PSEG NUCLEAR L.L.C.
SALEM/OPERATIONS

S2.OP-AR.ZZ-0005(Q) REV. 19

OVERHEAD ANNUNCIATORS WINDOW E

- Biennial Review Performed: Yes ____ No ____ NA ✓
- DCP Packages and Affected Document Numbers incorporated into this revision: None
- The following OTSCs were incorporated into this revision: None

REVISION SUMMARY:

- OHA E-8 and E16, ROD INSERTION LIMIT LO and LO-LO: **[70110976]**

  - Step 3.9, changed to read; "REFER to Technical Specifications 3.1.1.1 (Modes 1-4) and 3.1.3.5 (Modes 1-2)." Added T/S references.

- OHA E-13, SR HI FLUX AT S/D: **[70106166]**

  - Changed SETPOINT to "0.5 to 1.0 Decade above the SR Count Rate at Shutdown. Set IAW SC.IC-DC.NIS-0003(Q)." Reference 70102877, 70091991, and SC-NIS001-01.

- OHA E-24, ROD DEV OR SEQ: **[70092606]**

  - Aligned SETPOINT "Rod Deviation" phraseology with information previously reviewed and approved in S1.OP-AR.ZZ-0005(Q) for consistency.

  - Reformatted Step 3.1, the 4 hour RPI and Group Demand Position readings are applicable at >85% RTP (Step 3.1.A) as well as ≤85% RTP (Step 3.1.B). Aligns with information previously reviewed and approved in S2.OP-DL.ZZ-0003(Q).

IMPLEMENTATION REQUIREMENTS **Effective Date: July 1, 2010**

None

OVERHEAD ANNUNCIATORS WINDOW E

TABLE OF CONTENTS

1 21 SEAL WTR INJ FLTR △P HI	2 POPS CH I ARM	3 POPS CH II ARM	4 PZR LVL HI	5 SR DET VOLT TRBL	6 IR DET VOLT LOSS	7 PR DET VOLT LOSS	8 ROD INSERT LMT LO ●
9 22 SEAL WTR INJ FLTR △P HI	10 POPS CH I DISARM/ 2PR6 CLSD	11 POPS CH II DISARM/ 2PR7 CLSD	12 PZR PRESS LO ●	13 SR HI FLUX AT S/D	14 IR N35 COMPEN VOLT LOSS	15 PR HI RNG FLUX HI	16 ROD INSERT LMT LO-LO ●
17 BA BATCH TK LVL LO	18 POPS CH I AUX AIR PRESS LO	19 POPS CH II AUX AIR PRESS LO	20 PZR HTR ON LVL HI	21 SR HI FLUX AT S/D BLOCKED	22 IR N36 COMPEN VOLT LOSS	23 PR LO RNG FLUX HI	24 ROD DEV OR SEQ
25 BA BATCH TK TEMP HI OR LO	26 2PR1 NOT FULL CLSD	27 2PR2 NOT FULL CLSD	28 PZR HTR ON PRESS LO	29 SR & IR TRIP BYP ●	30 IR HI FLUX ROD WDRWL STOP	31 PR OVRPWR ROD STOP	32 ROD DRIVE PWR SPLY GND FAULT
33	34 2PR1 CHANNEL UNSAFE	35 2PR2 CHANNEL UNSAFE	36 PZR HTR OFF LVL LO	37 CH C SDM DECRNG	38 UPPER SECT DEV ABV 50% PWR	39 PR CH DEV	40 ROD BANK URGENT FAIL
41 LTDWN HX OUT TEMP HI	42 2PR1 1/2 TRIP	43 2PR2 1/2 TRIP	44 PZR SFTY VLV 2PR3-2PR5 NOT CLSD	45 CH D SDM DECRNG	46 LOWER SECT DEV ABV 50% PWR	47 PR NEUT FLUX RATE HI	48 ROD BOTTOM

ALARM	1
E-1	21 SEAL WTR INJ FLTR ΔP HI

DEVICES: 2PIC-189B

SETPOINT: ≥20 psid

1.0 **CAUSE(S)**:

≥20 psid across 21 Seal Injection Filter

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 **ENSURE** CVC System parameters are normal.

3.2 **ENSURE** 2CV71, CHG HDR PCV, and 2CV55, CENT CHG PMP FCV, are adjusted to maintain seal injection flow 6-10 gpm to each RCP.

3.3 **SEND** an Operator to check differential pressure locally at Elev. 84' Aux Building.

3.4 IF the alarm is valid,
THEN:

A. **PLACE** 22 Seal Injection Filter in service
IAW S2.OP-SO.CVC-0001(Q), Charging, Letdown and Seal Injection.

B. **ENSURE** the alarm clears.

C. **INITIATE** SAP Notification to replace 21 Seal Injection Filter.

3.5 IF the alarm is not valid,
THEN **INITIATE** SAP Notification to determine and correct the cause of alarm.

References: Dwg. 211562, 205328

ALARM	2
E-2	POPS CH I ARM

DEVICES: 2TC-413C

SETPOINT: ≥312°F

1.0 **CAUSE(S)**:

POPS Ch I is armed with Loop 21 WR T Cold ≥312°F

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 **CONFIRM** the alarm by observing RCS Temperature.

3.2 IF plant conditions require that POPS be armed,
THEN **REDUCE** RCS Temperature to <312°F.

3.3 IF alarm is due to normal plant heatup,
THEN **ENSURE** RHR is out of service and RH1 and RH2 are CLOSED,
AND **DISARM** POPS Ch I by pressing OFF Push Button.

3.4 IF alarm is due to a malfunction,
THEN **INITIATE** SAP Notification to determine and correct the cause of the alarm.

3.5 **REFER** to Technical Specifications.

References: Dwg. 244082

ALARM	3
E-3	POPS CH II ARM

DEVICES: 2TC-423C

SETPOINT: ≥312°F

1.0 **CAUSE(S)**:

POPS Ch II is armed with Loop 22 WR T Cold ≥312°F

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 **CONFIRM** the alarm by observing RCS Temperature.

3.2 IF plant conditions require that POPS be armed,
THEN **REDUCE** RCS Temperature to <312°F.

3.3 IF alarm is due to normal plant heatup,
THEN **ENSURE** RHR is out of service and RH1 and RH2 are CLOSED,
AND **DISARM** POPS Ch II by pressing the OFF Push Button.

3.4 IF alarm is due to a malfunction,
THEN **INITIATE** SAP Notification to determine and correct the cause of the alarm.

3.5 **REFER** to Technical Specifications.

References: Dwg. 224084

ALARM	4
E-4	PZR LVL HI

DEVICES: 2LC459A, 2LC460A, 2LC461A

SETPOINT: ≥92%

1.0 **CAUSE(S)**:

At least one channel of Pzr level ≥92%

2.0 **AUTOMATIC ACTIONS**:

NOTE

2-out-of-3 Channels will initiate a Reactor Trip ≥P-7.

♦ None

3.0 **OPERATOR ACTIONS**:

3.1 IF a single instrument failure has occurred,
THEN **INITIATE** S2.OP-AB.CVC-0001(Q), Loss of Charging, for applicability.

3.2 IF more than one channel indicates ≥92% and power is ≥P-7,
THEN:

A. **TRIP** Reactor.

B. **CONFIRM** the Reactor Trip.

C. **GO TO** 2-EOP-TRIP-1, Reactor Trip or Safety Injection.

References: Dwg. 221055

ALARM	5
E-5	SR DET VOLT TRBL

DEVICES: N/A

SETPOINT: N/A

1.0 **CAUSE(S)**:

Any:

A. SR channel deenergized with Turbine Power <15% (P-2)

B. SR channel energized with Turbine Power ≥15% (P-2)

2.0 **AUTOMATIC ACTIONS**:

NOTE

Source Range Channels will deenergize when 2 of 4 Power Range Channels reach P-10.

This alarm is blocked by P-2 when turbine power is >15%
AND will annunciate when turbine power <15%.

♦ None

3.0 **OPERATOR ACTIONS**:

3.1 IF the alarm is due to P-6 Block during Reactor Start-up, testing or maintenance, THEN no further action is required.

3.2 **GO TO** S2.OP-AB.NIS-0001(Q), Nuclear Instrumentation System Malfunctions.

References: Dwg. 218914

ALARM	6
E-6	IR DET VOLT LOSS

DEVICES: N/A

SETPOINT: N/A

1.0 **CAUSE(S)**:

Loss of Detector voltage on IR Channel

2.0 **AUTOMATIC ACTIONS**:

NOTE

If Reactor Power below P-10, Reactor Trip may occur.

