

**PSEG NUCLEAR L.L.C.
SALEM/OPERATIONS**

S1.OP-AB.ANN-0001(Q) REV. 24

LOSS OF OVERHEAD ANNUNCIATOR SYSTEM

-
- ◆ 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
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REVISION SUMMARY:

- ◆ Steps 3.14D & E, corrected Attachment 10, Section 1.0, step references. [70088954]
Typographical error correction.
- ◆ Steps 3.22D & E, corrected Attachment 10, Section 2.0, step references. [70088954]
Typographical error correction.

IMPLEMENTATION REQUIREMENTS

Effective Date: 12/12/08

None

LOSS OF OVERHEAD ANNUNCIATOR SYSTEM

1.0 ENTRY CONDITION

DATE: _____ TIME: _____

1.1 A partial or total loss of the Overhead Annunciator (OHA) System is suspected or occurs as recognized by the following:

- ◆ OHA System fault is detected by the Annunciator Verification System (AVS) Programmable Logic Controller (PLC), CRT Point 92
- ◆ AVS PLC Failure has occurred as indicated by CRT Point 565, AVS FAULT DETECTED - IMPLEMENT HEIGHTENED AWARENESS
- ◆ 1CC1 AVS ANNUN FAULT alarm pushbutton alarms or reflashes
- ◆ OHA(s) versus plant parameters NOT in alarm when expected
- ◆ OHA System P1 Port failed indication on CRT
- ◆ CRT time NOT updating
- ◆ Auxiliary Annunciator alarm received without associated OHA
- ◆ No OHA occurs during plant activities that normally initiates OHA
- ◆ Routine functional testing or maintenance identifies abnormality
- ◆ Primary (SER A) auto transfers to Backup (SER B)
- ◆ 1CC1 OVERHEAD ANNUN TRBL lamp is illuminated with no testing or maintenance in progress

2.0 IMMEDIATE ACTIONS

2.1 None

3.0 SUBSEQUENT ACTIONS

3.1 IF AT ANY TIME a transient occurs OR the plant becomes unstable, THEN with SM/CRS concurrence, **DETERMINE** need to TRIP the Reactor AND GO TO 1-EOP-TRIP-1, Reactor Trip or Safety Injection.

Time

___ 3.2 Has this procedure been entered due to 1CC1 AVS ANNUN FAULT alarm or reflash?

___ YES ___ NO ———> **GO TO Step 3.9**

 |

 V

Time

___ 3.3 Is OHA Window A-9 displayed?

___ NO ___ YES ———> **GO TO Step 3.9**

 |

 V

Time

___ 3.4 Is CRT Point No.92 displayed on the OHA CRT?

___ NO ___ YES ———> **GO TO Step 3.9**

 |

 V

Time

NOTE

At least one SER is to be verified functional within 15 minutes of the time of discovery
OR the OHA System is to be considered non-functional AND ECG EAL 8.2 then applies.

___ 3.5 **NOTIFY** the SM/CRS to refer to the following (SER A in-command is locked up):

- ___ ◆ ECG EAL 8.2, Loss Of Overhead Annunciators
(Applies when 15 minutes has elapsed since the loss of OHA)
- ___ ◆ T/S Surveillance Requirements 4.1.3.1.1 and 4.1.3.2.1.1 for inoperable
Rod Position Deviation Monitor (OHA E-24, ROD DEV OR SEQ)
- ___ ◆ T/S Surveillance Requirement 4.2.4 for inoperable QPTR alarms
(OHA E-38/46, UPPER/LOWER SECT DEV ABV 50% PWR)

___ 3.6 **PLACE** Betalog 4100 Sequential Events Recorder power supply toggle switches PS1, PS2, PS7, and PS8 in the OFF position (rear of cabinet 116-1).

___ 3.7 After ≈15 seconds, **PLACE** Betalog 4100 Sequential Events Recorder power supply toggle switches PS1, PS2, PS7, and PS8 in the ON position.

___ 3.8 IF SER in-command is still locked up, e.g.;
 ICC1 AVS ANNUN FAULT is still in alarm OR reflashed
 AND OHA A-9 is NOT displayed
 AND CRT Point No. 92 is NOT displayed on the OHA CRT
THEN GO TO Step 3.17. Time

___ 3.9 SM/CRS **EVALUATE** the following for impact until the OHA System is restored:

- ◆ In progress load changes (limited to <5%/hour)
- ◆ Plant Startups
- ◆ Boron concentration changes
- ◆ Surveillance tests in progress
- ◆ Radioactive releases in progress
- ◆ Event Classification Guide applicability

___ 3.10 Are the PRI LEDs (front of Cab 72-1) illuminated?
 (SER A is in command)

___ YES ___ NO ———> **GO TO** Step 3.15 Time
 |
 V

___ 3.11 **DETERMINE** status of AVS PLC 24 VDC OUTPUT MODULE LEDs
 (front of cabinet 124-1) as follows:

- ___ ◆ IF AVS PLC "140 DDO 353 00 24 VDC OUT" Module LED No.12 is illuminated,
THEN AVS is functioning.
- ___ ◆ IF AVS PLC "140 DDO 353 00 24 VDC OUT" Module LED No.12 is extinguished,
THEN REQUEST Maintenance to correct cause of AVS PLC failure.

NOTE

A satisfactory ANNUN TEST requires at least 3 scanners, the SER in-command and 2 peripherals to be functional. The functionality of the SER in-command is checked indirectly through the check of scanners(s) and peripheral(s) that functioned.

___ 3.12 **PERFORM** a ANNUN TEST to verify proper SER A operation as follows: **[CAPR 70045986]**

___ A. **VERIFY** at least 2 of the following 3 peripherals functioned:

- ___ ◆ OHA Window A-9 alarms or reflashes
- ___ ◆ OHA CRT displays at least 1 incoming logic alarm (reflash or clear).
- ___ ◆ OHA Local Printer (front of ANN-115-1) displays at least 1 incoming logic alarm.

___ B. IF <2 peripherals functioned,
THEN GO TO Step 3.14.

Time

___ C. **COMPLETE** table below to determine that a minimum of 3 scanners functioned:

NOTE

Only one Logic Error Message Number OR Associated Computer Point Number is required to prove that the respective Scanner functioned.

CIRCLE the Logic Error Message Number
OR the Associated Computer Point Number that reflashed or cleared.

Logic Error Message Number	Associated Computer Point Number	Scanner Utilized	Functioned (✓)	
			Yes	No
0/1	239	#4		
2/3	216	#4		
4/5	54	#1		
6/7	60	#1		
8/9	62	#1		
10/11	73	#2		
12/13	76	#2		
14/15	81	#2		
16/17	82	#2		
18/19	83	#2		
20/21	84	#2		

___ 3.13 Was ANNUN TEST SAT? (at least 2 peripherals and 3 scanners functioned)

___ NO ___ YES ———>
 ↓
 V

GO TO Step 3.25

Time _____

NOTES

- ◆ Attachment 10, Section 1.0 contains the scanner and ground detector switch to the affected annunciator window, CRT/local printer cross-reference.
- ◆ A satisfactory Manual Alarm Test requires at least 3 scanners, the SER in-command and 1 peripheral to be functional. The functionality of the SER in-command is checked indirectly through the check of scanners(s) and peripheral(s) that functioned.
- ◆ Do NOT ACK/RESET any OHA generated by operation of the Ground Detector switches until Attachment 10, Section 1.0 is completed. ANNUN SILENCE is acceptable.

___ 3.14 **PERFORM** Manual Alarm Test using Annunciator Ground Switches as follows:

[CAPR 70045986 / 70088954]

- ___ A. Momentarily **TOGGLE** each of the following Ground Isolation switches from NORM to ISOLATE and back to NORM:

Ground Detection Isolation Panel (front of OHA Cabinet 118-1)			
Ground Isolation Switch	ISOLATE (down)	NORM (up)	Initials
SW1			
SW5			
SW6			
SW9			
SW13			
SW20			
SW21			
SW25			
SW28			
SW29			

- ___ B. NCO **COMPLETE** Attachment 10, Annunciator Ground Detection, Section 1.0, PRIMARY SER.

- ___ C. NCO **ACK AND RESET** the Overhead Alarms.

(step continued on next page)

3.14 (continued)

NOTE

Local Printer alone requires continuous monitoring until the OHA Windows OR CRT are restored.

