ACTION:

Alarm only

OPERATOR ACTION:

1. **OBSERVE** Panel 10C607, amber Squib Monitor or Shear Valve Monitor light.
2. **REFER TO** HC.OP-AB.CONT-0002(Q) Primary Containment.
3. **REFER TO** T/S 3.6.3.

CAUSE	CORRECTIVE ACTION
1. TIP Shear Valve Closed or Discontinuity	1A. **REQUEST** the SM/CRS to initiate corrective action.

REFERENCES N1-C51-1060-23(3)-14
E-6774-0, Sht. A

ATTACHMENT A4

BOP

SAFETY SYS

OUT OF SVCE

Window Location **D1-A4**

OPERATOR ACTION:

REFER TO the OPERATOR ACTION for the associated Digital Alarm Point.

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D4676	SSW & SCREEN SPRAY OUT OF SVCE	Alarm only
D4677	SSWS TO HX & CLG TWR OUT OF SVCE	Alarm only
D4678	SACS OUT OF SVCE	Alarm only
D4679	SPENT FUEL POOL CLG OUT OF SVCE	Alarm only
D4680	CTMT ATMOS CONT OUT OF SVCE	Alarm only
D4681	H2 RECOMBINERS OUT OF SVCE	Alarm only
D4682	PRI CONT INST GAS OUT OF SVCE	Alarm only
D4683	INST GAS NON-1E ISV OUT OF SVCE	Alarm only
D4684	DIESEL GENERATORS OUT OF SVCE	Alarm only
D4685	INTAKE STRUCT HVAC OUT OF SVCE	Alarm only
D4686	SWGR RM COOLERS OUT OF SVCE	Alarm only

REFERENCES J-101-0, Sht. 14

ATTACHMENT A4

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D4687	DSL GEN RM RECIRC OUT OF SVCE	Alarm only
D4688	REACT BLDG EXH SYS OUT OF SVCE	Alarm only
D4689	AUX BLDG CONT HVAC OUT OF SVCE	Alarm only
D4690	REACT BLDG HVAC OUT OF SVCE	Various
D4691	ECCS/SACS PMP RM CLR OUT OF SVCE	Alarm only
D4692	CONT AREA CHW OUT OF SVCE	Various
D4694	125VDC SPLY TO INVRT OUT OF SVCE	Alarm only
D5472	PREPURGE CLEANUP OUT OF SVCE	Alarm only

ATTACHMENT A5

FUEL POOL LEVEL HI/LO	**Window Location** D1-A5

OPERATOR ACTION:

1. **CONFIRM** that the FUEL POOL LEVEL HI/LO alarm setpoint has been reached.
2. **ENSURE** compliance with the operability requirements of T/S 3.9.9 WATER LEVEL - SPENT FUEL STORAGE POOL.
3. IF LOW level alarm condition exists (D3834),
   ACKNOWLEDGE the low level alarm at Local Panel 10C214 (Rx. Bldg. El. 201')
   AND **REFER TO** HC.OP-AB.COOL-0004(Q), FUEL POOL COOLING.
4. **MONITOR** spent fuel pool level using Control Room or Lower Relay Room displays.

NOTE

Annunciator on local Panel 10C214 is always valid for low Spent Fuel Pool level, however it is only enabled for the low Reactor cavity water level during refueling operations. The annunciator on local Panel 10C214 alarms on low Spent Fuel Pool level and/or low Reactor cavity water level when the annunciator is enabled.

4. IF RPV Level Instrumentation is inoperable,
   AND a LOW Level condition has been confirmed,
   THEN manually **START** FRVS.
5. **VERIFY** proper operation of Shutdown Cooling, if in service.

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D3833	FUEL STORAGE POOL LEVEL HI	Alarm only
D3834	FUEL STORAGE POOL LEVEL LOW	Alarm only