♦ None

3.0 **OPERATOR ACTIONS**:

3.1 IF alarm is due to testing or maintenance,
THEN no further action is required.

3.2 IF a Reactor Trip occurs,
THEN **GO TO** 2-EOP-TRIP-1, Reactor Trip or Safety Injection.

3.3 **GO TO** S2.OP-AB.NIS-0001(Q), Nuclear Instrumentation System Malfunctions.

References: Dwg. 218914

ALARM	7
E-7	PR DET VOLT LOSS

DEVICES: N/A

SETPOINT: N/A

1.0 **CAUSE(S)**:

Loss of Detector Volts on PR channel

2.0 **AUTOMATIC ACTIONS**:

NOTE

- Loss of detector voltage may cause a Power Range Overpower Rod Stop.
- Loss of 2-out-of-4 Power Ranges will result in Reactor Trip.

- None

3.0 **OPERATOR ACTIONS**:

3.1 IF alarm is due to testing or maintenance,
THEN no further action is required.

3.2 IF Reactor Trip occurs,
THEN **GO TO** 2-EOP-TRIP-1, Reactor Trip or Safety Injection.

3.3 **GO TO** S2.OP-AB.NIS-0001(Q), Nuclear Instrumentation System Malfunctions.

References: Dwg. 218914

ALARM	8
E-8	ROD INSERT LMT LO ●

DEVICES: 2DC412A, 2DC422A, 2DC432A, 2DC442A

SETPOINT: ≤10 steps from Rod Insertion limit

1.0 **CAUSE(S)**:

One or more of Control Rod Banks (A, B, C, or D), within 10 steps of insertion limits

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 **DETERMINE** affected Rod Bank from Annunciator CRT:

CRT Point	Description	Rod Bank
502	Rod Insertion Limit Low (412)	Bank A
503	Rod Insertion Limit Low (422)	Bank B
504	Rod Insertion Limit Low (432)	Bank C
505	Rod Insertion Limit Low (442)	Bank D

3.2 **ENSURE** that Rods of applicable Bank are within ± 12 steps of Group Demand Counter.

3.3 IF a Reactor Startup is in progress and the alarm is expected,
THEN no further action is required.

3.4 IF alarm is due to surveillance testing pursuant to Technical Specification 4.1.3.1.2 IAW S2.OP-ST.RCS-0001(Q), Reactivity Control System - Rod Control Assemblies,
THEN no further action is required.

(continued)

3.5 IF cause of alarm is a dropped rod,
THEN **GO TO** S2.OP-AB.ROD-0002(Q), Dropped Rod.

3.6 IF cause of alarm is a misaligned rod,
THEN **GO TO** S2.OP-AB.ROD-0001(Q), Immovable/Misaligned Rod.

NOTE

The alarm will reset when the affected Rods are withdrawn at least 12 steps above Rod Insertion Limit.

3.7 **COMMENCE** Boron Addition to restore Rods to their normal band IAW S2.OP-SO.CVC-0006(Q), Boron Concentration Control.

3.8 IF the alarm is due to the Rod Insertion Limit Monitor or OHA being inoperable,
THEN **VERIFY** individual Control Rod Positions every 4 hours IAW S2.OP-DL.ZZ-0003(Q), Control Room Log - Modes 1-4. (T/S 4.1.3.5)

3.9 **REFER** to Technical Specifications 3.1.1.1 (Modes 1-4) and 3.1.3.5 (Modes 1-2).

References: Dwg. 220091

ALARM	9 22 SEAL WTR INJ FLTR ΔP HI
E-9	

DEVICES: 2PIC-189A

SETPOINT: ≥20 psid

1.0 **CAUSE(S)**:

≥20 psid across 22 Seal Injection Filter

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 **ENSURE** the CVC System parameters are normal.

3.2 **ENSURE** 2CV71, CHG HDR PCV, and 2CV55, CENT CHG PMP FCV, are adjusted to maintain seal injection flow 6-10 gpm to each RCP.

3.3 **SEND** an Operator to check differential pressure locally at Elev. 84' Aux Building.

3.4 IF the alarm is valid,
THEN:

A. **PLACE** 21 Seal Injection Filter in service
IAW S2.OP-SO.CVC-0001(Q), Charging, Letdown and Seal Injection.

B. **ENSURE** the alarm clears.

C. **INITIATE** SAP Notification to replace 22 Seal Injection Filter.

3.5 IF the alarm is not valid,
THEN **INITIATE** SAP Notification to determine and correct the cause of the alarm.

References: Dwg. 211562, 205328

ALARM	10
E-10	POPS CH I DISARM/ 2PR6 CLSD

DEVICES: 2TC-413C

SETPOINT: ≤312°F

1.0 **CAUSE(S)**:

Either of following with RCS Loop 21 WR T Cold ≤312°F:

A. POPS CH I disarmed

B. 2PR6, PZR PWR OP RELIEF STOP V, closed

2.0 **AUTOMATIC ACTIONS**:

2.1 POPS CH I disarmed: Reinstates 2335 psig setpoint on 2PR1, PZR PWR OP RELIEF V.

2.2 2PR6 closed: None

3.0 **OPERATOR ACTIONS**:

3.1 IF the alarm is due to testing or plant evolutions,
THEN no further action is required.

3.2 **MONITOR** RCS Temperature, POPS CH I, and 2PR6.

3.3 IF POPS CH I is disarmed with RCS Temperature ≤312°F,
THEN:

A. **ESTABLISH** RCS pressure <375 psig.

B. **ARM** POPS CH I IAW S2.OP-SO.PZR-0004(Q),
Pressurizer Overpressure Protection Operation.

3.4 IF 2PR6 is closed,
THEN **OPEN** 2PR6.

3.5 IF alarm is invalid,
THEN **INITIATE** SAP Notification to determine and correct the cause of the alarm.

3.6 **REFER** to Technical Specifications.

References: Dwg. 244082 / 244083

ALARM	11
E-11	POPS CH II DISARM/ 2PR7 CLSD

DEVICES: 2TC-423C

SETPOINT: ≤312°F

1.0 **CAUSE(S)**:

Either of following with RCS Loop 22 WR T Cold ≤312°F:

A. POPS CH II disarmed

B. 2PR7, PZR PWR OP RELIEF STOP V, closed

2.0 **AUTOMATIC ACTIONS**:

2.1 POPS CH II disarmed: Reinstates 2335 psig setpoint on 2PR2, PZR PWR OP RELIEF V.

2.2 2PR7 closed: None

3.0 **OPERATOR ACTIONS**:

3.1 IF the alarm is due to testing or plant evolutions,
THEN no further action is required.

3.2 **MONITOR** RCS Temperature, POPS CH II, and 2PR7.

3.3 IF POPS CH II is disarmed with RCS Temperature ≤312°F,
THEN:

A. **ESTABLISH** RCS pressure <375 psig.

B. **ARM** POPS CH II IAW S2.OP-SO.PZR-0004(Q),
Pressurizer Overpressure Protection Operation.

3.4 IF 2PR7 is closed,
THEN **OPEN** 2PR7.

3.5 IF the alarm is invalid,
THEN **INITIATE** SAP Notification to determine and correct the cause of the alarm.

3.6 **REFER** to Technical Specifications.

References: Dwg. 244084 / 244085

ALARM	12
E-12	PZR PRESS LO

DEVICES: 2PC-455D, 2PC-456D, 2PC-457D

SETPOINT: ≤1765 psig

1.0 **CAUSE(S)**:

One or more Pzr Pressure Channels ≤1765 psig

2.0 **AUTOMATIC ACTIONS**:

NOTE

Low pressure on 2-out-of-3 Channels will initiate Safety Injection.

♦ None

3.0 **OPERATOR ACTIONS**:

3.1 **DETERMINE** the affected Channel(s) from Annunciator CRT:

CRT Point	Description
426	Pressurizer Pressure Low Channel I
427	Pressurizer Pressure Low Channel II
428	Pressurizer Pressure Low Channel III

3.2 IF a Reactor Trip or Safety Injection occurs,
THEN **GO TO** 2-EOP-TRIP-1, Reactor Trip or Safety Injection.

(continued)

3.3 IF ≥2 channels indicate ≤1765 psig,
THEN:

A. Manually **TRIP** the Reactor AND **INITIATE** Safety Injection.

B. **GO TO** 2-EOP-TRIP-1, Reactor Trip or Safety Injection.

3.4 IF there is evidence of RCS leakage, (decreasing Pzr or VCT level),
THEN **GO TO** S2.OP-AB.RC-0001(Q), Reactor Coolant System Leak.

3.5 IF an actual RCS Pressure control problem exists,
THEN **GO TO** S2.OP-AB.PZR-0001(Q), Pressurizer Pressure Malfunction.