- | | | |
|-----------------------------|---|-------------|
| <p>___ D.</p> <p>___ E.</p> | <p><u>IF</u> Attachment 10, Section 1.0, PRIMARY SER, Step 1.3 is marked YES,
<u>THEN GO TO</u> Step 3.25 (Manual Alarm Test is SAT).</p> <p><u>IF</u> Attachment 10, Section 1.0, PRIMARY SER, Step 1.3 is marked NO
(Manual Alarm Test is UNSAT, SER A <u>AND/OR</u> all OHA peripherals
are <u>NOT</u> functional),
<u>THEN:</u></p> | <p>Time</p> |
|-----------------------------|---|-------------|

NOTE

At least one SER is to be verified functional within 15 minutes of time of discovery
OR the OHA System is non-functional AND ECG EAL 8.2 then applies.

- | | | |
|-----------------------------|---|-------------|
| <p>___ 1.</p> <p>___ 2.</p> | <p>NOTIFY the SM/CRS to refer to ECG EAL 8.2, Loss Of Overhead
Annunciators (applies when 15 minutes has elapsed since the loss of OHA)</p> <p>GO TO Step 3.17.</p> | <p>Time</p> |
|-----------------------------|---|-------------|

___ 3.15 Are the BACK UP LEDs (front of Cab 72-1) illuminated?
(SER B is in command)

___ NO ___ YES ———>
 |
 V

GO TO Step 3.19

Time

NOTE

At least one SER is to be verified functional within 15 minutes of time of discovery
OR the OHA System is non-functional AND ECG EAL 8.2 then applies.

___ 3.16 **NOTIFY** the SM/CRS to refer to the following (neither SER appears to be in-command):

- ___ ◆ ECG EAL 8.2, Loss Of Overhead Annunciators
(applies when 15 minutes has elapsed since the loss of OHA)
- ___ ◆ T/S Surveillance Requirements 4.1.3.1.1 and 4.1.3.2.1.1 for inoperable
Rod Position Deviation Monitor (OHA E-24, ROD DEV OR SEQ)
- ___ ◆ T/S Surveillance Requirement 4.2.4 for inoperable QPTR alarms
(OHA E-38/46, UPPER/LOWER SECT DEV ABV 50% PWR)

___ 3.17 **PERFORM** the following (MANUAL TRANSFER TO SER B):

- ___ A. **PLACE** Printer Switch in SER B (BACKUP) position (front of Cab 115-1).
- ___ B. **OBTAIN** OHA MANUAL TRANSFER failover switch key #49.
- ___ C. **INSERT** OHA MANUAL TRANSFER key in keyswitch (front of Cab 72-1).
- ___ D. **ROTATE** failover switch from NORMAL to
MANUAL TRANSFER TO SER B position.
- ___ E. **RECORD** status of AVS PLC LEDs (front of Cab 124-1) by completing
Attachment 11, AVS PLC Indications.
- ___ F. **RESET** AVS PLC using PB5-PLC FAULT DETECT RESET (front of Cab 124-1).

3.18 Are the BACK UP LEDs (front of Cab 72-1) illuminated?
(SER B is in command)

___ YES ___ NO ———>
 |
 V

GO TO Step 3.23
(SER "B" NOT in-command
after manual failover)

Time

___ 3.19 **DETERMINE** status of AVS PLC 24 VDC Output Module LEDs
(front of cabinet 124-1) as follows:

- ___ ♦ IF AVS PLC "140 DDO 353 00 24 VDC OUT" Module LED No.12 is illuminated,
 THEN AVS is functioning.
- ___ ♦ IF AVS PLC "140 DDO 353 00 24 VDC OUT" Module LED No.12 is extinguished,
 THEN REQUEST Maintenance correct cause of AVS PLC failure.

NOTE

A satisfactory ANNUN TEST requires at least 3 scanners, the SER in-command and 2 peripherals to be functional. The functionality of the SER in-command is checked indirectly through the check of scanners(s) and peripheral(s) that functioned.

3.20 **PERFORM** a ANNUN TEST to verify proper SER B operation as follows:

[CAPR 70045986]

A. **VERIFY** at least 2 of the following 3 peripherals functioned:

◆ OHA Window A-9 alarms or reflashes

◆ OHA CRT displays at least 1 incoming logic alarm (reflash or clear).

◆ OHA Local Printer (front of ANN-115-1) displays at least 1 incoming logic alarm.

B. IF <2 peripherals functioned,
THEN GO TO Step 3.22.

Time

C. **COMPLETE** table below to determine that a minimum of 3 scanners functioned:

NOTE

Only one Logic Error Message Number OR Associated Computer Point Number is required to prove that the respective Scanner functioned.

CIRCLE the Logic Error Message Number
OR the Associated Computer Point Number that reflashed or cleared.

Logic Error Message Number	Associated Computer Point Number	Scanner Utilized	Functioned (✓)	
			Yes	No
0/1	239	#4		
2/3	216	#4		
4/5	54	#1		
6/7	60	#1		
8/9	62	#1		
10/11	73	#2		
12/13	76	#2		
14/15	81	#2		
16/17	82	#2		
18/19	83	#2		
20/21	84	#2		

___ 3.21 Was ANNUN TEST SAT? (at least 2 peripherals and 3 scanners functioned)

___ NO
 ↓
 V

___ YES ———>

GO TO Step 3.25

Time _____

NOTES

- ◆ Attachment 10, Section 2.0, contains the scanner and ground detector switch to the affected annunciator window, CRT/local printer cross-reference.
- ◆ A satisfactory Manual Alarm Test requires at least 3 scanners, the SER in-command and 1 peripheral to be functional. The functionality of the SER in-command is checked indirectly through the check of scanners(s) and peripheral(s) that functioned.
- ◆ Do NOT ACK/RESET any OHA generated by operation of the Ground Detector switches until Attachment 10, Section 2.0 is completed. ANNUN SILENCE is acceptable.

___ 3.22 **PERFORM** Manual Alarm Test using Annunciator Ground Switches as follows:

[CAPR 70045986 / 70088954]

- ___ A. Momentarily **TOGGLE** each of the following Ground Isolation switches from NORM to ISOLATE and back to NORM:

Ground Detection Isolation Panel (front of OHA Cabinet 118-1)			
Ground Isolation Switch	ISOLATE (down)	NORM (up)	Initials
SW1			
SW5			
SW6			
SW9			
SW13			
SW20			
SW21			
SW25			
SW28			
SW29			

- ___ B. NCO **COMPLETE** Attachment 10, Annunciator Ground Detection, Section 2.0, BACKUP SER.

- ___ C. NCO **ACK AND RESET** the Overhead Alarms.

(step continued on next page)

3.22 (continued)

NOTELocal Printer alone requires continuous monitoring until the OHA Windows OR CRT are restored.

___ D. IF Attachment 10, Section 2.0, BACKUP SER, Step 2.3 is marked YES, THEN GO TO Step 3.25 (Manual Alarm Test is SAT). Time

___ E. IF Attachment 10, Section 2.0, BACKUP SER, Step 2.3 is marked NO (Manual Alarm Test is UNSAT, SER A AND SER B are NOT functional), THEN CONTINUE:

___ 3.23 **NOTIFY** the SM/CRS to refer to the following:
(both SER A AND SER B are non-functional)

___ ♦ ECG EAL 8.2, Loss Of Overhead Annunciators
(applies when 15 minutes has elapsed since the loss of OHA)

___ ♦ T/S Surveillance Requirements 4.1.3.1.1 and 4.1.3.2.1.1 for inoperable Rod Position Deviation Monitor (OHA E-24, ROD DEV OR SEQ)

___ ♦ T/S Surveillance Requirement 4.2.4 for inoperable QPTR alarms (OHA E-38/46, UPPER/LOWER SECT DEV ABV 50% PWR)

___ 3.24 **GO TO** Step 3.31.

Time

___ 3.25 **PERFORM** the following:

- ___ A. **EVALUATE** ECG EAL 8.2 Loss Of Overhead Annunciators for continued applicability (OHA System is currently functional).
- ___ B. **INITIATE** Corrective Action to restore total OHA System functionality.

NOTE

When the normal method of initiating an OHA alarm is unavailable, an alternate method is acceptable provided concurrence is obtained from the SM/CRS.