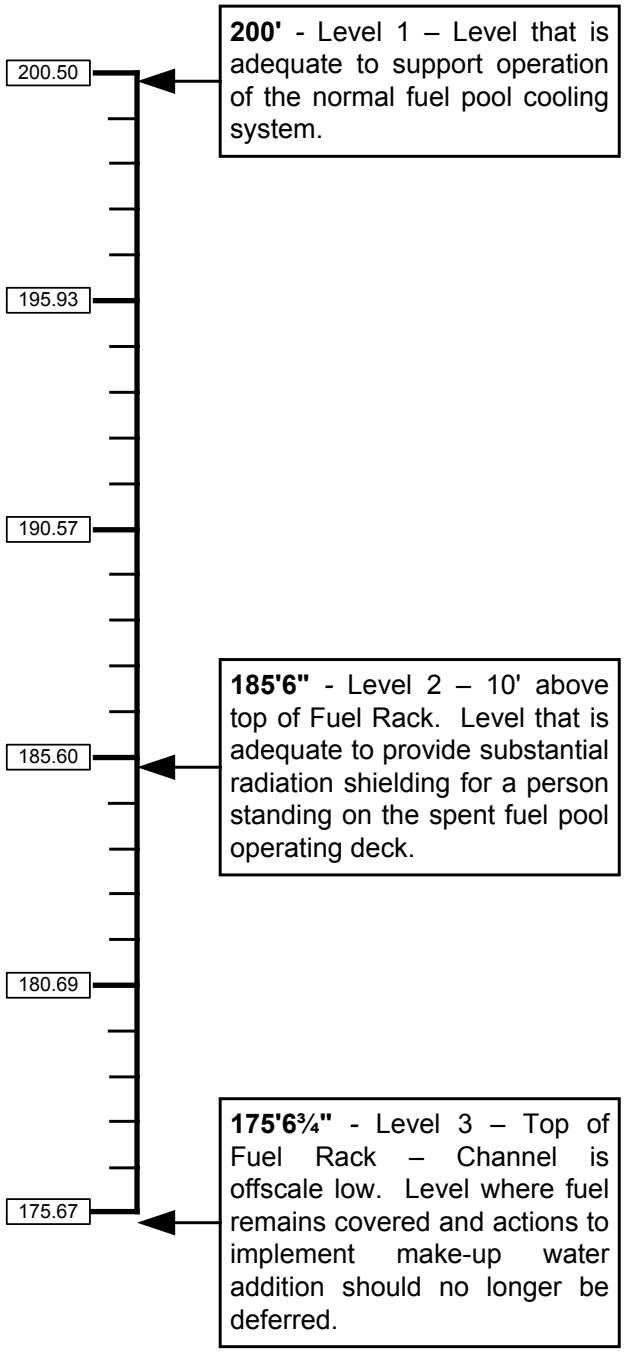
REFERENCES

J-53-0, Sht. 10
DCP No. 4-HC-0285, Pkg. 1
70159885-0030, 0280
JL-5000(A)-34
DCP No. 4-HM-0660
DCP 80109771

ATTACHMENT A5

SPENT FUEL POOL LEVEL INSTRUMENT SCALE
LIT-4670A/B
(Includes NRC Critical Levels)

In the event of a loss of inverter power, LIT-4670A/B in the Lower Relay Room will continue to operate on battery power for up to 7 days and the display will enter a “sleep mode.” Press any of the soft menu keys to display / obtain a reading.



ATTACHMENT B1

RRCS CONFIRMED ATWS

Window Location D1-B1

OPERATOR ACTION:

1. **CONFIRM** AUTOMATIC ACTION
2. **ENSURE** RWCU AP221
   AND BP221 trip.
3. **REFER TO** HC.OP-EO.ZZ-0101A(Q); ATWS – RPV Control.

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D2192	RRCS CONFIRMED ATWS DIVISION 1	1. HV-F001 RWCU PMP SUCT CONT INBD closes. 2. SLCS Squib Valves XV-F004A and XV-F004B open. 3. SLCS Pumps AP208 and BP208 start.
D2206	RRCS CONFIRMED ATWS DIVISION 2	1. HV-F004 RWCU PMP SUCT CONT OUTBD closes. 2. SLCS Squib Valves XV-F004A and XV-F004B open. 3. SLCS Pumps AP208 and BP208 start.

REFERENCES J-109-0, Sht. 2, 4
E-6798-0, Sht. 1

ATTACHMENT B3

CONTAINMENT

ISOLATION

VALVE O/PF

Window Location **D1-B3**

OPERATOR ACTION:

NOTE

FC-HV-4282, RCIC Turbine/Trip Throttle valve O/PF will cause this alarm.
FC-HV-4282 is NOT a containment Isolation valve.

1. **DETERMINE** valve(s) which is inoperative.
2. **REFER TO** Technical Specification 3.6.3.
3. **RESPOND** IAW VLV O/PF for associated Overhead Alarm Response.

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D4675	CONT ISLN MOV VLV OPF	Alarm only

REFERENCES J-101-0, Sht. 4

ATTACHMENT B5

FUEL POOL **COOLING SYS** **LEAKAGE HI**

Window Location **D1-B5**

OPERATOR ACTION:

1. **ENSURE** compliance with the WATER LEVEL - SPENT FUEL STORAGE POOL requirements of Technical Specifications 3.9.9.
2. **ENSURE** compliance with the WATER LEVEL - REACTOR VESSEL requirements of Technical Specifications 3.9.8.
3. IF unable to maintain within above specifications, **IMPLEMENT** HC.OP-AB.COOL-0004(Q); Fuel Pool Cooling.
4. **MONITOR** spent fuel pool level using Control Room or Lower Relay Room displays.