3.6 IF the alarm is due to testing, maintenance, or is normal for plant conditions,
THEN no further action is required.

3.7 IF a single Pressurizer Channel is malfunctioning,
THEN:

A. **INITIATE** SAP Notification to determine the cause and repair affected channel.

B. **REMOVE** malfunctioning channel from service IAW S2.OP-SO.RPS-0003(Q), Placing Pressurizer Channel in Tripped Condition.

References: Dwg. 221055

ALARM	13
E-13	SR HI FLUX AT S/D

DEVICES: 2NC31CX, 2NC32CX

SETPOINT: 0.5 to 1.0 Decade above the SR Count Rate at Shutdown.
Set IAW SC.IC-DC.NIS-0003(Q).

1.0 **CAUSE(S)**:

Source Range increasing by 0.5 to 1.0 Decade above background Source Range Level

2.0 **AUTOMATIC ACTIONS**:

The Containment Evacuation Horn sounds

3.0 **OPERATOR ACTIONS**:

3.1 **CONFIRM** the alarm by observing Source Range Counts.

3.2 IF the alarm is valid,
THEN:

A. **STOP** any core alteration in progress.

B. IF Initial Core Loading of source bearing assembly and array of fuel is in progress,
THEN **NOTIFY** Reactor Engineering to evaluate.

C. IF a planned heatup or dilution is in progress,
THEN **CONTACT** Reactor Engineering to confirm response.

(continued)

3.2 (continued)

D. IF Step B or C is not in progress,
THEN,

1. **ANNOUNCE** over the PA system: "The Source Range High Flux Alarm has sounded. Evacuate all personnel from Containment."

2. **SOUND** the Containment Evacuation Horn by pressing the Evacuation Horn Test Push Button on 2RP2.

3. **VERIFY** no dilution paths lined up and injecting.

4. **DETERMINE** if Shutdown Margin requirements are satisfied.

5. **REFER** to Technical Specifications.

3.3 IF alarm is due to spiking caused by welding or other electrical interference,
THEN:

A. **ATTEMPT** to locate and stop the activity.

B. **OBTAIN** the key AND **BLOCK** the Containment Evacuation Horn.

References: Dwg. 218914, SC-NIS001-01, VTD 301156

ALARM	14
E-14	IR N35 COMPEN VOLT LOSS

DEVICES: N/A

SETPOINT: N/A

1.0 **CAUSE(S)**:

Loss of Compensating voltage on Intermediate Range Channel N35

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 IF the alarm is due to testing or maintenance,
THEN no further action is required.

3.2 **GO TO** S2.OP-AB.NIS-0001(Q), Nuclear Instrumentation System Malfunctions.

References: Dwg. 218914

ALARM	15
E-15	PR HI RNG FLUX HI

DEVICES: 2NC41R, 2NC42R, 2NC43R, 2NC44R

SETPOINT: ≥109%

1.0 **CAUSE(S)**:

PR High Range Channel at ≥109%

2.0 **AUTOMATIC ACTIONS**:

NOTE

2-out-of-4 PR High Flux Channel Trips will initiate Reactor Trip.

♦ None

3.0 **OPERATOR ACTIONS**:

3.1 IF a Reactor Trip Occurs,
THEN **GO TO** 2-EOP-TRIP-1, Reactor Trip or Safety Injection.

3.2 IF the alarm is due to a Control Rod Misalignment,
OR two or more channels are ≥109%,
AND a Reactor Trip has not occurred,
THEN:

A. Manually **TRIP** the Reactor.

B. **GO TO** 2-EOP-TRIP-1, Reactor Trip or Safety Injection.

3.3 IF the alarm is due to testing or maintenance,
THEN no further action is required.

3.4 IF the alarm is due to an instrument malfunction,
THEN **GO TO** S2.OP-AB.NIS-0001(Q), Nuclear Instrumentation System Malfunctions.

References: Dwg. 221052

ALARM	16
E-16	ROD INSERT LMT LO-LO ●

DEVICES: 2DC412B, 2DC422B, 2DC432B, 2DC442B

SETPOINT: At Rod Insertion Limit

1.0 **CAUSE(S)**:

One or more Control Rod Banks (A, B, C, or D), at insertion limit

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 **DETERMINE** the affected Rod Bank from Annunciator CRT:

CRT Point	Description	Rod Bank
506	Rod Insertion Limit Low-Low (412)	Bank A
507	Rod Insertion Limit Low-Low (422)	Bank B
508	Rod Insertion Limit Low-Low (432)	Bank C
509	Rod Insertion Limit Low-Low (442)	Bank D

3.2 **ENSURE** that all Rods of affected Bank are within ±12 steps of Group Demand Counter.

3.3 IF a Reactor Startup is in progress and the alarm is expected,
THEN no further action is required.

3.4 IF alarm is due to surveillance testing pursuant to Technical Specification 4.1.3.1.2 IAW S2.OP-ST.RCS-0001(Q), Reactivity Control System - Rod Control Assemblies,
THEN no further action is required.

3.5 **COMMENCE** Emergency Boration IAW S2.OP-SO.CVC-0008(Q), Rapid Boration.

(continued)

3.6 IF the cause of the alarm is a dropped rod,
THEN **GO TO** S2.OP-AB.ROD-0002(Q), Dropped Rod.

3.7 IF the cause of the alarm is a misaligned rod,
THEN **GO TO** S2.OP-AB.ROD-0001(Q), Immovable/Misaligned Control Rods.

NOTE

The alarm will reset when the affected rods are withdrawn at least 2 steps above the Rod Insertion Limit.

3.8 IF the alarm is due to the Rod Insertion Limit Monitor or OHA being inoperable,
THEN **VERIFY** individual Control Rod Positions every 4 hours
IAW S2.OP-DL.ZZ-0003(Q), Control Room Readings - Modes 1-4 (T/S 4.1.3.5).

3.9 **REFER** to Technical Specifications 3.1.1.1 (Modes 1-4) and 3.1.3.5 (Modes 1-2).

References: Dwg. 220091

ALARM	17
E-17	BA BATCH TK LVL LO

DEVICES: 2LIC-101

SETPOINT: ≤22%

1.0 **CAUSE(S)**:

Boric Acid Batching Tank Level ≤22%

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 IF the alarm is due to a Boric Acid Batch Transfer,
THEN **ENSURE** the alarm clears when the transfer is complete.

3.2 IF the alarm is unexpected,
THEN **SEND** an Operator to determine and correct the cause of the alarm.

References: Dwg. 218851

ALARM	18
E-18	POPS CH I AUX AIR PRESS LO

DEVICES: 2PD-9862

SETPOINT: ≤90 psig

1.0 **CAUSE(S)**:

Low air pressure on POPS Ch I Air Accumulator (2PR1)

2.0 **AUTOMATIC ACTIONS**:

NOTE

This alarm indicates that a problem exists in the air supply for 2PR1, and allows time for corrective action.

The PORV Air System operates as follows:

1) Redundant Air Supply Panel is designed to transfer Control Air supply to the alternate header at ≈ 82 psig.

2) If CA Supply pressure at the PORV drops to 85 psig, the Accumulator outlet solenoid will open and the Accumulators will begin to supply 2PR1. At this time, the Accumulators should still be charged to ≈ 120 psig.

3) As 2PR1 is cycled, the Accumulators begin to depressurize and, at 90 psig, cause this alarm. If the CA header repressurizes to ≥90 psig, the system will transfer back to the CA Header.

Based on calculations S-C-CA-MDC-1169 and S-C-CA-MEE-0433-01:

1) A minimum initial accumulator pressure of 88 psig is needed to stroke the PORVs 100 cycles at LTOP condition (RCS temperature less than or equal to 312°F). For inadvertent SI at power, the PORVs accumulators capacity provides for 220 strokes of the PORVs.

2) A minimum air pressure of 77 psig is required to open a PORV under full flow conditions and 85 psig under static flow conditions.

♦ None

(Continued)

3.0 **OPERATOR ACTIONS**:

3.1 IF the Control Air Header "A" or "B" pressure drops to ≤88 psig,
THEN manually **START** the Emergency Control Air Compressor.

3.2 IF a loss of Control Air is indicated,
THEN **GO TO** S2.OP-AB.CA-0001(Q), Loss of Control Air.

3.3 IF a Containment entry is possible,
THEN:

A. **CHECK** for air system leaks.

B. **CHECK** for proper operation of Redundant Air Supply Panel 700-2AB.

C. **PERFORM** the valve lineup on the Accumulator air supply.

3.4 **INITIATE** SAP Notification to determine and correct the cause of the alarm.

3.5 **REFER** to Technical Specifications.