___ 3.26 Is AVS abnormal condition indicated by the presence of any of the following alarms:

- ◆ AVS ANNUN FAULT (1CC1)
- ◆ CRT Point 92, OHA SYSTEM FAULT DETECTED BY AVS
- ◆ CRT Point 565, AVS FAULT DETECTED - IMPLEMENT HEIGHTENED AWARENESS
- ◆ AVS PLC output LED #12 extinguished

___ YES ___ NO ———>
 |
 V

GO TO Step 3.29
 (AVS functioning properly.
 Manual door checks NOT required)

Time

___ 3.27 **INITIATE** Corrective Action to restore total OHA System functionality.

- ___ 3.28 **INITIATE** an alarm check of the OHA System as follows:
- ___ A. IF an alternate method is NOT being used,
THEN:
- ___ 1. **OPEN AND CLOSE** an RPS or SSPS cabinet door.
- ___ 2. **VERIFY** associated alarm is received and clears.
- ___ B. IF an alternate method is used,
THEN:
- ___ 1. **EVALUATE** the alternate method against current plant conditions.
- ___ 2. **RECORD** the basis for each initial use of an alternate method in the Control Room Narrative Log.
- ___ 3. **PERFORM** an alternate method as determined by the SM/CRS.
- ___ 4. **VERIFY** associated alarm is received and clears.
- ___ C. **RECORD** alarm check results IAW SH.OP-AP.ZZ-0110(Q), Use and Development of Operating Logs. This will ensure the timely detection of any unplanned loss of the OHA System.
- ___ D. **REPEAT** Step 3.28 at least once every 10 minutes until the OHA System is fully functional OR as directed by the SM/CRS.
- ___ 3.29 **PERFORM** S1.OP-SO.ANN-0001(Q), Overhead Annunciators Operation, section for Functional Testing of the functional OHA System SER(s).
- ___ 3.30 When OHA System is determined to be fully functional (Both SER A & B Functional Test completed SAT) IAW S1.OP-SO.ANN-0001(Q), Time Overhead Annunciator Operation AND AVS is functioning properly THEN GO TO Section 4.0.
- ___ 3.31 IF this step NOT previously performed,
THEN RESET SER B (Cabinet 115-1) as follows:
- ___ A. **ENSURE** Printer Switch in SER B (BACKUP) position (front of Cabinet 115-1).
- ___ B. **PRESS** FUNCTIONAL TEST pushbutton, then **PRESS** ENTER.
- ___ C. **PRESS** ALARM SUMMARY pushbutton, then **PRESS** ENTER.
- ___ D. **RESET** SER B MAIN CONTROL (back of Panel 116-1, via RESET access port).
- ___ E. IF CRT is NOT updating time OR incoming alarms are NOT displayed,
THEN PRESS the RESET button on the electronic display unit (1CC1, under the CRT)

NOTE

Steps 3.32 & 3.33 are to be performed concurrently.

Step 3.32 is to see if SER Reset restored OHA System functionality.

Step 3.33 is compensatory actions to be taken when the entire OHA System is NOT functional.

Time

- ___ 3.32 **IF** this step NOT previously performed,
THEN RETURN to Step 3.18.
- ___ 3.33 **IF** this step NOT previously performed,
THEN PERFORM the following compensatory actions until OHA System is functional:
- ___ A. **INITIATE** continuous Control Console walk down
AND MONITOR plant status with "heightened awareness" using the
following alternate means:
- ◆ Control Console Indicators
 - ◆ Plant Computer
 - ◆ Reactor Protection System Status Panel (RP4)
 - ◆ All Recorder Panels (RP)
 - ◆ **REFER** to Attachments 1-9 as applicable to identify alternate indication and compensatory actions and determine additional plant equipment monitoring requirements. Attachments in conjunction with applicable Alarm Response Procedures (ARP) are to be used, as required.
- ___ B. **DISPATCH** personnel as needed into the plant to begin monitoring of equipment and local annunciator panels at an increased frequency.
- ___ C. **INITIATE** Corrective Action to restore total OHA System functionality.
- ___ 3.34 When the cause of OHA System malfunction is corrected,
PERFORM S1.OP-SO.ANN-0001(Q), Overhead Annunciators Operation,
section for Functional Testing of the OHA System to demonstrate total functionality.

4.0 **COMPLETION AND REVIEW**

- ___ 4.1 **CIRCLE** Entry Condition number in Section 1.0
OR EXPLAIN Entry Condition in Comments Section of Attachment 12.
- ___ 4.2 **COMPLETE** Attachment 12, Sections 1.0 and 2.0
AND FORWARD this procedure to SM/CRS for review and approval.
- ___ 4.3 IF any Ground Detection Isolation switches were operated in Step 3.14 or Step 3.22,
THEN DIRECT a second Operator to perform an Independent Verification of
switches listed in Attachment 10, Section 3.0.
- ___ 4.4 SM/CRS **PERFORM** the following:
 - ___ A. **REVIEW** this procedure with Attachment 12 for completeness and accuracy.
 - ___ B. **COMPLETE** Attachment 12, Section 3.0.
 - ___ C. **FORWARD** completed procedure to Operations Staff.

END OF PROCEDURE SECTION SECTION

ATTACHMENT 1
(Page 1 of 7)

WINDOW BOX A

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
A-1 ANNUN PWR FAIL	AVS PLC Input or Output Module LED #21 or #29 ANNUNCIATOR CABINET 116-1: All 8 Power Supply indicators lit ANNUNCIATOR CABINETS 124-1, 117-1 and 118-1: All 22 Logic Panel Power Fail indicators lit ANNUNCIATOR CABINET 115-1: All 8 Power Supply indicators lit ANNUNCIATOR CABINET 117-1: Indicators 1-5 lit on 24 VDC Relay Panel 1CC1: OHA TROUBLE bezel alarm	MONITOR CRT Alarm Log or OHA Printer.
A-2 SPRY COMPR CH 1 UNSAFE	PROTECTION RACK #4: Test Panel (CT Switch) cover installed <u>AND</u> all Bistable Switches down	
A-3 SPRY COMPR CH 1 ON TEST	PROTECTION RACK #4: Test Panel (CT Switch) cover installed	
A-4 RX PROT CH 1 ON TEST	PROTECTION RACKS #1, 2, 3, 4, and 5: All doors closed Test Panel (CT Switch) cover installed	
A-5 NIS CH ON TEST	NI Cabinets: All NI Channels OPERATION SELECTOR switches in Normal	
A-6 RMS HI RAD OR TRBL	RMS Racks 1R53A-D use indication at 1XK17871 (Relay Room) and 1XK17871R (1RP1) 1RP1 Radiation Alarm Annunciator: Meter indication	
A-7 FIRE PROT FIRE	Unit 2 OHA A-7 1RP5: No coded fire alarms	NOTIFY Loss Control to monitor FP system.

ATTACHMENT 1
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WINDOW BOX A

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
A-8 FIRE PROT CO ₂ / HALON DISCH	Unit 2 OHA A-8 1RP5: CO ₂ /Halon discharge light not lit	NOTIFY Loss Control to monitor FP System.
A-9 ANNUN TRBL	AVS PLC Output Module LEDs #9, #10, #17, #18, #19, #20, #25, #26, #27 or #28 1CC1: OHA TROUBLE bezel alarm	MONITOR CRT Alarm Log or OHA Printer.
A-10 SPRY COMPR CH II UNSAFE	PROTECTION RACK #9: Test Panel (CT Switch) cover installed <u>AND</u> all Bistable Switches down	
A-11 SPRY COMPR CH II ON TEST	PROTECTION RACK #9: Test Panel (CT Switch) cover installed	
A-12 RX PROT CH II ON TEST	PROTECTION RACK #6, 7, 8, 9, and 10: All doors closed Test Panel (CT Switch) cover installed	
A-13 RPI ON TEST	RPI-1, 2, 3, and 4 cabinets: All test switches in OPERATE	
A-14 ELECT PEN AREA AMB TEMP HI	Aux. Annunciator: Point No. 682	
A-15 FIRE PMP 1/2 RUN	Unit 2 OHA A-15	NOTIFY Loss Control to monitor FP system.
A-16 FIRE PROT WTRFLO IN CNTMT	No Fire Pumps running as indicated on Unit 2 OHA A-15 1FP147 indicates closed on 1RP5	NOTIFY Loss Control to monitor FP system.
A-17 ANNUN GND DET	ANNUNCIATOR CABINET 118-1: GND DET light off on ISOLATION SWITCHES panel	

ATTACHMENT 1
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WINDOW BOX A

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
A-18 SPRY COMPR CH III UNSAFE	PROTECTION RACK #12: Test Panel (CT Switch) cover installed <u>AND</u> all Bistable Switches down	
A-19 SPRY COMPR CH III ON TEST	PROTECTION RACK #12: Test Panel (CT Switch) cover installed	
A-20 RX PROT CH III ON TEST	PROTECTION RACKS #11, 12, and 13: All doors closed Test Panel (CT Switch) cover installed	
A-21 213 PNL DOOR OPEN	None	Check the following doors closed: 205-1: 11 AFP Panel 206-1: 12 AFP Panel 207-1: 13 AFP Panel 213-1: Hot S/D Panel 216-1: Chg Pmps Flow/Press Panel
A-22 SOUTH PEN AREA AMB TEMP HI	Aux. Annunciator: Point No. 732	
A-23 FIRE PMP 1/2 TRBL	Unit 2 OHA A-23	NOTIFY Loss Control to monitor Fire Pumps.
A-24 FIRE PROT WTRFLO IN 1/2 AUX BLDG	No Fire Pumps running as indicated on Unit 2 OHA A-15	NOTIFY Loss Control to monitor FP system.