INPUTS

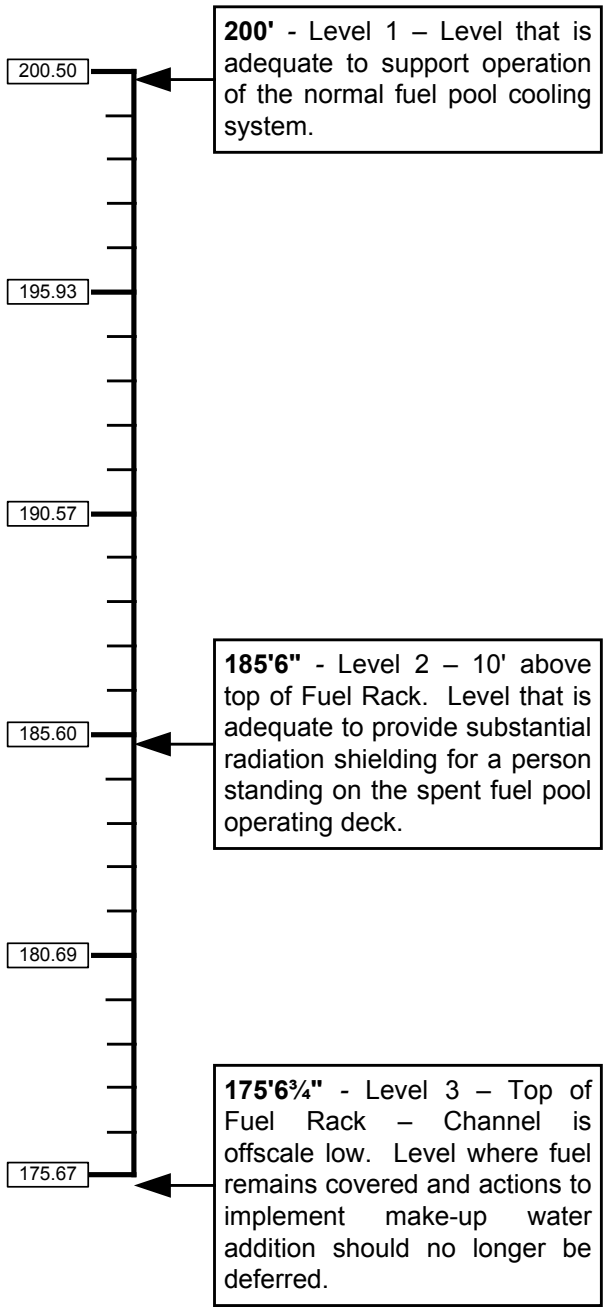
Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D3835	FUEL/CASK POOL GATES LEAKAGE	Alarm only
D3837	DRYWELL/REACT WELL SEAL LKG	Alarm only
D3838	VESSEL/DRYWELL SEAL LEAKAGE	Alarm only

REFERENCES M-53-1, Sht. 1 JL-5000(A)-34
J-53-0, Sht. 10, 11 DCP 80109771

ATTACHMENT B5

SPENT FUEL POOL LEVEL INSTRUMENT SCALE
LIT-4670A/B
(Includes NRC Critical Levels)

In the event of a loss of inverter power, LIT-4670A/B in the Lower Relay Room will continue to operate on battery power for up to 7 days and the display will enter a “sleep mode.” Press any of the soft menu keys to display / obtain a reading.



ATTACHMENT C1

RRCS **RWCU ISLN** **INITIATED**

Window Location **D1-C1**

OPERATOR ACTION:

1. **CONFIRM** AUTOMATIC ACTION
2. **ENSURE** RWCU AP221 and BP221 trip.
3. **RESPOND** according to HC.OP-EO.ZZ-0101A(Q); ATWS – RPV Control.

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D2191	RRCS RWCU ISOLATED DIVISION 1	1. HV-F001 RWCU PMP SUCT CONT INBD closes. 2. SLCS Squib Valves XV-F004A and XV-F004B open. 3. SLCS Pumps AP208 and BP208 start.
D2205	RRCS RWCU ISOLATED DIVISION 2	1. HV-F004 RWCU PMP SUCT CONT OUTBD closes. 2. SLCS Squib Valves XV-F004A and XV-F004B open. 3. SLCS Pumps AP208 and BP208 start.

REFERENCES J-109-0, Sht. 2; Sht. 4 E-6798-0, Sht. 1

ATTACHMENT C3

EXCESS FLOW

CHECK VALVE

CLOSED

Window Location **D1-C3**

CAUTION

Instruments may fail upscale or downscale.

OPERATOR ACTION:

1. **DISPATCH** an operator to Remote Control Panel (A)(B)(C)(D)C204 to determine which valve is closed.
2. IF operating Reactor Recirc Pump speeds are ≥100% of rated, **MONITOR** the affected instrument line for excessive vibrations. **[CD-600G]**

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D4843	RCP AC204 EX FL CHK V NON-1E	Alarm only
D4844	RCP BC204 EX FL CHK V NON-1E	Alarm only
D4845	RCP CC204 EX FL CHK V NON-1E	Alarm only
D4846	RCP DC204 EX FL CHK V NON-1E	Alarm only
D5824	RCP AC204 EX FL CHK V CH A/W/X	Alarm only
D5825	RCP BC204 EX FL CHK V CH B/W/X	Alarm only
D5759	RCP CC204 EX FL CHK V CH C/Y/Z	Alarm only
D5760	RCP DC204 EX FL CHK V CH D/Y/Z	Alarm only

REFERENCES J-104-0, Sht. 1

ATTACHMENT C5

FUEL POOL **F/D PANEL** **10C305**

Window Location **D1-C5**

OPERATOR ACTION:

1. **CONFIRM** AUTOMATIC ACTION.
2. **DISPATCH** an operator to remote Panel 10C305 to investigate the cause of alarm.