References: Dwg. 244083 / 205347

ALARM	19
E-19	POPS CH II AUX AIR PRESS LO

DEVICES: 2PD-9863

SETPOINT: ≤90 psig

1.0 **CAUSE(S)**:

Low air pressure on POPS Ch II Air Accumulator (2PR2)

2.0 **AUTOMATIC ACTIONS**:

NOTE

This alarm indicates that a problem exists in the air supply for 2PR2, and allows time for corrective action.

The PORV Air System operates as follows:

1) Redundant Air Supply Panel is designed to transfer Control Air supply to the alternate header at ≈ 82 psig.

2) If CA Supply pressure at the PORV drops to 85 psig, the Accumulator outlet solenoid will open and the Accumulators will begin to supply 2PR2. At this time, the Accumulators should still be charged to ≈ 120 psig.

3) As 2PR2 is cycled, the Accumulators begin to depressurize and, at 90 psig, cause this alarm. If the CA header repressurizes to ≥90 psig, the system will transfer back to the CA Header.

Based on calculations S-C-CA-MDC-1169 and S-C-CA-MEE-0433-01:

1) A minimum initial accumulator pressure of 88 psig is needed to stroke the PORVs 100 cycles at LTOP condition (RCS temperature less than or equal to 312°F). For inadvertent SI at power, the PORVs accumulators capacity provides for 220 strokes of the PORVs.

2) A minimum air pressure of 77 psig is required to open a PORV under full flow conditions and 85 psig under static flow conditions.

♦ None

(Continued)

3.0 **OPERATOR ACTIONS**:

3.1 IF the Control Air Header "A" or "B" pressure drops to ≤88 psig,
THEN manually **START** the Emergency Control Air Compressor.

3.2 IF a loss of Control Air is indicated,
THEN **GO TO** S2.OP-AB.CA-0001(Q), Loss of Control Air.

3.3 IF a Containment entry is possible,
THEN:

A. **CHECK** for air system leaks.

B. **CHECK** for proper operation of Redundant Air Supply Panel 700-2AC.

C. **PERFORM** the valve lineup on the Accumulator air supply.

3.4 **INITIATE** SAP Notification to determine and correct the cause of the alarm.

3.5 **REFER** to Technical Specifications.

References: Dwg. 244085 / 205347

ALARM **E-20**	20 PZR HTR ON LVL HI

DEVICES: 2LC459-EX

SETPOINT: Computer generated 5% above program

1.0 **CAUSE(S)**:

Pzr level ≥5% above program

2.0 **AUTOMATIC ACTIONS**:

Backup Heaters will energize (if in auto).

3.0 **OPERATOR ACTIONS**:

3.1 IF alarm is expected,
THEN no further action is required.

3.2 **CONFIRM** pressurizer level is ≥5% above program as shown on Figure 1E-20.

3.3 IF an instrument failure exists,
THEN:

A. **SELECT** an operable channel for Control and Alarm.

B. **REFER** to Technical Specifications.

C. **REMOVE** the inoperable channel from service IAW S2.OP-SO.RPS-0003(Q), Placing Pressurizer Channel in Tripped Condition.

D. **REFER** to S2.OP-AB.CVC-0001(Q), Loss of Charging, for applicability.

3.4 IF pressurizer level is above the program value,
THEN:

A. **REDUCE** charging OR **INCREASE** letdown IAW S2.OP-SO.CVC-0001(Q), Charging, Letdown and Seal Injection, to restore pressurizer level to program value of Figure 1E-20.

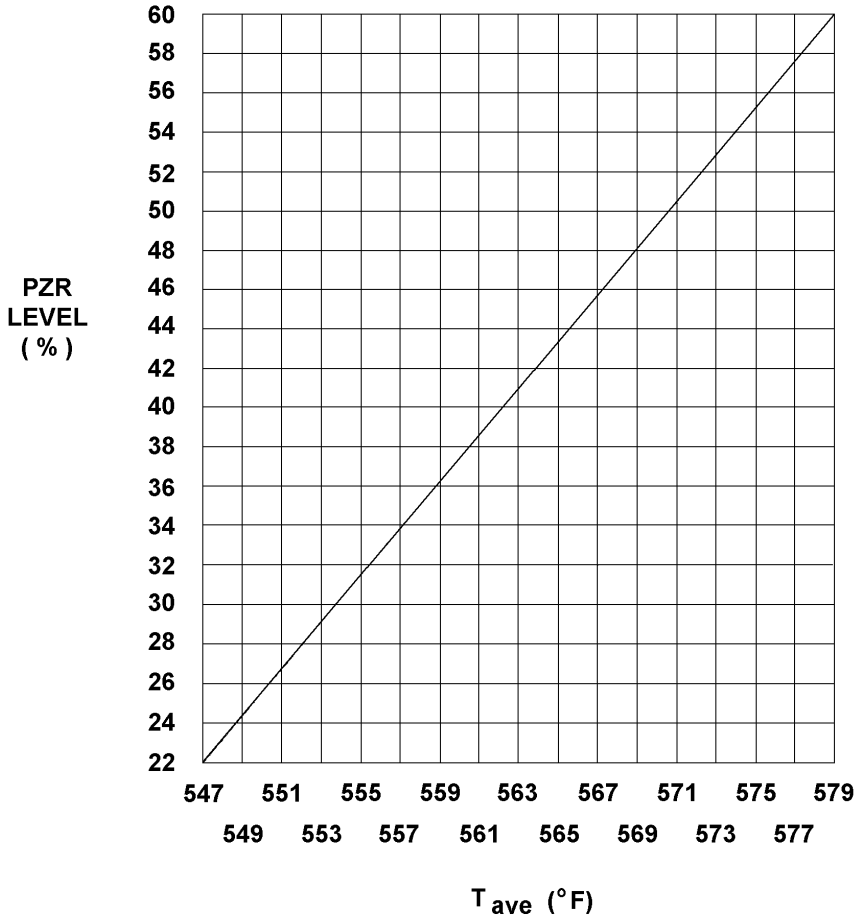
B. **MATCH** T_{AVE} to T_{REF}.

(continued)

3.4 (continued)

C. IF normal letdown cannot be placed in service,
THEN **PLACE** Excess Letdown in service
IAW S2.OP-SO.CVC-0003(Q), Excess Letdown Flow.

Figure 1E-20



References: Dwg. 203347

ALARM	21
E-21	SR HI FLUX AT S/D BLOCKED

DEVICES: 2PC-505CX

SETPOINT: ≤15% Power (P-2)

1.0 **CAUSE(S)**:

The SR channel "High Flux at Shutdown" switch is in the BLOCK position when below P-2 (15%).

2.0 **AUTOMATIC ACTIONS**:

NOTE

The alarm should clear when Reactor Power is ≥15% (P-2).

♦ None

3.0 **OPERATOR ACTIONS**:

3.1 IF the alarm is due to testing or normal plant evolutions,
THEN no further action is required.

3.2 **POSITION** the High Flux at Shutdown switch as required by the applicable IOP.

3.3 IF the alarm is invalid,
THEN **INITIATE** SAP Notification to determine and correct the cause of the alarm.

References: Dwg. 218914

ALARM	22
E-22	IR N36 COMPEN VOLT LOSS

DEVICES: N/A

SETPOINT: N/A

1.0 **CAUSE(S)**:

Loss of Compensating voltage on Intermediate Range Channel N36

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 IF the alarm is due to testing or maintenance,
THEN no further action is required.

3.2 **GO TO** S2.OP-AB.NIS-0001(Q), Nuclear Instrumentation System Malfunctions.

References: Dwg. 218914

ALARM	23
E-23	PR LO RNG FLUX HI

DEVICES: 2NC41P, 2NC42P, 2NC43P, 2NC44P

SETPOINT: ≥25%

1.0 **CAUSE(S)**:

Any PR Channel is ≥25% with:

- Power <P-10 (10% power).

  OR

- Power is >P-10 and the circuit is not manually blocked.

2.0 **AUTOMATIC ACTIONS**:

NOTE

2-out-of-4 Low Range High Flux Trips will initiate Reactor Trip.

- None

3.0 **OPERATOR ACTIONS**:

3.1 IF a Reactor Trip has occurred,
THEN **GO TO** 2-EOP-TRIP-1, Reactor Trip or Safety Injection.

3.2 IF two channels are ≥25% and the circuit is not blocked,
THEN:

A. Manually **TRIP** the Reactor.

B. **GO TO** 2-EOP-TRIP-1, Reactor Trip or Safety Injection.

(continued)

3.3 IF the Low Range Flux trips should be blocked,
AND only one channel is ≥25%,
THEN:

A. **REDUCE** power to less than 25%.

B. **BLOCK** the trips IAW applicable IOP.

3.4 IF the alarm is due to testing or maintenance,
THEN no further action is required.

3.5 IF the alarm is due to a Rod Control System Malfunction,
THEN **GO TO** the applicable procedure:

- S2.OP-AB.ROD-0001(Q), Immovable/Misaligned Control Rods
- S2.OP-AB.ROD-0002(Q), Dropped Rod
- S2.OP-AB.ROD-0003(Q), Continuous Rod Motion

3.6 IF the alarm is due to an instrument malfunction,
THEN **GO TO** S2.OP-AB.NIS-0001(Q), Nuclear Instrumentation System Malfunctions.