ATTACHMENT 1
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WINDOW BOX A

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
A-25 AUX ALM SYS PWR FAIL	<p>Aux. Annunciator RACK 133: Event Capture Units (4) have LED indication as follows: 1PPS LED (green) Normal operation when 1 pulse/sec. Field Contact Voltage Power Supplies (4) have LED indication as follows: Prime Power LEDs 1 and 2 (green) indicate input power A and B available when lit. Output Power LEDs (red) indicate output power available when lit.</p> <p>Aux. Annunciator RACK 134: Communication Interface Unit (1) has LED indication as follows: 1PPS LED (green) Normal operation when 1 pulse/sec.</p>	
A-26 SPRY COMPR CH IV UNSAFE	<p>PROTECTION RACK #14: Test Panel (CT Switch) cover installed <u>AND</u> all Bistable Switches down</p>	
A-27 SPRY COMPR CH IV ON TEST	<p>PROTECTION RACK #14: Test Panel (CT Switch) cover installed</p>	
A-28 RX PROT CH IV ON TEST	<p>PROTECTION RACKS #14, 15, and 31: All doors closed Test Panel (CT Switch) cover installed</p>	
A-29 SEC 1A-1C TEST OR TRBL	<p>In <u>each</u> SAFEGUARDS EQUIPMENT CONTROL SYSTEM UNIT No. 1A, 1B, and 1C: All 13 blocking switches down V1 TEST & V2 TEST switches OFF Doors closed TEST No. indicator lights energized Auto Test Switch in RESET</p> <p><u>At 1CC3:</u> All three SEQUENCE IN TEST bezel lights OFF</p>	
A-30 CROSSFLOW TROUBLE	<p>Alarm Point UPPALARM clear with Control Room Plant Computer CRT Updating properly.</p>	

ATTACHMENT 1
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WINDOW BOX A

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
A-31 FIRE PROT WTR PRESS LO	Unit 2 OHA A-31	NOTIFY Loss Control to monitor FP system pressure.
A-32 FIRE PROT 28VDC LOSS	None	NOTIFY Loss Control to monitor Fire Panel 1FP4 for indication of loss of 28VDC.
A-33 AUX ALM SYS TRBL	<p>Aux. Annunciator PANEL 133: Field Contact Voltage Power Supplies (4) have LED indications as follows: Ground Fault LEDs (green) not lit (no positive or negative fault detected).</p> <p>Aux. Annunciator PANEL 134: Communication Interface Unit (1) has LED indication as follows: ALERT LED (yellow) indicates problem with an external I/O device such as a printer. FAULT LED (red) indicates a module malfunction or diagnostic failure.</p>	
A-34 SSPS TRN A TRBL	<p>SSPS Train A Cabinets: GEN WARNING lamp <u>NOT</u> lit on Logic Cabinet</p> <p>1RP4: Mimic lights not flashing (train disagreement)</p> <p>NOTE: This alarm indicates that SSPS is in a partial trip condition. A Trouble Alarm on the other train will initiate a Reactor Trip</p>	
A-35 SSPS TRN A ON TEST	<p>SSPS Train A Cabinets: All doors closed</p> <p>All test switches in the OUTPUT TEST AND INTERFACE CABINET in UNBLOCK OUTPUT</p>	
A-36 AMSAC BYPASSED	Turbine Power >40%	

ATTACHMENT 1
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WINDOW BOX A

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
A-37 SEIS RCDR SYS ACT	Monitor Seismic Monitoring System	
A-38 MIMS IMPACT	Loose Parts Monitoring Panel 1PNL-998	
A-39 FIRE PROT CO ₂ PRESS HI OR LO	None	NOTIFY Loss Control to monitor CO ₂ pressure.
A-41 AUX ALM SYS PRINTER	1RP9: No alarms on printer	
A-42 SSPS TRN B TRBL	SSPS Train B Cabinets: GEN WARNING lamp not lit on Logic Cabinet 1RP4: Mimic lights not flashing (train disagreement) NOTE: This alarm indicates that SSPS is in a partial trip condition. A Trouble Alarm on the other train will initiate a Reactor Trip	
A-43 SSPS TRN B ON TEST	SSPS Train B Cabinets: All doors closed All test switches in the OUTPUT TEST AND INTERFACE CABINET in UNBLOCK OUTPUT	
A-44 AMSAC TEST OR TRBL	AMSAC Cabinet: No red lights lit SYSTEM BYPASS switch in NORMAL	

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WINDOW BOX A

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
A-45 RMS CH TEST	1RP1: Meters, recorders RMS Cabinets: Indicators	
A-46 CMPTR FAIL	Control Room Plant Computer CRT Updating properly	
A-47 FIRE PROT TRBL	1RP5: No Zone alarms Verify valve "closed" positions not lost Verify CLOSED GATE VALVE LOSS OF AC light is OFF. Verify AUDIBLE ALM CODERS LOSS OF AC light is OFF.	

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WINDOW BOX B

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
B-1 FRESH WTR SYS TRBL	Unit 2 OHA B-1	
B-2 1A 125VDC CNTRL BUS VOLT LO	1RP9: 1A BATTERY 125 VOLTS Voltmeter VM-13	MONITOR Bus voltages
B-3 1A VTL INSTR BUS INVRT FAIL	Aux. Annunciator: Point No. 0147	MONITOR Inverter indications
B-4 250VDC BUS VOLT HI OR LO	1RP9: 250 VOLT BATTERY Voltmeter VM-23	MONITOR Bus voltages
B-5 11 SW HDR PRESS HI	1CC1: 11 HEADER PRESSURE indication PA-5373	
B-6 12 SW HDR PRESS HI	1CC1: 12 HEADER PRESSURE indication PA-5386	
B-7 TURB AREA SW HDR PRESS HI	None	MONITOR local Service Water Supply Panel 273-1 (88' TGA)
B-8 11-13 SW STRAIN TRBL	None	MONITOR D/P at strainer
B-9 HTG WTR STM SYS TRBL	Unit 2 OHA B-9	MONITOR Panel 470 alarms and indications (120' TGA)

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WINDOW BOX B

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
B-10 1B 125VDC CNTRL BUS VOLT LO	1RP9: 1B BATTERY 125 VOLTS Voltmeter VM-15	MONITOR Bus voltages
B-11 1B VTL INSTR BUS INVRT FAIL	Aux. Annunciator: Point No. 0155	MONITOR Inverter indications
B-12 VTL FREEZE PROT TRBL	None	MONITOR Panel 1VF-AL
B-13 11 SW HDR PRESS LO	1CC1: 11 HEADER PRESSURE indication PA-5373	
B-14 12 SW HDR PRESS LO	1CC1: 12 HEADER PRESSURE indication PA-5386	
B-15 TURB AREA SW HDR PRESS LO	None	MONITOR local Service Water Supply Panel 273-1 (88' TGA)
B-16 14-16 SW STRAIN TRBL	None	MONITOR D/P at strainer
B-17 AUX BOIL TRBL	Unit 2 OHA B-17	MONITOR Panel 470 alarms and indications (120' TGA)
B-18 1C 125VDC CNTRL BUS VOLT LO	1RP9: 1C BATTERY 125 VOLTS Voltmeter VM-236	MONITOR Bus voltages