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D3840	TORUS WTR CLNUP PMP OP229 FLOW	Torus Water Cleanup Pump OP229 trips after 15 second time delay.

REFERENCES

M-53-1, Sht. 2	E-0031-1, Sht. 1
J-53-0, Sht. 3, 10; 11	J-102-0, Sht. 2; 3, 6, 8

ATTACHMENT D1

RRCS MANUAL INIT ENABLED

Window Location D1-D1

OPERATOR ACTION:

None

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
RRCS CHANNEL A/B LOGIC A and B MANUAL INITIATION PERMISSIVE status light on 10C651	RRCS MANUAL INITIATION PERMISSIVE	Alarm only

REFERENCES J-109-0, Shts. 2; Sht. 4
E-6789-0

ATTACHMENT D1

DIGITAL ALARM POINT None

NOMENCLATURE RRCS MANUAL INITIATION PERMISSIVE **SETPOINT** N/A

DESCRIPTION Logic Channel A(B) of RRCS Channel A(B) manually armed **ORIGIN** Panel 10C651

AUTOMATIC ACTION:

Alarm only

OPERATOR ACTION:

None

CAUSE	CORRECTIVE ACTION
1. The MANUAL INITIATION PERMISSIVE pushbutton of the RRCS Channel A(B) Logic A and B bezel depressed on 10C651.	1A. **DETERMINE** IF the reason for manually arming Logic Channel A(B) of RRCS Channel A(B) is warranted. IF not, **PRESS** the Channel A(B) Logic A(B) RRCS RESET PB.

REFERENCES N1-C22-1050-22(29)-7
J-109-0 Shts. 2, 4

ATTACHMENT D3

EXCESS FLOW

CHK VLV SW

IN RESET

Window Location **D1-D3**

OPERATOR ACTION:

1. **DISPATCH** an operator to Local Panels A(B)(C)(D)C204 to confirm the AUTOMATIC ACTION.
2. **ENSURE** compliance with the CONTAINMENT ISOLATION VALVE requirements of Technical Specifications 3.6.3.

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D5037	PNLS AC204 & CC204 SW IN RESET	Solenoid is energized which opens associated excess flow check valve.
D5036	PNLS BC204 & DC204 SW IN RESET	Solenoid is energized which opens associated excess flow check valve.

REFERENCES J-104-0, Sht. 1
E-6782-0, Sht. 2

ATTACHMENT D5

FUEL POOL **COOLING SYS** **TROUBLE**

Window Location D1-D5

Setpoint Various

OPERATOR ACTION:

1. **REFER TO** OPERATOR ACTION associated with each particular digital alarm point.
2. **ENSURE** compliance with the CONTAINMENT ISOLATION VALVES requirements of T/S 3.6.3.

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D3827	FUEL POOL CLG PMP DSCHG TEMP	Alarm only
D3831	SKIMMER SURGE TANK BT208 LEVEL - LSLL-4661A	1. Fuel Pool Cooling Pump AP211 trips. 2. HV-4676A Fuel Pool Filter Demin Isolation Valve closes.
D3828	SKIMMER SURGE TANK BT208 LEVEL - LSLL-4661B	1. Fuel Pool Cooling Pump BP211 trips. 2. HV-4676B AND HV-4678 Fuel Pool Filter Demin Isolation Valve close.
D3832	SKIMMER SURGE TANK BT208 LEVEL - LSHH-4660	Alarm only

REFERENCES

M-53-1, Sht. 1 & 2
JL-5000(A)-34
J-11-0, Sht. 30 & 31
M-11-1, Sht. 2
J-53-0, Sht. 10

ATTACHMENT D5

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D4716	FUEL POOL HX A WTR FLOW	Alarm only
D4718	FUEL POOL HX B WTR FLOW	Alarm only
D3847/ OVLD/PWR FAIL	TORUS WTR CLNUP V HV-4652	Alarm only
D3848/ OVLD/PWR FAIL	TORUS WTR CLNUP V HV-4680	Alarm only
D3849/ OVLD/PWR FAIL	FUEL POOL F/D BYP HV-4689A OPF	Alarm only
D3850/ OVLD/PWR FAIL	EMERG MKUP TO FUEL POOL LP A V	Alarm only
D3851/ OVLD/PWR FAIL	TORUS WTR CLNUP V HV-4679	Alarm only
D3852/ OVLD/PWR FAIL	TORUS WTR CLNUP V HV-4681	Alarm only
D3853/ OVLD/PWR FAIL	EMERG MKUP TO FUEL LP B V	Alarm only
D3854/ OVLD/PWR FAIL	FUEL POOL F/D BYP HV-4689B OPF	Alarm only
D4791/ OVLD/PWR AIL	FPL HX A INL HV-2314A OPF	Alarm only
D4792/ OVLD/PWR FAIL	FPL HX A OULET HV-7921A OPF	Alarm only
D4793/ OVLD/PWR FAIL	FPL B INL HV-2314B OPF	Alarm only
D4794/ OVLD/PWR FAIL	FPL B OUTLET HV-7921B OPF	Alarm only
D3829/STOP	FUEL POOL CLG PUMP B	Fuel Pool Cooling Pump BP211 trips.
D3830/STOP	FUEL POOL CLG PUMP A	Fuel Pool Cooling Pump AP211 trips.