References: Dwg. 221052

ALARM	24
E-24	ROD DEV OR SEQ

DEVICES: Plant Computer generated

SETPOINT:	Rod Deviation:	≥±12 steps from Bank Demand when Tcold ≥350°F and >85% RTP. ≥±18 steps from Bank Demand when Tcold ≥350°F and ≤85% RTP. ≥±24 steps from Bank Demand when Tcold <350°F ≥±24 steps from Bank Demand anytime Rods are in motion.
	Rod Sequence:	≥1 step from fully withdrawn for any Shutdown Rod Out-of-Sequence

1.0 **CAUSE(S)**:

1.1 Any deviation between an individual rod and its bank demand by:

A. ≥±12 steps when Tcold is ≥350°F AND Rods are not in motion.

B. ≥±24 steps when Tcold is <350°F.

C. ≥±24 steps when Rods are in motion.

1.2 Any Shutdown Rod Off Top (not fully withdrawn)

1.3 Any Rod Bank Withdrawal Out-of-Sequence.

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 IF Tcold is ≥350°F,
AND Rods are not in motion,
THEN

A. IF Rated Thermal Power is >85%,
THEN **ENSURE** all Rods are within ±12 steps of the Group Demand Counter within one hour after rod motion.

(continued)

3.1 (continued)

B. IF Rated Thermal Power is ≤85%,
THEN **ENSURE** all Rods are within ±18 steps of the Group Demand Counter within one hour after rod motion.

C. **PERFORM** the following every 4 hours IAW S2.OP-DL.ZZ-0003(Q), Control Room Log - Modes 1-4, until the alarm is clear.

1. **VERIFY** Group Positions IAW T/S 4.1.3.1.1.

2. **COMPARE** the Demand Position Indication and the Rod Position Indication IAW T/S 4.1.3.2.1.1.

3.2 IF Tcold is <350°F,
THEN **ENSURE** all Rods are within ±24 steps of the Group Demand Counter within one hour after rod motion.

3.3 IF Rods are in motion,
THEN **ENSURE** all Rods are within ±24 steps of the Group Demand Counter within one hour after rod motion.

3.4 IF the alarm is due to the Rod Deviation Monitor or OHA being inoperable,
THEN **PERFORM** the following every 4 hours IAW S2.OP-DL.ZZ-0003(Q), Control Room Readings - Modes 1-4.

A. **VERIFY** Group Positions IAW T/S 4.1.3.1.1.

B. **COMPARE** the Demand Position Indication and the Rod Position Indication IAW T/S 4.1.3.2.1.1.

3.5 **ENSURE** proper Rod Withdrawal Sequence.

3.6 IF the cause of the alarm is a dropped rod,
THEN **GO TO** S2.OP-AB.ROD-0002(Q), Dropped Rod.

3.7 IF the cause of the alarm is not a dropped rod,
AND Rod Deviation is outside the allowed value for current plant conditions
THEN **GO TO** S2.OP-AB.ROD-0001(Q), Immovable/Misaligned Control Rods.

References: Dwg. 203494

ALARM	25
E-25	BA BATCH TK TEMP HI OR LO

DEVICES: 2TIC-100

SETPOINT: Hi: ≥165°F
Lo: ≤125°F

1.0 **CAUSE(S)**:

Boric Acid Batching Tank Temperature is ≥165°F or ≤125°F

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 IF the alarm is due to a Boric Acid Tank transfer,
THEN no further action is required.

3.2 IF the alarm is unexpected,
THEN **SEND** an Operator to investigate.

3.3 **INITIATE** SAP Notification to correct the cause of the alarm.

References: Dwg. 218851

ALARM	26
E-26	2PR1 NOT FULL CLSD

DEVICES: N/A

SETPOINT: N/A

1.0 **CAUSE(S)**:

2PR1, PZR PWR OP RELIEF V, is not fully closed.

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 IF a Reactor Coolant System high pressure condition exists,
THEN **GO TO** S2.OP-AB.PZR-0001(Q), Pressurizer Pressure Malfunction.

3.2 IF the Reactor Coolant System pressure is normal and 2PR1 is leaking, (high tailpipe temperature, PRT level and temperature increasing),
THEN:

A. **CLOSE** 2PR6, PZR PWR OP RELIEF STOP V.

B. **REFER** to Technical Specifications.

3.3 IF the Reactor Coolant System pressure is normal,
AND 2PR1 is not leaking,
THEN **INITIATE** S2.OP-ST.RC-0008(Q), Reactor Coolant System Water Inventory Balance.

3.4 **INITIATE** SAP Notification to determine and correct cause of alarm.

References: Dwg. 244083

ALARM	27
E-27	2PR2 NOT FULL CLSD

DEVICES: N/A

SETPOINT: N/A

1.0 **CAUSE(S)**:

2PR2, PZR PWR OP RELIEF V, is not fully closed.

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 IF a Reactor Coolant System high pressure condition exists,
THEN **GO TO** S2.OP-AB.PZR-0001(Q), Pressurizer Pressure Malfunction.

3.2 IF the Reactor Coolant System pressure is normal and 2PR2 is leaking (high tailpipe temperature, PRT level and temperature increasing),
THEN:

A. **CLOSE** 2PR7, PZR PWR OP RELIEF STOP V.

B. **REFER** to Technical Specifications.

3.3 IF the Reactor Coolant System pressure is normal,
AND 2PR2 is not leaking,
THEN **INITIATE** S2.OP-ST.RC-0008(Q), Reactor Coolant System Water Inventory Balance.

3.4 **INITIATE** SAP Notification to determine and correct the cause of the alarm.

References: Dwg. 244085

ALARM	28
E-28	PZR HTR ON PRESS LO

DEVICES: 2PC-455IX

SETPOINT: <9% MASTER PRESSURE CONTROL (PI-455D) OUTPUT (approximately 2210 psig compensated pressure)

1.0 **CAUSE(S)**:

Pzr Pressure Control Channel is ≤2210 psig

2.0 **AUTOMATIC ACTIONS**:

Pzr Backup Heaters will energize (if in Auto).

3.0 **OPERATOR ACTIONS**:

3.1 IF the alarm is due to testing or maintenance,
THEN no further action is required.

3.2 IF the alarm is expected due to plant evolutions,
THEN **ENSURE** pressure returns to normal,
AND no further action is required.

3.3 IF there is evidence of RCS leakage, (decreasing Pzr or VCT level),
THEN **GO TO** S2.OP-AB.RC-0001(Q), Reactor Coolant System Leak.

3.4 **GO TO** S2.OP-AB.PZR-0001(Q), Pressurizer Pressure Malfunction.

References: Dwg. 203347

ALARM	29
E-29	SR & IR TRIP BYP ●

DEVICES: N/A

SETPOINT: N/A

1.0 **CAUSE(S)**:

One or more Channel Bypass switches in BYPASS (2/N31B, 2/N32B, 2/N35A, or 2/N36A)

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 **DETERMINE** the affected NI Channel from Annunciator CRT:

CRT Point	Description
389	NIS Ch N31B Source Range Trip Bypass
390	NIS Ch N32B Source Range Trip Bypass
391	NIS Ch N35A Intermediate Range Trip Bypass
392	NIS Ch N36A Intermediate Range Trip Bypass

3.2 IF the alarm is due to testing or removing a channel from service,
THEN no further action is required.

3.3 IF the alarm is unexpected,
THEN **INITIATE** SAP Notification to determine and correct the cause of the alarm.

3.4 **REFER** to Technical Specifications.

References: Dwg. 221052

ALARM	30
E-30	IR HI FLUX ROD WDRWL STOP

DEVICES: 2NC35EX, 2NC36EX

SETPOINT: ≥20% Power

1.0 **CAUSE(S)**:

Any Intermediate Range Channel is ≥20% with the IR Rod Withdrawal Stop not blocked.

2.0 **AUTOMATIC ACTIONS**:

NOTE

- The Rod Withdrawal Stop is manually blocked when Reactor Power is above P-10, and is automatically reinstated when Reactor Power falls below P-10.
- If an Intermediate Range channel reaches 25% before the Rod Withdrawal Stop is blocked, a Reactor Trip will occur.