ATTACHMENT 2
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WINDOW BOX B

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
B-19 1C VTL INSTR BUS INVRT FAIL	Aux. Annunciator: Point No. 0134	MONITOR Inverter indications
B-20 CMPTR INVRT TRBL	None	MONITOR Inverter status lights and voltmeters, 120' TGA.
B-21 11-13 SW SCRNWSH TRBL	None	MONITOR Service Water Screen Wash Control Panel 361-1A at Service Water Structure
B-22 14-16 SW SCRNWSH TRBL	None	MONITOR Service Water Screen Wash Control Panel 361-1B at Service Water Structure
B-23 11-13 SW PMP BRG WTR PRESS LO	None	MONITOR local bearing water pressures at Service Water Structure
B-24 14-16 SW PMP BRG WTR PRESS LO	None	MONITOR local bearing water pressures at Service Water Structure
B-26 1A 28VDC CNTRL BUS VOLT LO	1RP9: 1A BATTERY 28 VOLTS Voltmeter VM-33	MONITOR Bus voltages
B-27 1D VTL INSTR BUS INVRT FAIL	Aux. Annunciator: Point No. 0159	MONITOR Inverter indications
B-29 11-13 SW PMP SUMP AREA LVL HI	None	MONITOR sump level at Service Water Structure

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WINDOW BOX B

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
B-30 14-16 SW PMP SUMP AREA LVL HI	None	MONITOR sump level at Service Water Structure
B-31 11-13 SW PMP ROOM TEMP HI OR LO	None	MONITOR room temperatures at Service Water Structure
B-32 14-16 SW PMP ROOM TEMP HI OR LO	None	MONITOR room temperatures at Service Water Structure
B-34 1B 28VDC CNTRL BUS VOLT LO	1RP9: 1B BATTERY 28 VOLTS Voltmeter VM-35	MONITOR Bus voltages
B-35 11 ESS CONTROLS INVRT FAIL	Aux. Annunciator Point No. 200 for normal source failure to either 11 or 12 ESS CONTR Inverter	MONITOR 11 ESS Controls Inverter
B-37 11 CC HX SW FLO HI	None	MONITOR flow at 11 CC Hx
B-38 12 CC HX SW FLO HI	None	MONITOR flow at 12 CC Hx
B-43 12 ESS CONTROLS INVRT FAIL	Aux. Annunciator Point No. 200 for normal source failure to either 11 or 12 ESS Inverter	MONITOR 12 ESS Controls Inverter

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WINDOW BOX B

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
B-44 HEAT TRACE TRBL	None	MONITOR 1PNL14897, 1HT-AL#1, and 1HT-AL#2.
B-47 SW ACCUM TANK TROUBLE	Local Level: 1LA19249 1LA19250 1LA19251 1LA19252 Local Press: 1PA19245 1PA19246 1PA19247 1PA19248	MONITOR Display at Panel 1362-1
B-48 SW VLV RM FLOODED	Aux. Annunciator: Point Nos. 0754 and 0755	MONITOR sump in 78' Mech Pen Room

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WINDOW BOX C

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
C-1 GAS ONLY TRBL	None	MONITOR alarms and indications on WASTE DISPOSAL GAS ANALYZER Panel 110-1 (122' AUX.)
C-2 CNTMT SUMP PMP START	Aux. Annunciator: Point Nos. 683, 704	
C-3 11 CC HX IN TEMP HI	None	MONITOR temperatures on No. 11 CC HX Panel 203-1 (TIC-627A)
C-4 11 CFCU AIRFLO TRBL	1CC1: Damper position indication	
C-5 11 CFCU WTRFLO TRBL	1CC1: SW Valve positions	
C-6 CNTMT PRESS HI-HI	1CC1: Containment Pressure Recorders PR-948A and PR-948B, Meters PI-948A through D 1RP4: Bistable indicating lights	
C-7 11 H ₂ RECOMB TRBL	Equipment Room: POWER AVAILABLE light at Hydrogen Recombiner Panel	
C-8 ϕ A CNTMT ISOL ACT	1CC1: ϕ A ISOLATION orange bezel or RESET ϕ A ISOLATION green bezel 1RP4: Actuation light and valve indicating lights	

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WINDOW BOX C

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
C-9 104 PNL TRBL	None	MONITOR WASTE DISPOSAL BORON RECOVERY PANEL 104-1 alarms and indications
C-10 CNTMT SUMP OVERFLO	1CC1: Sump level indication LA-2445, LA-2448 1RP1: Sump recorders LR-3389, LR-3390	
C-11 12 CC HX IN TEMP HI	None	MONITOR temperatures on No. 12 CC HX Panel 204-1 (TIC-627B)
C-12 12 CFCU AIRFLO TRBL	1CC1: Damper position indication	
C-13 12 CFCU WTRFLO TRBL	1CC1: SW Valve positions	
C-14 CNTMT PRESS HI	1CC1: Containment Pressure Recorders PR-948A and PR-948B, Meters PI-948A through D 1RP4: Bistable indicating lights	
C-15 12 H ₂ RECOMB TRBL	Equipment Room: POWER AVAILABLE light at Hydrogen Recombiner Panel	
C-16 φ B CNTMT ISOL ACT	1CC1: φB AND SPRAY ACTUATION CONT VENT ISOLATION orange bezel or RESET φB ISOLATION green bezel 1RP4: Actuation light and valve indicating lights	

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WINDOW BOX C

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
C-17 11-13 CVCS HUT LVL HI	1RP1: LA-4145	
C-18 RX SUMP OVRFLO	Aux. Annunciator: Point No. 684	
C-19 SFP TEMP HI	None	MONITOR temperature on Panel 431
C-20 13 CFCU AIRFLO TRBL	1CC1: Damper position indication	
C-21 13 CFCU WTRFLO TRBL	1CC1: SW Valve positions	
C-22 CNTMT SPRY ACT	1CC1: ΦB AND SPRAY ACTUATION CONT VENT ISOLATION orange bezel or RESET SPRAY ACT 1RP4: Actuation light	
C-23 CNTMT H ₂ LVL HI	1RP5: XA-3361, and XA-3362	
C-25 BA EVAP TRBL	None	MONITOR BA EVAPORATOR Panel 301-1 alarms and indications
C-26 11 RHR SUMP OVRFLO	Aux. Annunciator: Point Nos. 0835, 0836	MONITOR level

ATTACHMENT 3
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WINDOW BOX C

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
C-27 SFP LVL HI	None	MONITOR level
C-28 14 CFCU AIRFLO TRBL	1CC1: Damper position indication	
C-29 14 CFCU WTRFLO TRBL	1CC1: SW Valve positions	
C-30 CFCU LK DET HI-HI	1CC1: LI-730	
C-33 RWST/PWST OVRFLO	Use Unit 2 OHA C-33 alarm	
C-34 12 RHR SUMP OVRFLO	Aux. Annunciator: Point Nos. 0757, 0758	MONITOR level
C-35 SFP LVL LO	None	MONITOR level
C-36 15 CFCU AIRFLO TRBL	1CC1: Damper position indication	
C-37 15 CFCU WTRFLO TRBL	1CC1: SW Valve positions	
C-38 CFCU LK DET HI	1CC1: LI-730	

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WINDOW BOX C

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
C-41 NON-RAD LIQ WSTE DISP TRBL	None	Chemistry to MONITOR Panel 370
C-46 PERSONNEL ACCESS DOOR OPEN	1RP3: Door position light indication	
C-48 ROD DRIVE FAN VIB HI ALERT	1RP3: Fan vibration indication	

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WINDOW BOX D

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
D-1 RWST LVL HI OR LO	1CC1: RWST level indication LI920, LI921	
D-2 11/12SJ54 OFF NORM POS	1CC2: Valve position indication Aux. Annunciator: Point Nos. 691, 692	
D-3 1SJ30 OFF NORM POS	Valve position indication Aux. Annunciator: Point No. 685	
D-4 11 RCP BRG OIL LVL HI	RCP Vibrations on 1RP3 RCP Brg Temps on Plant Computer	
D-5 12 RCP BRG OIL LVL HI	RCP Vibrations on 1RP3 RCP Brg Temps on Plant Computer	
D-6 13 RCP BRG OIL LVL HI	RCP Vibrations on 1RP3 RCP Brg Temps on Plant Computer	
D-7 14 RCP BRG OIL LVL HI	RCP Vibrations on 1RP3 RCP Brg Temps on Plant Computer	
D-8 RC PRESS HI	1CC2: Recorders / meters	
D-9 RWST LVL LO BU	1CC1: RWST level indication LI920, LI921	