ATTACHMENT E1

RRCS TROUBLE

Window Location **D1-E1**

OPERATOR ACTION:

1. **MONITOR** the RRCS controls/indicators on the 10C651 Panel for abnormal conditions.
2. **MONITOR** indications on local RRCS Control Panels 10C601 and 10C602.
3. Many inputs to this alarm are generated from the safety channel trip signals (Level 2 and High Rx Dome Pressure) and resulting logic signals (RPT trip for example). Indications are listed for single channel inputs only.
   IF two channels in the same division actuate,
   alarm windows A1, A2, B1, C1, D1 will also energize.
   REFER TO response for those alarms for automatic actions.
4. **ENSURE** compliance with the ATWS RECIRCULATION PUMP TRIP INSTRUMENTATION requirements of Technical Specifications 3.3.4.1.

   NOTE 1: This alarm is initiated from identical signals generated in 10C601 (DIV I) and 10C602 (DIV II).

   NOTE 2: RRCS DIV I is designated as Channel A on 10C651; RRCS DIV II is designated as Channel B on 10C651. Channels A & B within each division are designated as Logic A & B on 10C651.

5. **DIRECT** I&C to perform an RRCS STS reset
   WHEN condition is cleared."

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
TEST FAULT ESSENTIAL LOGIC FAILURE RRCS LOGIC A TROUBLE status lights on 10C651 panel	RRCS DIV 1(2) Safety Related logic circuit failed self test; ATWS RPT, ARI, FW Runback, RWCU Isolation, SLCS Initiation, or SLC Tank Low Level functions may be inoperable.	Alarm only

REFERENCES J-109-0 E-6798-0 PN1-C22-1050-0022
PN1-C22-P001-0065 PN1-C22-P001-0044 PN1-A41-8010-0054

ATTACHMENT E1

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
TEST FAULT status light on RRCS local panels 10C601 or 602, RRCS LOGIC B TROUBLE on 10C651	RRCS Self Test System circuit failure; STS circuit failure, power supply trouble, fuse trouble, STS link with other division interrupted, STS stopped in other division	Alarm only
ATM CALI GROSS FAILURE status light on RRCS local panel 10C601 or 10C602 RRCS LOGIC A/B TROUBLE on 10C651	RRCS Analog Trip Module is in test or signal exceeded gross fail limits or gross fail latch circuit not reset.	Alarm only
10C651 Logic A(B) MANUAL INITIATION PERMISSIVE, RRCS LOGIC A/B TROUBLE status light on 10C651	RRCS MANUAL INITIATION ARMED DIV I OR II, Logic A or B Manual Initiation Armed.	Alarm only
MANUAL INITIATION status light on 10C651 Channel A/B, Logic A/B, RRCS LOGIC A/B TROUBLE status light on 10C651	MANUAL INITIATION in Channel A(B), Logic A(B) has tripped	Alarm only
RPV DOME PRESS HIGH CHAN A or B - status lamp on 10C601 or 10C602, LOGIC A/B RRCS TROUBLE, ARI READY FOR RESET (After 30 sec delay), RRCS READY FOR REST (After 13.8 minute delay) status lights on 10C651	RX DOME PRESS HIGH/channel has tripped in DIV I or DIV II.	Alarm Only
RPV WATER LEVEL LOW CH A or B - status light on 10C601/10C602, LOGIC A/B RRCS TROUBLE, ARI READY FOR RESET (After 30 sec delay), RRCS READY FOR RESET (After 13.8 minute delay) status lights on 10C651	RPV LOW WATER LEVEL 2 Channel A or B in DIV I or DIV II has tripped.	Alarm only

ATTACHMENT E1

CONDITION	RRCS DIV 1(2) CIRCUIT TROUBLE	**SETPOINT**	N/A
INDICATION	TEST FAULT ESSENTIAL LOGIC FAILURE and RRCS LOGIC A TROUBLE on 10C651 Panel	**ORIGIN**	Local Panel 10C601 or 602

AUTOMATIC ACTION:

Alarm only

OPERATOR ACTION:

1. **MONITOR** the RRCS controls/indications on the 10C651 Panel for abnormal conditions.
2. **ENSURE** compliance with the ATWS RECIRCULATION PUMP TRIP INSTRUMENTATION requirements of Technical Specifications 3.3.4.1.