Automatic or Manual Rod Withdrawal is prevented.

3.0 **OPERATOR ACTIONS**:

3.1 IF a Reactor Trip occurs,
THEN **GO TO** 2-EOP-TRIP-1, Reactor Trip or Safety Injection.

3.2 **REDUCE** power to ≤20% Power.

3.3 IF the alarm is due to testing,
THEN no further action is required.

3.4 IF there are indications of a malfunctioning IR channel,
THEN **GO TO** S2.OP-AB.NIS-0001(Q), Nuclear Instrumentation System Malfunctions.

References: Dwg. 218913

ALARM	31
E-31	PR OVRPWR ROD STOP

DEVICES: 2NC41LX, 2NC42LX, 2NC43LX, 2NC44LX

SETPOINT: ≥103%

1.0 **CAUSE(S)**:

Any Power Range Channel is ≥103%

2.0 **AUTOMATIC ACTIONS**:

Automatic or Manual Rod Withdrawal is blocked.

3.0 **OPERATOR ACTIONS**:

3.1 IF a Reactor Trip occurs,
THEN **GO TO** 2-EOP-TRIP-1, Reactor Trip or Safety Injection.

3.2 **REDUCE** power to ≤100% Power.

3.3 IF the alarm is due to testing,
THEN no further action is required.

3.4 IF there are indications of a malfunctioning PR channel,
THEN **GO TO** S2.OP-AB.NIS-0001(Q), Nuclear Instrumentation System Malfunctions.

3.5 IF the alarm is due to Rod Control System Malfunction,
THEN **GO TO**:

- ♦ S2.OP-AB.ROD-0001(Q), Immovable/Misaligned Control Rods
- ♦ S2.OP-AB.ROD-0002(Q), Dropped Rod
- ♦ S2.OP-AB.ROD-0003(Q), Continuous Rod Motion

3.6 IF power increases due to a Steam Leak,
THEN **GO TO** S2.OP-AB.STM-0001(Q), Excessive Steam Flow.

References: Dwg. 218913

ALARM	32
E-32	ROD DRIVE PWR SPLY GND FAULT

DEVICES: N/A

SETPOINT: N/A

1.0 **CAUSE(S)**:

A Ground Fault on 21 or 22 Rod Drive Generator

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 IF AT ANY TIME, a Reactor trip occurs,
THEN **GO TO** 2-EOP-TRIP-1, Reactor Trip or Safety Injection.

3.2 **ATTEMPT** to reset the Ground Detection Relay on the face of #21 MG Set Control Panel by pressing the GND ALARM RESET Push Button.

NOTE

There is one Ground Detection relay for both MG sets. It monitors the common neutral the MG sets share. If both MG sets are in operation, they must be removed from service one at a time to determine which MG is affected.

(continued)

3.3 IF the ground does not clear,
THEN: at the direction of the SM/CRS,

A. **REMOVE** 21 Rod Drive Generator from service
IAW S2.OP-SO.RCS-0001(Q), Rod Control System Operation.

B. **ATTEMPT** to reset the Ground Detection Relay on the face of #21 MG Set Control Panel by pressing the GND ALARM RESET Push Button.

3.4 IF the ground does not clear,
THEN, at the direction of the SM/CRS:

A. **RETURN** 21 Rod Drive Generator to service
IAW S2.OP-SO.RCS-0001(Q), Rod Control System Operation.

B. **REMOVE** 22 Rod Drive Generator from service
IAW S2.OP-SO.RCS-0001(Q), Rod Control System Operation.

C. **ATTEMPT** to reset the ground Detection Relay on the face of
21 MG Set Control Panel by pressing the GND ALARM RESET Push Button.

3.5 **INITIATE** SAP Notification to determine and correct the cause of the alarm.

References: Dwg. 228452 / 228459

ALARM	33
E-33	

DEVICES:

SETPOINT:

SPARE

References: Dwg.

ALARM	34
E-34	2PR1 CHANNEL UNSAFE

DEVICES: 2BS-455E, 2BS457E, 2CT-455, 2CT-457

SETPOINT: N/A

1.0 **CAUSE(S)**:

1.1 Bistable Test Switch 2BS-455E or 2BS-457E in TEST.

1.2 Channel Test Switch 2CT-455 or 2CT-457 in TEST.

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

IF Unit is in Modes 1 - 3,
THEN:

3.1 **REFER** to Technical Specification 3.4.5.

3.2 **DIRECT** Maintenance to ensure the following:

A. Both 2BS-455E AND 2BS-457E are aligned to NORMAL.

B. Both 2CT-455 AND 2CT-457 are aligned to NORMAL.

References: Dwg. 220066, 244083

ALARM	35
E-35	2PR2 CHANNEL UNSAFE

DEVICES: 2BS-456E, 2BS-474B, 2CT-456, 2CT-474

SETPOINT: N/A

1.0 **CAUSE(S)**:

1.1 Test Switch 2BS-456E or 2BS-474B in TEST.

1.2 Channel Test Switch 2CT-456 or 2CT-474 in TEST.

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

IF Unit is in Modes 1 - 3,
THEN:

3.1 **REFER** to Technical Specification 3.4.5.

3.2 **DIRECT** Maintenance to ensure the following:

A. Both 2BS-456E AND 2BS-474E are aligned to NORMAL.

B. Both 2CT-456 AND 2CT-474 are aligned to NORMAL.

References: Dwg. 220068, 244085

ALARM	36
E-36	PZR HTR OFF LVL LO

DEVICES: 2LC459C, 2LC460C

SETPOINT: ≤17% level

1.0 **CAUSE**:

Either Pressurizer Level Channel (Control or Alarm) ≤17%

2.0 **AUTOMATIC ACTIONS**:

2.1 Deenergizes Pressurizer Heaters.

2.2 Isolates Letdown: (2CV3, 2CV4, and 2CV5 close)
(2CV2 closes from Control Channel signal)
(2CV277 closes from Alarm Channel signal)

3.0 **OPERATOR ACTIONS**:

3.1 **VERIFY** actual Pressurizer level.

3.2 **ISOLATE** Letdown AND **DEENERGIZE** Pressurizer Heaters.

3.3 IF a loss of Charging capability has occurred,
THEN **INITIATE** S2.OP-AB.CVC-0001(Q), Loss of Charging.

3.4 IF a single instrument failure has occurred,
THEN **INITIATE** S2.OP-AB.CVC-0001(Q), Loss of Charging, for applicability.

(continued)

3.5 IF actual Pressurizer level is ≤17%,
THEN:

A. **TAKE** Charging to manual
AND **INCREASE** charging to restore pressurizer level to >17%.

B. IF there is indication of an RCS Leak,
THEN **GO TO** S2.OP-AB.RC-0001(Q), RCS Leak.

C. When Pressurizer level is >17%:

1. **PLACE** Pressurizer Heaters in service as required.

2. **ESTABLISH** Letdown IAW S2.OP-SO.CVC-0001(Q), Charging, Letdown, and Seal Injection.

D. **RESTORE** Pressurizer level to program band per Figure on next page.

E. When Pressurizer level is restored to program,
RETURN Charging to automatic or as directed by SM/CRS.

3.6 **REFER** to Technical Specifications.

References: Dwg. 203347 / 221060

ALARM	37
E-37	CH C SDM DECRNG

DEVICES: 2XA-6562

SETPOINT: Variable

1.0 **CAUSE(S)**:

Increasing count rate on Source Range Channel C (Gamma Metrics)

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 IF the alarm occurs during Reactor Startup or Core Reload,
AND the alarm is expected,
THEN **PRESS** the ALARM SETPOINT RESET pushbutton for Channel C on 2RP1.

3.2 IF counts are elevated on both Source Range Channel C and D,
THEN:

A. **NOTIFY** the personnel in Containment of an increase in counts.

B. **PERFORM** a Shutdown Margin Calculation to ensure minimum SDM requirements are met.

C. **REQUEST** that Chemistry analyze RCS Boron concentration.

D. **EVALUATE** the need for immediate boration,
AND **NOTIFY** SM/CRS.

3.3 IF an instrument failure is suspected,
THEN **INITIATE** SAP Notification to determine and correct the cause of alarm.

3.4 **REFER** to Technical Specifications.

References: Dwg. 601649 / PSBP 304198

ALARM	38
E-38	UPPER SECT DEV ABV 50% PWR

DEVICES: 2NC50B

SETPOINT: Upper Section QPTR ≥1.02

1.0 **CAUSE(S)**:

Upper Section QPTR is ≥1.02, (2% deviation), with Reactor Power above 50%

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 IF the alarm is due to testing or maintenance,
THEN no further action is required.