ATTACHMENT 4
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WINDOW BOX D

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
D-10 13/14SJ54 OFF NORM POS	1CC1: Valve position indication Aux. Annunciator: Point Nos. 693, 694	
D-11 1SJ69 OFF NORM POS	Valve position indication Aux. Annunciator: Point No. 623	
D-12 11 RCP BRG OIL LVL LO	RCP Vibrations on 1RP3 RCP Brg Temps on Plant Computer	
D-13 12 RCP BRG OIL LVL LO	RCP Vibrations on 1RP3 RCP Brg Temps on Plant Computer	
D-14 13 RCP BRG OIL LVL LO	RCP Vibrations on 1RP3 RCP Brg Temps on Plant Computer	
D-15 14 RCP BRG OIL LVL LO	RCP Vibrations on 1RP3 RCP Brg Temps on Plant Computer	
D-16 RC PRESS LO	1CC2: Recorders / Meters	
D-17 RWST LVL LO LO	1CC1: RWST level indication LI920, LI921	
D-18 11/12SJ40 OFF NORM POS	1CC1: Valve position indication Aux. Annunciator: Point Nos. 705, 706	

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WINDOW BOX D

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
D-19 1SJ135 OFF NORM POS	1CC1: Valve position indication Aux. Annunciator: Point No. 686	
D-20 11 RCP BRG CLG WTR FLO LO	RCP Brg Temps on Plant Computer	FIC-613 at Panel 237-1 (78' Ctmt)
D-21 12 RCP BRG CLG WTR FLO LO	RCP Brg Temps on Plant Computer	FIC-616 at Panel 232-1 (78' Ctmt)
D-22 13 RCP BRG CLG WTR FLO LO	RCP Brg Temps on Plant Computer	FIC-619 at Panel 241-1 (78' Ctmt)
D-23 14 RCP BRG CLG WTR FLO LO	RCP Brg Temps on Plant Computer	FIC-622 at Panel 240-1 (78' Ctmt)
D-24 RX TRIP & TAVE LO	1RP4: Rx Trip light and Loop Tave indicating light 1CC2: Loop Tave and Rx TRIP & Bypass Bkrs OPEN	
D-26 11/12SJ44 OFF NORM POS	1CC1: Valve position indication Aux. Annunciator: Point Nos. 412, 413	
D-27 1CS14 OFF NORM POS	Valve position indication Aux. Annunciator: Point No. 624	

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WINDOW BOX D

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
D-28 11 RCP BKR OPEN/FLO LO	1CC1: 11 RCP Start/Stop bezel lights Loop Flow meters (FI-414, 415, 416)	
D-29 12 RCP BKR OPEN/FLO LO	1CC1: 12 RCP Start/Stop bezel lights Loop Flow meters (FI-424, 425, 426)	
D-30 13 RCP BKR OPEN/FLO LO	1CC1: 13 RCP Start/Stop bezel lights Loop Flow meters (FI-434, 435, 436)	
D-31 14 RCP BKR OPEN/FLO LO	1CC1: 14 RCP Start/Stop bezel lights Loop Flow meters (FI-444, 445, 446)	
D-32 TAVE LO	1CC2: Tave Recorders/Meters	
D-34 1RH26 OFF NORM POS	1CC1: Valve position indication Aux. Annunciator: Point No. 695	
D-35 1SJ67/68 OFF NORM POS	1CC1: Valve position indication Aux. Annunciator: Point Nos. 394, 395	
D-36 RCP VIB HI	RCP Vibrations on 1RP3	
D-37 RCP BRG CLG HDR TEMP HI	Monitor RCP Bearing Temps on Plant Computer	

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WINDOW BOX D

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
D-38 THERM BARR TEMP HI	Monitor RCP Seal Water inlet temperatures, Seal d/p, CC Surge Tank level, CC Header activity	
D-39 RCP SEAL WTR BYP FLO LO	Monitor RCP Seal Water inlet and outlet temperatures	
D-40 SUBCLG CH A MARGIN LO	1CC2: Ch A Subcooling Meter PA-15606 1RP4: Subcooling Margin Monitor 1XD15726B	
D-41 BIT DISCH PRESS HI	1CC1: BIT Pressure meter PI-942	
D-42 11/12SJ49 OFF NORM POS	1CC1: Valve position indication Aux. Annunciator: Point Nos. 687, 688	
D-43 SPRY ADD TK LVL LO	1CC1: Spray Additive Tank Level meter LI-931	
D-44 1RH1 NOT CLSD & RC PRESS HI	1CC1: 1RH1 valve position indication POPS RC Press PA-9858 1CC2: RC Pressure meters / recorders Aux. Annunciator: Point No. 138	

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WINDOW BOX D

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
D-45 1RH2 NOT CLSD & RC PRESS HI	1CC1: 1RH2 Valve position indication POPS RC Press PA-9858 1CC2: RC Pressure meters / recorders Aux. Annunciator: Point No. 013	
D-46 RX HEAD VENT VLV NOT CLSD	1RP2: Determine valve position from the valve operate switches	
D-47 RHR MIDLOOP SYS TRBL	NOTE: ALARM IS DEACTIVATED IN MODES 1-4 Plant Computer points: Listed in D-47 of S1.OP-AR.ZZ-0004(Q)	
D-48 SUBCLG CH B MARGIN LO	1CC2: Ch B Subcooling Meter XA-3269 1RP4: Subcooling Margin Monitor 1XD15727B	

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WINDOW BOX E

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
E-1 11 SEAL WTR INJ FLTR D/P HI	None	MONITOR d/p
E-2 POPS CH I ARM	1CC1: PRESSURIZER OVERPRESSURE PROTECTION bezel indicators	
E-3 POPS CH II ARM	1CC1: PRESSURIZER OVERPRESSURE PROTECTION bezel indicators	
E-4 PZR LVL HI	1CC2: PRESSURIZER LEVEL HI bezel Alarm and Level indication and recorders 1RP4: Bistable indicating lights	
E-5 SR DET VOLT TRBL	NI Cabinets: DETECTOR VOLTS meter LOSS OF DETECTOR VOLT light	
E-6 IR DET VOLT LOSS	NI Cabinets: LOSS OF DETECTOR VOLT light	
E-7 PR DET VOLT LOSS	NI Cabinets: LOSS OF DETECTOR VOLT light	
E-8 ROD INSERT LMT LO	1CC2: CONTROL ROD GROUPS POSITION and INSERTION LIMITS recorders Plant Computer ARPI screen	

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WINDOW BOX E

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
E-9 12 SEAL WTR INJ FLTR D/P HI	None	MONITOR d/p
E-10 POPS CH I DISARM / 1PR6 CLSD	1CC1: PRESSURIZER OVERPRESSURE PROTECTION bezel indications 1CC2: 1PR6 indication	
E-11 POPS CH II DISARM / 1PR7 CLSD	1CC1: PRESSURIZER OVERPRESSURE PROTECTION bezel indications 1CC2: 1PR7 indication	
E-12 PZR PRESS LO	1CC2: Meters and recorders 1RP4: Bistable indicating lights	
E-13 SR HI FLUX AT S/D	NI Cabinets: HIGH FLUX AT SHUTDOWN lights Control Room: High Audio Count Rate	
E-14 IR N35 COMPEN VOLT LOSS	NI Cabinets: LOSS OF COMP VOLT light	

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WINDOW BOX E

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
E-15 PR HI RNG FLUX HI	1CC2: Meter indications 1RP4: Bistable indicating lights NI Cabinets: OVERPOWER TRIP HIGH RANGE lights	
E-16 ROD INSERT LMT LO-LO	1CC2: CONTROL ROD GROUPS POSITION AND INSERTION LIMITS recorders Plant Computer ARPI screen	
E-17 BA BATCH TK LVL LO	None	MONITOR indications at Panel 411-1
E-18 POPS CH I AUX AIR PRESS LO	1CC1: CR operator can verify normal Control Air pressures and position of CONTAINMENT CNTRL AIR ISOL VALVES 11/12CA330 OPEN	
E-19 POPS CH II AUX AIR PRESS LO	1CC1: CR operator can verify normal Control Air pressures and position of CONTAINMENT CNTRL AIR ISOL VALVES 11/12CA330 OPEN	
E-20 PZR HTR ON LVL HI	1CC2: "11/12 BACKUP ON" bezel lights (bezel pushbutton) Pzr level can be compared against program level (as shown in S1.OP-AR.ZZ-0005(Q))	