CAUSE	CORRECTIVE ACTION
1. Fault within RRCS Local Panel 10C601(CH A) or 10C602 (CH B) safety related circuits (failed self test), ATWS RPT, ARI, FW Runback, SLCS Initiation, RWCU Isolation, or SLC Tank Level circuit may be inoperable.	1A. **REQUEST** the SM/CRS to initiate corrective action. 1B. **DIRECT** I&C to determine source of alarm by performing HC.IC-GP.SA-0003(Q), General Work Procedure Troubleshooting of Redundant Reactivity Control System and Documentation of Work.
2. RWCU BG-HV-F004 Isolation valve breaker 52-242081 open (no power to RRCS output isolators) causes RRCS Test Fault in Channel B Logic A only.	2A. **DETERMINE** reason for loss of power to breaker.
3. SLCS Pump 1AP208 (1BP208) breaker 52-212063 (222101) open (no power to RRCS output isolators) - causes test fault in Channel B (A) Logic A.	3A. **DETERMINE** reason for loss of power to breaker.
4. Feedwater Runback circuit power from 10C612 lost (no power to RRCS isolators) causes Test Fault in Channel A and B Logic A.	4A. **DETERMINE** reason for loss of power to breaker.

REFERENCES J-109-0, Sht. 3 PSBB 317039 E-6050-0
PN1-C22-P001-0044 Sht. 30 PN1-A41-8010-0054
E-6007-0 Sht. 2

ATTACHMENT E1

CONDITION	RRCS DIV 1(2) SELF TEST CIRCUIT FAULT	**SETPOINT**	N/A
INDICATION	RRCS LOGIC B TROUBLE status light on 10C651; TEST FAULT on 10C601(602) Panel.	**ORIGIN**	Local Panel 10C601 or 602

AUTOMATIC ACTION:

Alarm only

OPERATOR ACTION:

1. **MONITOR** the RRCS controls/indications on the 10C651 panel for abnormal conditions.
2. **ENSURE** compliance with the ATWS RECIRCULATION PUMP TRIP INSTRUMENTATION requirements of Technical Specifications 3.3.4.1.

CAUSE	CORRECTIVE ACTION
1. Fault within RRCS local panel 10C601(602) self test system circuits.	**REQUEST** the SM/CRS to initiate corrective action.
2. Fault exists in RRCS Local Panel 10C601 to 10C602 communications cross-tie.	Operability of safety related circuits is not likely to be impacted.
3. Power Supply in 10C601 or 10C602 out of tolerance. 4. Fuse failure in 10C601 or 10C602. 5. Self Test stopped in other division.	**DIRECT** I&C to determine source of alarm by performing HC.IC-GP.SA-0003(Q), General Work Procedure Troubleshooting of Redundant Reactivity Control System and Documentation of Work.

REFERENCES J-109-0, Sht. 3 PN1-C22-P001-0044, Sht. 31

ATTACHMENT E1

CONDITION	RRCS ATM CALIBRATION OR GROSS FAILURE DIV 1(2)	**SETPOINT**	N/A
INDICATION	ATM CALI GROSS FAILURE status light on RRCS local panel 10C601(602), RRCS LOGIC A(B) TROUBLE status light on 10C651.	**ORIGIN**	Local Panel 10C601 or 602

AUTOMATIC ACTION:

Alarm only

OPERATOR ACTION:

1. **MONITOR** the RRCS controls/indications on the 10C651 panel for abnormal conditions.
2. **ENSURE** compliance with the ATWS RECIRCULATION PUMP TRIP INSTRUMENTATION requirements of Technical Specifications 3.3.4.1.

CAUSE	CORRECTIVE ACTION
1. RRCS Channel A analog trip module signal has failed high or low or is in test mode.	1A. **REQUEST** the SM/CRS to initiate corrective action IF not in test.

REFERENCES PN1-C22-P001-0044, Sht 30 & 31

ATTACHMENT E1

CONDITION RX DOME PRESS HIGH RRCS DIV I/II LOGIC A/B

SETPOINT 1071 psig

INDICATION 10C651D RRCS TROUBLE, ARI READY FOR RESET, RRCS READY FOR RESET status lights, 10C601/602 RX DOME PRESS CHAN A/B HIGH

ORIGIN PT-N403A/E PT-N403B/F

AUTOMATIC ACTION:

None

OPERATOR ACTION:

1. **MONITOR** the RRCS controls/indications on the 10C651/10C601/10C602 Panel(s) for abnormal conditions.
2. **ENSURE** compliance with the ATWS RECIRCULATION PUMP TRIP INSTRUMENTATION requirements of Technical Specifications 3.3.4.1.

CAUSE	CORRECTIVE ACTION
1. Circuit failure in Rx Dome Pressure circuit PT-N403A or E or PT-N403B or F.	1A. **REQUEST** the SM/CRS to initiate corrective action.

REFERENCES PN1-C22-P001-0044, Sht 30 & 31

ATTACHMENT E1

CONDITION	RRCS MANUAL INITIATION ARMED DIV I/II, LOGIC A/B	**SETPOINT**	N/A
INDICATION	10C651 Logic A(B) MANUAL INITIATION PERMISSIVE status light	**ORIGIN**	Panel 10C651

AUTOMATIC ACTION:

Alarm only

OPERATOR ACTION:

None

CAUSE	CORRECTIVE ACTION
1. The MANUAL INITIATION PERMISSIVE pushbutton of the RRCS CHANNEL A/B LOGIC A/B10C651 bezel depressed.	1A. **DETERMINE** if the reason for manually arming RRCS is warranted AND IF not warranted THEN **RESET** the manual arming WHEN permitted.