3.2 IF there are indications of a Power Range Channel malfunction,
THEN **GO TO** S2.OP-AB.NIS-0001(Q), Nuclear Instrumentation System Malfunctions.

3.3 IF there are indications of a Rod Control System Malfunction,
THEN **GO TO**:

- ♦ S2.OP-AB.ROD-0001(Q), Immovable/Misaligned Control Rods.
- ♦ S2.OP-AB.ROD-0002(Q), Dropped Rod.

3.4 **PERFORM** a Quadrant Power Tilt Ratio Calculation
IAW S2.OP-ST.NIS-0002(Q), Power Distribution - Quadrant Power Tilt Ratio.

3.5 **REFER** to Technical Specifications.

3.6 **NOTIFY** Reactor Engineering of the alarm and the results of the QPTR calculation.

References: Dwg. 220459

ALARM	39
E-39	PR CH DEV

DEVICES: 2NC46BX

SETPOINT: ≥±5% Deviation

1.0 **CAUSE(S)**:

≥±5% Deviation between two Power Range NI Channels

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 IF the alarm is due to testing or maintenance,
THEN no further action is required.

3.2 IF the alarm due to an instrument malfunction,
THEN **GO TO** S2.OP-AB.NIS-0001(Q), Nuclear Instrumentation System Malfunctions.

3.3 IF the alarm is due to a Rod Control System Malfunction,
THEN **GO TO**:

- S2.OP-AB.ROD-0001(Q), Immovable/Misaligned Control Rods.
- S2.OP-AB.ROD-0002(Q), Dropped Rod.
- S2.OP-AB.ROD-0003(Q), Continuous Rod Motion.

3.4 **INITIATE** SAP Notification to determine and correct the cause of the alarm.

References: Dwg. 220460 / 218914

ALARM	40
E-40	ROD BANK URGENT FAIL

DEVICES: N/A

SETPOINT: N/A

1.0 **CAUSE(S)**:

Any:

- Power Cabinet - Regulation failure, Phase failure, Logic failure, Multiplex failure, or Loose circuit card
- Logic Cabinet - Pulser failure, Slave Cycler Input failure, or Loose circuit card

2.0 **AUTOMATIC ACTIONS**:

All Rod Motion in Manual or Automatic is inhibited.

3.0 **OPERATOR ACTIONS**:

CAUTION

Rod motion should not be attempted due to the possibility of dropping rods.

NOTE

At the discretion of the SM/CRS, Maintenance should be contacted to collect as found data from the control rod logic and power cabinets prior to removing power from the cabinets. When the Reactor Trip Breakers are opened, power to the rod control cabinets is removed and solid state indicator lights will extinguish. Not having this as found data will make it very difficult to identify the problem that caused the alarm.

- **GO TO** S2.OP-AB.ROD-0001(Q), Immovable/Misaligned Control Rods.

References: Dwg. 223159

ALARM	41
E-41	LTDWN HX OUT TEMP HI

DEVICES: 2TC-130C

SETPOINT: ≥136°F

1.0 **CAUSE(S)**:

Letdown Heat Exchanger outlet temperature is ≥136°F

2.0 **AUTOMATIC ACTIONS**:

2CV21 will divert coolant directly to VCT.

3.0 **OPERATOR ACTIONS**:

3.1 IF 2CC71 is not controlling Letdown temperature at approximately 100°F, THEN **PLACE** 2CC71 in manual AND ADJUST Letdown temperature to ≈100°F.

NOTE

2CC71 fails closed on loss of power.

3.2 **VERIFY** 2CV21 indicates Mixed Bed diversion to VCT at 2CC2.

3.3 IF 2CC71 is closed, THEN:

A. **CHECK** status of breaker 2ADC2AX7 (2CC113, 2CC215, & 2CC71 LETDOWN DISCHARGE VALVES; located in 2AADC 125VDC Distribution Cabinet).

B. IF 2ADC2AX7 is tripped, THEN **REFER TO** SC.OP-DD.ZZ-0006(Z), Protective Circuit/Breaker Reset and Reclosure Policy.

3.4 IF 2CV18 is not controlling Letdown pressure at approximately 300 psig, THEN **PLACE** valve in manual AND **ADJUST** Letdown pressure to ≈300 psig.

(continued)

3.5 IF Letdown temperature or pressure cannot be controlled,
THEN:

A. **ISOLATE** Normal Letdown as follows:

1. **CLOSE** following LTDWN ORIFICE ISOL Valves, as required:

- ♦ 2CV3, 45 GPM ORIFICE.
- ♦ 2CV4, 75 GPM ORIFICE.
- ♦ 2CV5, 75 GPM ORIFICE.

2. **CLOSE** 2CV2, LTDWN LINE ISOL V.

3. **CLOSE** 2CV277, LTDWN LINE ISOL V.

4. **CLOSE** 2CV7, LTDWN HX INLET V.

B. **PLACE** Excess Letdown in service IAW S2.OP-SO.CVC-0003(Q), Excess Letdown Flow.

C. IF reduced charging flow is required for PZR level control,
THEN:

1. IF a Centrifugal Charging Pump is in service.
THEN **PLACE** 2CA2015, CONTROL AIR SUPPLY TO CV55 BYPASS VALVE, in BYPASS.

2. IF 23 Charging Pump is in service,
THEN:

a. **TRANSFER** to a Centrifugal Charging Pump IAW S2.OP-SO.CVC-0002(Q), Charging Pump Operation.

b. **ADJUST** position of linkage for 23 Charging Pump to a lower position.

c. **TRANSFER** to 23 Charging Pump IAW S2.OP-SO.CVC-0002(Q), Charging Pump Operation.

D. **NOTIFY** Chemistry that the demineralizer is being bypassed.

3.6 IF the alarm is due to CC System Malfunction,
THEN **GO TO** S2.OP-AB.CC-0001(Q), Component Cooling Abnormality.

3.7 IF the alarm is due to the loss of SW Header pressure,
THEN **GO TO** S2.OP-AB.SW-0001(Q), Loss of Service Water Header Pressure.

3.8 **INITIATE** SAP Notification to determine and correct the cause of the alarm.

References: Dwg. 211594

ALARM	42
E-42	2PR1 1/2 TRIP

DEVICES: 2PC-455A, 2PC-457A

SETPOINT: 2335 psig

1.0 **CAUSES**:

Pressurizer Pressure Channel I or Channel III ≥2335 psig.

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 IF a Reactor Trip occurs,
THEN **GO TO** 2-EOP-TRIP-1, Reactor Trip or Safety Injection.

3.2 **CONFIRM** alarm by observing Pressurizer pressure.

3.3 IF alarm is due to malfunction,
THEN **GO TO** S2.OP-AB.PZR-0001(Q), Pressurizer Pressure Malfunction.

References: Dwg. 244083

ALARM	43
E-43	2PR2 1/2 TRIP

DEVICES: 2PC-456A, 2PC-474A

SETPOINT: 2335 psig

1.0 **CAUSES**:

Pressurizer Pressure Channel II or Channel IV ≥2335psig.

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 IF a Reactor Trip occurs,
THEN **GO TO** 2-EOP-TRIP-1, Reactor Trip or Safety Injection.

3.2 **CONFIRM** alarm by observing Pressurizer pressure.

3.3 IF alarm is due to malfunction,
THEN **REFER** to Technical Specification 3.3.1.1.

References: Dwg. 244085

ALARM	44
E-44	PZR SFTY VLV 2PR3-2PR5 NOT CLSD

DEVICES: N/A

SETPOINT: N/A

1.0 **CAUSE(S)**:

One or more Pzr Code Safety Valves are not fully closed.

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 **CONFIRM** the alarm by observing individual tailpipe temperatures on 2CC2.

3.2 IF RCS pressure is normal and a Safety Valve leak is indicated,
THEN **GO TO** S2.OP-AB.RC-0001(Q), Reactor Coolant System Leak.

3.3 IF RCS pressure is excessive,
THEN:

A. Manually **TRIP** the reactor.

B. **GO TO** 2-EOP-TRIP-1, Reactor Trip or Safety Injection.

3.4 IF no Safety Valve leakage is indicated,
THEN **INITIATE** SAP Notification to determine and correct the cause of the alarm.

References: Dwg. 203464

ALARM	45
E-45	CH D SDM DECRNG

DEVICES: 2XA-6563

SETPOINT: Variable

1.0 **CAUSE(S)**:

Increasing count rate on Source Range Channel D (Gamma Metrics)

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 IF the alarm occurs during Reactor Startup or Core Reload,
AND the alarm is expected,
THEN **PRESS** the ALARM SETPOINT RESET pushbutton for Channel D on 2RP1.