ATTACHMENT 5
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WINDOW BOX E

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
E-21 SR HI FLUX AT S/D BLOCKED	NI Cabinets: HIGH FLUX AT SHUTDOWN switches in BLOCK	
E-22 IR N36 COMPEN VOLT LOSS	NI Cabinets: LOSS OF COMP VOLT light	
E-23 PR LO RNG FLUX HI	1CC2: Meter indications 1RP4: Bistable indicating lights NI Cabinets: OVERPOWER TRIP LOW RANGE lights	
E-24 ROD DEV OR SEQ	1CC2: Compare bank overlap Compare all IRPIs against the Group Step Counters, Plant Computer ARPI screen	MONITOR/LOG rod positions once per 4 hours IAW S1.OP-DL.ZZ-0003(Q)
E-25 BA BATCH TK TEMP HI OR LO	None	MONITOR indications at Panel 411-1
E-26 1PR1 NOT FULL CLSD	1CC2: 1PR1 Indication TI-463 RELIEF VALVE OUTLET TEMP PRT level, temperature and pressure (LI-470, TI-471, PI-472)	
E-27 1PR2 NOT FULL CLSD	1CC2: 1PR2 Indication TI-463 RELIEF VALVE OUTLET TEMP PRT level, temperature and pressure (LI-470, TI-471, PI-472)	

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WINDOW BOX E

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
E-28 PZR HTR ON PRESS LO	1CC2: Pressure meters/recorders 11 BACKUP ON bezel light flashing 12 BACKUP ON bezel light flashing	
E-29 SR & IR TRIP BYP	1RP4: Source Range/Step Train A & B TRIP BLOCKED lights lit NI Cabinets: LEVEL TRIP switch in BYPASS	
E-30 IR HI FLUX ROD WDRWL STOP	1CC2: IR and PR indication NI Cabinets: HIGH LEVEL ROD STOP lights	
E-31 PR OVRPWR ROD STOP	1CC2: PR indication NI Cabinets: OVERPOWER ROD STOP lights	
E-32 ROD DRIVE PWR SPLY GND FAULT	None	to MONITOR the Ground Relay on the MG Control Panel (84' Swgr)
E-34 1PR1 CHANNEL UNSAFE	None	
E-35 1PR2 CHANNEL UNSAFE	None	

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WINDOW BOX E

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
E-36 PZR HTR OFF LVL LO	1CC2: Pressurizer level meters / recorders 11 BACKUP OFF bezel light flashing 12 BACKUP OFF bezel light flashing CNTRL GRP HTRS OFF bezel light flashing	
E-37 CH C SDM DECRNG	1RP1: Red ALARM on Channel C Gamma-Metric	
E-38 UPPER SECT DEV ABV 50% PWR	NI Cabinets: UPPER SECTION DEVIATION light on Detector Current Comparator	Perform a QPTR calculation at least once per 12 hours when >50% RTP
E-39 PR CH DEV	NI Cabinets: CHANNEL DEVIATION Comparator & Rate Module 1CC2: Power Range Meters	
E-40 ROD BANK URGENT FAIL	1CC2: URGENT FAILURE bezel alarm	
E-41 LTDWN HX OUT TEMP HI	1CC2: Letdown temperature meter (TI-130A)	
E-42 1PR1 1/2 TRIP	Protection Rack 1, Bistable 1PC455A-E and Rack 12, Bistable 1PC457A-E, "#2 OUT" indication lights	
E-43 1PR2 1/2 TRIP	Protection Rack 10, Bistable 1PC456A-E and Rack 14, Bistable 1PC474C-B, "#2 OUT" indication lights	

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WINDOW BOX E

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
E-44 PZR SFTY VLV 1PR3 - 1PR5 NOT CLSD	1CC2: Safety Valve Temperatures (TI-465, 467, 469) PRT level, temperature, and pressure (LI-470, TI-471, PI-472)	
E-45 CH D SDM DECRNG	1RP1: Red ALARM light on Channel D Gamma-Metric	
E-46 LOWER SECT DEV ABV 50% PWR	NI Cabinets: LOWER SECTION DEVIATION light on Detector Current Comparator	Perform a QPTR calculation at least once per 12 hours when >50% RTP
E-47 PR NEUT FLUX RATE HI	1RP4: Bistable indicating lights NI Cabinets: RATE TRIP light	
E-48 ROD BOTTOM	1CC2: IRPIs Plant Computer: ARPI screen 1RP3: REACTOR CORE Map ROD BOTTOM lights	

ATTACHMENT 6
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WINDOW BOX G

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
G-1 LOOP 11 STM LN D/P LO	1CC2: Steam Generator Pressure 1RP4: Bistable indicating lights	
G-2 11 SG STM LN ISOL	1CC1: Safeguards bezels 1RP4: 11 STM. GEN. lights	
G-3 EH SYS TRBL	1CC3: TURBINE E-H CONTROL & STATUS monitor 1RP7: TURBINE E-H CONTROL & STATUS monitor	MONITOR indications and Alarm Summary status.
G-4 TURB AUTO STOP OIL PRESS LO	1RP4: Bistable indicating lights	
G-5 CNDSR VAC LO	1RP1: Condenser Vacuum Recorder 1CC3: CONDENSER VACUUM LO Alarm on Steam Generator Blowdown bezel Condenser Absolute Pressure meters (PA-5224 & PA-5225) on Condenser bezel Plant Computer: Points P2501A & P2503A	
G-6 11 SGFP TRBL	Plant Computer: SGFP High Vib or Thrust Alert (Y2614D), SGFP High Vib or Thrust Danger (Y2615D) Indicating lights at Control Oil Power Unit local panel. LCD display on Woodward Governor (1SA2805)	MONITOR vibration and thrust position on SGFP Panel 1033-1A MONITOR alarms at SGFP Panels NOTIFY Maintenance to locally investigate and correct the problem

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WINDOW BOX G

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
G-7 ADFCS SWITCH TO MANUAL	1CC2: 11-14 S/G Auto-Manual bezels. 11-14MS10s Auto-Manual bezels. 11 & 12 SGFP Auto-Manual bezels. Engineering Work Station alarm display available	Take manual control of components, as needed. NOTIFY Maintenance to investigate and correct the problem
G-8 TAC EXP TK LVL HI OR LO	None	MONITOR level at gauge glass locally
G-9 LOOP 12 STM LN D/P LO	1CC2: Steam Generator Pressure 1RP4: Bistable indicating lights	
G-10 12 SG STM LN ISOL	1CC1: Safeguards bezel 1RP4: 12 STM. GEN. lights	
G-11 (spare)		
G-12 TURB STM STOP VLV CLSD	1CC3 and 1RP7: TURBINE E-H CONTROL & STATUS computer 1RP4: STOP VALVES indication	MONITOR 11-14MS28 positions.
G-13 CNDSR VAC LO-LO	1CC3: Condenser Absolute Pressure meters (PA-5224 & PA-5225) 1RP1: Condenser Vacuum Recorder Plant Computer: Points P2501A & P2503A	

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WINDOW BOX G

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
G-14 12 SGFP TRBL	Plant Computer: SGFP High Vib or Thrust Alert (Y2611D), SGFP High Vib or Thrust Danger (Y2612D) Indicating lights at Control Oil Power Unit local panel LCD display on Woodward Governor (1SA2806)	MONITOR vibration and thrust position on SGFP Panel 1033-1B MONITOR alarms at SGFP Panels NOTIFY Maintenance to locally investigate and correct the problem
G-15 ADFCs TROUBLE	1CC2: 11-14 S/G Pressure, Level and Flow indications 11 & 12 SGFP Control Bezels	MONITOR Engineering Work Station (EWS) alarm display
G-16 TAC EXP TK N ₂ PRESS HI	None	MONITOR Tank pressure on PL-3199 on Panel 468-1
G-17 LOOP 13 STM LN D/P LO	1CC2: Steam Generator Pressure 1RP4: Bistable indicating lights	
G-18 13 SG STM LN ISOL	1CC1: Safeguards bezels 1RP4: 13 STM. GEN. lights	
G-19 COND POL AUTO SWAP	<u>1CC2</u> : 11-13CN108 & 1CN109 valve positions.	MONITOR Condenser 13 for levels of high conductivity. Manually place the Condensate Polishing System in service, as directed by the SM/CRS.
G-20 SEAL & CYL HTG STM SYS TRBL	Plant Computer: Points T2007A, 2008A, 2095A, and P2004D, 2010D	MONITOR alarms and indications on TURBINE GLAND SEALING STEAM SUPPLY Panel 679-1
G-21 TURB THRUST BRG FAIL	Plant Computer: Point No. P2003D	MONITOR Plant Computer Main Turbine Data screen.