REFERENCES PN1-C22-P001-0044 Sht. 30 & 31 J-109-0 Sht. 1

ATTACHMENT E1

CONDITION	RX WTR LEVEL RRCS DIV I/II LOGIC A/B	**SETPOINT**	-38"
INDICATION	10C651D - RRCS Channel A/B LOGIC A/B RRCS TROUBLE, ARI READY FOR RESET, RRCS READY FOR RESET status lights	**ORIGIN**	LT-N402A/E LT-N402B/F

AUTOMATIC ACTION:

None

OPERATOR ACTION:

1. **MONITOR** the RRCS controls/indications on 10C651/10C601/10C602 Panel(s) for abnormal conditions.
2. **ENSURE** compliance with the ATWS RECIRCULATION PUMP TRIP INSTRUMENTATION requirements of Technical Specifications 3.3.4.1.

CAUSE	CORRECTIVE ACTION
1. Rx Level instrument circuit has failed.	1A. **REQUEST** SM/CRS to initiate corrective action.

REFERENCES PN1-C22-P001-0044, Sht. 30 & 31

ATTACHMENT E1

NOMENCLATURE	MANUAL INIT RRCS DIV 1 CH A	**SETPOINT**	N/A
DESCRIPTION	10C651D CHANNEL A/B LOGIC A/B MANUAL INITIATION pushbutton depressed	**ORIGIN**	Panel 10C651

AUTOMATIC ACTION:

None

OPERATOR ACTION:

None

CAUSE	CORRECTIVE ACTION
1. RRCS Channel A/B LOGIC A/B MANUAL INITIATION pushbutton depressed after arming of the MANUAL INITIATION PERMIT pushbutton.	1A. **INVESTIGATE** the reason for manually initiating Logic AND IF not valid THEN **RESET** the manual initiation WHEN permitted.

ATTACHMENT E2

OPT ISLN **PNL 10C663** **TROUBLE**

Window Location **D1-E2**

OPERATOR ACTION:

1. **DISPATCH** an operator and I&C to Optical Isolation Auxiliary Cabinet (C663) to determine cause of alarm.
2. **OBSERVE** the Digital Logic Circuit Disable Summary alarm panel for illuminated bezel(s) - indicative of a particular Plant System potentially affected by the problem.
   Indicator will illuminate for any of the following reasons:

   Card Out of File
   Blown Fuse
   24V OP/Disable Switch in Disable Position

   I&C must determine cause and effect of problem
   AND Upon determination of problem
   NOTIFY CRS to initiate Tech Spec required actions and/or corrective actions.

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D3097	OIAC CKT DISABLE ALARM	Alarm only
D3098	OIAC DOOR OPEN ALARM	Alarm only

REFERENCES J-108-0, Sht. 10 E-6797-0, Sht. A

ATTACHMENT F1

RRCS OUT OF SERVICE

Window Location D1-F1

OPERATOR ACTION:

DETERMINE why power was lost to RRCS Panel.

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
RRCS CHANNEL A(B) RRCS OUT OF SERVICE status light on 10C651	N/A	Alarm only

REFERENCES J-109-0, Sht. 2; 3, 4 E-6798-0, Sht. 1

ATTACHMENT F1

CONDITION	Loss of 125 VDC power to RRCS Channel A Panel 10C601	**SETPOINT**	N/A
INDICATION	10C651 RRCS CHANNEL A OUT OF SERVICE status light	**ORIGIN**	Local Panel 10C601

AUTOMATIC ACTION:

Alarm only

OPERATOR ACTION:

DETERMINE cause of power loss
AND **RESTORE** power to Panel 10C601.

CAUSE	CORRECTIVE ACTION
1. RRCS local panel 10C601 power supply breaker tripped.	1A. Under the order of the SM/CRS, **DIRECT** operator to **RESET** brk 1AD417-07 of 125VDC Class 1E Dist. Panel 1AD417. 1B. IF breaker 7 cannot be reset OR trips after being reset, **NOTIFY** the SM/CRS.
2. Breaker 72-41023 of Class 1E 125VDC Switchgear 10D410 tripped.	2A. Under the order of the SM/CRS, **DIRECT** operator to **RESET** breaker 72-41023. 2B. IF breaker 72-41023 cannot be reset OR trips after being reset, **NOTIFY** the SM/CRS.
3. Loss of Class 1E 125VDC Bus 10D410 power.	3A. **REFER TO** HC.OP-AB.ZZ-0150(Q) 125VDC Malfunction.

REFERENCES N1-C22-1050-22(13)-4, (29)-7; (30)-4(33)-3; (35)-3
E-0009-1, Sht. 1

ATTACHMENT F1

CONDITION	Loss of 125 VDC power to RRCS Channel B Panel 10C602	**SETPOINT**	N/A
INDICATION	10C651 RRCS CHANNEL B OUT OF SERVICE status light	**ORIGIN**	Local Panel 10C602

AUTOMATIC ACTION:

Alarm only

OPERATOR ACTION:

DETERMINE cause of power loss
AND **RESTORE** power to panel 10C602.