3.2 IF counts are elevated on both Source Range Channel C and D,
THEN:

A. **NOTIFY** the personnel in Containment of an increase in counts.

B. **PERFORM** a Shutdown Margin Calculation to ensure minimum SDM requirements are met.

C. **REQUEST** that Chemistry analyze RCS Boron concentration.

D. **EVALUATE** the need for immediate boration,
AND **NOTIFY** SM/CRS.

3.3 IF an instrument failure is suspected,
THEN **INITIATE** SAP Notification to determine and correct the cause of the alarm.

3.4 **REFER** to Technical Specifications.

References: Dwg. 601649 / PSBP 304198

ALARM	46
E-46	LOWER SECT DEV ABV 50% PWR

DEVICES: 2NC50D

SETPOINT: Lower Section QPTR ≥1.02

1.0 **CAUSE(S)**:

Lower Section QPTR is ≥1.02, (2% deviation), with Reactor Power above 50%.

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 IF the alarm is due to testing or maintenance,
THEN no further action is required.

3.2 IF there are indications of a Power Range Channel malfunction,
THEN **GO TO** S2.OP-AB.NIS-0001(Q), Nuclear Instrumentation System Malfunctions.

3.3 IF there are indications of a Rod Control System Malfunction,
THEN **GO TO**:

- ♦ S2.OP-AB.ROD-0001(Q), Immovable/Misaligned Control Rods.
- ♦ S2.OP-AB.ROD-0002(Q), Dropped Rod.

3.4 **PERFORM** a Quadrant Power Tilt Ratio Calculation
IAW S2.OP-ST.NIS-0002(Q), Power Distribution - Quadrant Power Tilt Ratio.

3.5 **REFER** to Technical Specifications.

3.6 **NOTIFY** Reactor Engineering of the alarm and the results of the QPTR calculation.

References: Dwg. 220459

ALARM	47
E-47	PR NEUT FLUX RATE HI

DEVICES: Increasing: 2NC41U, 2NC42U, 2NC43U, 2NC44U
Decreasing: 2NC41K, 2NC42K, 2NC43K, 2NC44K

SETPOINT: Increasing: ≥+5% per 2 second change
Decreasing: Setpoint functionally defeated per DCP 80092664 / 80094424

1.0 **CAUSE(S)**:

≥+5% Change of Power in a 2 second period on any Power Range Channel

2.0 **AUTOMATIC ACTIONS**:

NOTE

2-of-4 High Flux Rates will trip reactor.

♦ None

3.0 **OPERATOR ACTIONS**:

NOTE

Hi Flux Rate Bistables must be reset at NIS Cabinets.

3.1 IF the alarm is due to testing,
THEN no further action is required.

3.2 IF a Reactor Trip occurs,
THEN **GO TO** 2-EOP-TRIP-1, Reactor Trip or Safety Injection.

3.3 IF the alarm is due to a malfunction in a Power Range channel,
THEN **GO TO** S2.OP-AB.NIS-0001(Q), Nuclear Instrumentation System Malfunctions.

3.4 IF there are indications of a Rod Control System Malfunction,
THEN **GO TO**:

♦ S2.OP-AB.ROD-0001(Q), Immovable/Misaligned Control Rods.

♦ S2.OP-AB.ROD-0002(Q), Dropped Rod.

References: Dwg. 221053

ALARM	48
E-48	ROD BOTTOM

DEVICES: Relays 57CR through 63CR in Rod Control Cabinets

SETPOINT:

Any Shutdown Bank Rod:	<20 Steps
Control Bank A Rod:	<20 Steps
Control Bank B-D Rod:	<20 steps (with Gp Demand >35 steps)

1.0 **CAUSE(S)**:

Any:

1.1 Shutdown Bank Rod: <20 Steps

1.2 Control Bank A Rod: <20 Steps

1.3 Control Bank B-D Rod: <20 steps with the respective Group Demand >35 steps

2.0 **AUTOMATIC ACTIONS**:

None

3.0 **OPERATOR ACTIONS**:

3.1 IF the alarm is due to testing or a normal plant evolution,
THEN no further action is required.

3.2 IF there are indications of a dropped rod,
THEN **GO TO** S2.OP-AB.ROD-0002(Q), Dropped Rod.

3.3 IF there are indications of an IRPI failure,
THEN **GO TO** S2.OP-AB.ROD-0004(Q), Rod Position Indication Failure.

References: Dwg. 226066

OVERHEAD ANNUNCIATORS WINDOW E

REFERENCES

1.0 **Plant Documents**:

1.1 Technical Specifications, Unit 2
1.2 Updated Final Safety Analysis Report

2.0 **Reference Drawings**:

2.1 203347, Pressurizer Heaters Schematic
2.2 203464, Pzr and PRT Valves & Temperatures
2.3 203494, Computer Wiring Diagram
2.4 205328, No. 2 Unit, Chemical & Volume Control Operation
2.5 211562, CVCS Schematic
2.6 211594, CVCS Schematic
2.7 218851, BA Batch Tank
2.8 218913, Rod Control Schematic
2.9 218914, Rod Control Schematic
2.10 220079, Pzr Overpressure Protection
2.11 220091, Rod Control Wiring Diagram
2.12 220459, PR Upper/Lower Section Deviation
2.13 220460, PR Deviation
2.14 221052, NI Trips/Alarms
2.15 221053, NI Trips/Alarms
2.16 221055, Pressurizer Pressure/Level Trips/Alarms
2.17 221060, Pressurizer Pressure/Level Trips/Alarms
2.18 223159, Rod Control System
2.19 224384, No.2 Unit Component Cooling System
2.20 226066, Rod Control System
2.21 228459, Rod Drive MG Sets
2.22 244082, Pzr Controls Schematic
2.23 244083, Pzr Controls Schematic
2.24 244084, Pzr Controls Schematic
2.25 244085, Pzr Controls Schematic
2.26 601649, Shutdown Monitor

3.0 **PSBPs**:

3.1 304209, Westinghouse Precautions, Limitations, and Setpoints.
3.2 304198, Gamma-Metrics Model RCS-30 Shutdown Monitor Instruction Manual.

4.0 **Other**:

4.1 DCP 2EC-3225, Boric Acid Concentration Reduction
4.2 DCP 2EC-3585, CCW Letdown Temperature Control Valve Modification
4.3 Calculations S-C-CA-MDC-1169 and S-C-CA-MEE-0433-01

5.0 **Cross References**:

5.1 2-EOP-TRIP-1, Reactor Trip or Safety Injection
5.2 SC.OP-DD.ZZ-0006(Z), Protective Circuit/Breaker Reset and Reclosure Policy
5.3 S2.OP-AB.CA-0001(Q), Loss of Control Air
5.4 S2.OP-AB.CC-0001(Q), Component Cooling Abnormality
5.5 S2.OP-AB.NIS-0001(Q), Nuclear Instrumentation System Malfunctions
5.6 S2.OP-AB.PZR-0001(Q), Pressurizer Pressure Malfunction
5.7 S2.OP-AB.RC-0001(Q), Reactor Coolant System Leak
5.8 S2.OP-AB.ROD-0001(Q), Immovable/Misaligned Control Rods
5.9 S2.OP-AB.ROD-0002(Q), Dropped Rod
5.10 S2.OP-AB.ROD-0003(Q), Continuous Rod Motion
5.11 S2.OP-AB.ROD-0004(Q), Rod Position Indication Failure
5.12 S2.OP-AB.STM-0001(Q), Excessive Steam Flow
5.13 S2.OP-AB.SW-0001(Q), Loss of Service Water Header Pressure
5.14 S2.OP-DL.ZZ-0003(Q), Control Room Readings - Modes 1-4
5.15 S2.OP-SO.CVC-0001(Q), Charging, Letdown, and Seal Injection Flow
5.16 S2.OP-SO.CVC-0003(Q), Excess Letdown Flow
5.17 S2.OP-SO-CVC-0006(Q), Boron Concentration Control
5.18 S2.OP-SO.CVC-0008(Q), Rapid Boration
5.19 S2.OP-SO.PZR-0004(Q), Pressurizer Overpressure Protection Operation
5.20 S2.OP-SO.RCS-0001(Q), Rod Control System Operation
5.21 S2.OP-SO.RPS-0003(Q), Placing Pressurizer Channel in Tripped Condition
5.22 S2.OP-ST.NIS-0002(Q), Power Distribution - Quadrant Power Tilt Ratio
5.23 S2.OP-ST.RC-0008(Q), Reactor Coolant System Water Inventory Balance
5.24 S2.OP-ST.RCS-0001(Q), Reactivity Control System - Rod Control Assemblies
5.25 S2.OP-DL.ZZ-0003(Q), Control Room Log - Modes 1-4