CAUSE	CORRECTIVE ACTION
1. RRCS local panel 10C602 power supply breaker tripped.	1A. Under the order of the SM/CRS, **DIRECT** operator to **RESET** brk 1BD417-07 of 125VDC Class 1E Dist. Panel 1BD417. 1B. IF breaker 7 cannot be reset OR trips after being reset, **NOTIFY** the SM/CRS.
2. Breaker 72-42024 of Class 1E 125VDC Switchgear 10D420 tripped.	2A. Under the order of the SM/CRS, **DIRECT** operator to **RESET** breaker 72-42024. 2B. IF breaker 72-42024 cannot be reset OR trips after being reset, **NOTIFY** the SM/CRS.
3. Loss of Class 1E 125VDC Bus 10D420 power.	3A. **REFER TO** HC.OP-AB.ZZ-0150(Q) 125VDC Malfunction.

REFERENCES N1-C22-1050-22(4)-6 E-0009-1, Sht. 2

ATTACHMENT F2

DGTL LOGIC

ASSEMBLY

TROUBLE

Window Location **D1-F2**

OPERATOR ACTION:

1. **DISPATCH** an operator and I&C to the Summary Panel of Logic Cabinet(s) 1A(B)(C)(D)652 OR Non-1E Digital Logic Cabinet(s) A(B)(C)(D)653 to determine alarm.
2. **OBSERVE** the Digital Logic Circuit Disable Summary alarm panel for illuminated bezel(s) - indicative of a particular Plant System potentially affected by the problem.
   Indicator will illuminate for any of the following reasons:

   Card Out of File
   Blown Fuse
   24V OP/Disable Switch in Disable Position

   I&C must determine cause and effect of problem
   AND Upon determination of problem
   NOTIFY CRS to initiate Tech Spec required actions and/or corrective actions.
3. **REFER** to HC.IC-GP.RL-0003(Q) and HC.IC-GP.RL-0004(Q) as needed for impact.

INPUTS

Digital Point/Indication	Nomenclature/Condition	Automatic Action
D2434	1E DIGITAL LOGIC CAB AC652 & 57 Card Out of File 24V Op/Disable Switch in Disable Position	Alarm only/ **REQUEST** SM/CRS to initiate corrective action.
D2435	1E DIGITAL LOGIC CAB BC652 & 57 Card Out of File 24V Op/Disable Switch in Disable Position	Alarm only/ **REQUEST** SM/CRS to initiate corrective action.
D2436	1E DIGITAL LOGIC CAB CC652 & 57 Card Out of File 24V Op/Disable Switch in Disable Position	Alarm only/ **REQUEST** SM/CRS to initiate corrective action.

REFERENCES J-108-0, Sht. 10

ATTACHMENT F2

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D2437	1E DIGITAL LOGIC CAB DC652 & 57 Card Out of File 24V Op/Disable Switch in Disable Position.	Alarm only/ **REQUEST** SM/CRS to initiate corrective action.
D2438	NON-1E DIGITAL LOGIC CAB AC653 Card Out of File 24V Op/Disable Switch in Disable Position	Alarm only/ **REQUEST** SM/CRS to initiate corrective action.
D2439	NON-1E DIGITAL LOGIC CAB BC653 Card Out of File 24V Op/Disable Switch in Disable Position	Alarm only/ **REQUEST** SM/CRS to initiate corrective action.
D2440	NON-1E DIGITAL LOGIC CAB CC653 Card Out of File 24V Op/Disable Switch in Disable Position	Alarm only/ **REQUEST** SM/CRS to initiate corrective action.
D2441	NON-1E DIGITAL LOGIC CAB DC653 Card Out of File 24V Op/Disable Switch in Disable Position	Alarm only/ **REQUEST** SM/CRS to initiate corrective action.

ATTACHMENT F3

ANLG LOGIC

ASSEMBLY

TROUBLE

Window Location **D1-F3**

OPERATOR ACTION:

1. **DISPATCH** an operator and I&C to the Summary Panel of 1E Analog Cabinet(s) A(B)(C)(D)655
   OR Non-1E Analog Cabinet(s) C661 to determine cause of alarm.
2. **OBSERVE** the Digital Logic Circuit Disable Summary alarm panel for illuminated bezel(s) - indicative of a particular Plant System potentially affected by the problem.
   Indicator will illuminate for any of the following reasons:

   Card Out of File
   Blown Fuse
   24V OP/Disable Switch in Disable Position

   I&C must determine cause and effect of problem
   AND Upon determination of problem
   NOTIFY CRS to initiate Tech Spec required actions and/or corrective actions.

INPUTS

Digital Point/ Indication	Nomenclature/Condition	Automatic Action
D2395	1E ANALOG CAB AC655	Alarm only
D2396	1E ANALOG CAB BC655	Alarm only
D2397	1E ANALOG CAB CC655	Alarm only
D2398	1E ANALOG CAB DC655	Alarm only
D2399	NON-1E ANALOG CAB C661	Alarm only

REFERENCES J-108-0, Sht. 9