ATTACHMENT 6
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WINDOW BOX G

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
G-22 FW HTR IN VLV TRIP & LVL HI	1CC2: 11-13CN22, 11-13CN27, and 11-13BF7 valve positions (open - normal, closed - high level)	
G-24 TAC TEMP HI OR LO	None	MONITOR temperature at Panel 666-1
G-25 LOOP 14 STM LN D/P LO	1CC2: Steam Generator Pressure 1RP4: Bistable indicating lights	
G-26 14 SG STM LN ISOL	1CC1: Safeguards bezels 1RP4: 14 STM. GEN. lights	
G-27 LO PRESS EXH HOOD TEMP HI	Plant Computer: 11-13 Exhaust Hood temps (T2080A, 2081A, 2082A)	
G-28 AST OIL FILTER HIGH D/P	None	MONITOR at Front Standard
G-29 PRIME TK VAC LO	None	MONITOR at Panel 563-1
G-32 TAC PMP DISCH PRESS HI OR LO	1CC3: TAC Common Discharge pressure meter (PA-5393)	
G-33 STM LN PRESS LO	1CC2: Steam Pressure bezels 1RP4: Bistable indicating lights	

ATTACHMENT 6
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WINDOW BOX G

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
G-34 11-14MS167 VALVE NOT FULL OPEN	1CC2: 11, 12, 13, & 14MS167 "OPEN" indications at Steam Generator Sections (loss of open indication when valve drifting)	
G-35 TSI TRBL	Plant Computer: Main Turbine Data Screen	MONITOR TSI Panel 982-1
G-36 COND POL BYP ALERT	1CC2: SGFP SUCTION PRESS RMS Computer: R40 Plant Computer: Condensate inlet temp	
G-37 PRIME TK WTR LVL HI	None	MONITOR sight glasses downstream of float valves at 120' TGA to determine which are leaking to cause the alarm
G-38 11 AFW DEF RUNOUT PROT	1CC2: 11 Aux Feed Pump PRESSURE OVERRIDE DEFEAT bezel PB	
G-43 TURB AREA LVL HI PMP START	None	MONITOR Turb Bldg sump water level
G-44 COND POL TRBL	None	Chemistry Polisher Operator to MONITOR local alarms
G-45 COND RTN TK LVL HI OR LO	None	MONITOR tank condition
G-46 12 AFW DEF RUNOUT PROT	1CC2: 12 Aux Feed Pump PRESSURE OVERRIDE DEFEAT bezel PB	

ATTACHMENT 7
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WINDOW BOX H

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
H-1 GEN LIQ DETS LVL HI	None	MONITOR level detectors locally
H-2 AIR SIDE SEAL OIL PMP TRBL	None	MONITOR the pump at Seal Oil Skid
H-3 H ₂ SIDE SEAL OIL PMP TRBL	None	MONITOR the pump at Seal Oil Skid
H-4 GEN OVRLD & OUT OF STEP	1CC3: Supervisory light	
H-5 GEN EXC PMG UV/ PWR LOSS	None	MONITOR voltage regulator local panel for proper operation
H-6 GEN & XFMR OVRALL DIFF REG	1CC3: Supervisory light	
H-7 MPT L/O RELAY TRIP	None	MONITOR relay status at 100' Relay Room
H-8 APT L/O RELAY TRIP	None	MONITOR relay status at 100' Relay Room
H-9 DEFOAM TK LVL HI	None	None

ATTACHMENT 7
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WINDOW BOX H

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
H-10 AIR SIDE SEAL OIL PMP EMER BKR CLSD	None	MONITOR Normal and Emergency Breakers in vicinity of Seal Oil Skid
H-11 H ₂ SIDE SEAL OIL LVL LO	None	MONITOR Hydrogen Side Drain Regulator Tank is >1/4 on local bullseye
H-12 GEN DIFF & LOSS OF FLD	1CC3: Supervisory light	
H-13 GEN EXC OVREXC PROT/VREG TRIP	1CC3: Generator Voltmeter VA-5606 Generator Exciter Field Current IA-5113	MONITOR voltage regulator local panel for proper operation
H-14 GEN & XFMR OVRALL DIFF BU	1CC3: Supervisory light	
H-15 MPT ø 1 TRBL	None	MONITOR local annunciator
H-16 APT TRBL	None	MONITOR parameters
H-17 CO ₂ STOR PRESS HI OR LO	None	MONITOR 4 Ton Storage tank level, pressure, and compressor operation locally
H-19 GEN STAT COIL WTR FLO LO	1CC3: Stator Cooling Pump run status	MONITOR alarms on Stator Cooling Water Annunciator Panel.

ATTACHMENT 7
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WINDOW BOX H

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
H-20 GEN NEG ϕ SEQ	1CC3: Supervisory light	
H-21 GEN EXC V. REG TRBL	None	MONITOR alarms on Voltage Regulator local panel.
H-22 UNIT ISOL TRIP REG	1CC3: 1-5 & 5-6 500KV Bkrs	MONITOR relay status at 100' Relay Room
H-23 MPT ϕ 2 TRBL	None	MONITOR local annunciator
H-25 H ₂ TEMP HI	Plant Computer: Points T1042A, T2650A, T2651A, and T2662A	
H-26 EMER SEAL OIL PRESS LO	None	MONITOR pressure on PL-1833 >85 psig
H-27 GEN STAT COIL WTR FLOW LO LO	1CC3: Stator Cooling Pump run status	MONITOR indications at Stator Cooling Water skid locally
H-28 GEN/EXC FIELD GRND	None	MONITOR Gen/Exc field ground detector at Voltage Regulator local panel
H-29 GEN/EXC VOLTS/HZ PROT	None	MONITOR Volts/Hertz at Voltage Regulator local panel

ATTACHMENT 7
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WINDOW BOX H

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
H-30 UNIT ISOL TRIP BU	1CC3: 1-5 & 5-6 500KV Bkrs	MONITOR relay status at 100' Relay Room
H-31 MPT ϕ 3 TRBL	None	MONITOR local annunciator
H-33 H ₂ PRESS HI OR LO	1CC3: Bezel indicator PA-5131	
H-34 SEAL OIL Δ P LO	None	MONITOR Seal Oil Discharge pressure with Generator Hydrogen pressure at Seal Oil Skid
H-35 GEN STAT CLG WTR IN/OUT COND HI	1RP7: KA1952	MONITOR alarms on Stator Cooling Water Annunciator Panel
H-36 GEN LEADS TRBL	Plant Computer: Points T2800A, T2801A, & T2802A	MONITOR alarms on Generator Isolated Phase Bus Annunciator Panel
H-37 LOSS OF VOLT REG & METR PT SENSING	None	MONITOR at Voltage Regulator local panel.
H-38 GEN EXC DIGIT REG TRANSFER	None	MONITOR Voltage Regulator local panel for proper operation of digital regulator

ATTACHMENT 7
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WINDOW BOX H

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
H-39 MPT OVREXC	None	MONITOR relay status at 100 el. Relay Room
H-41 H ₂ PURITY LO OR LO-LO	1CC3: Bezel indicator XA-5132	MONITOR H2 Purity Indicator 1XA20228 locally at 465-1
H-42 BULK H ₂ TRBL	None	MONITOR H ₂ pressure locally on PL-3304: High alarm: 120 psig Changeover: 90 psig Low: 80 psig
H-43 GEN STAT CLG SYS TRBL	None	MONITOR all alarms at Stator Cooling Water Annunciator Panel.
H-44 GEN STAT COIL IN/OUT TEMP HI	Plant Computer: Points T0073A and T0074A	MONITOR temperatures at Stator Cooling Water Skid locally
H-46 SMOKE IN GEN	None	MONITOR Generator Condition Monitor (XA-8577) 120' TGA
H-47 MPT HARMONIC OVRCUR	System Operator's SMD VARS ALARM	NOTIFY System Operator to immediately notify Salem if SMD VARS ALARM occurs
H-48 TRANSIENT DATA RCDR TRBL	None	Local operator MONITOR Transient Data Recorder in the 100' Relay Rm

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WINDOW BOX J

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
J-1 1A 4KV VTL BUS DIFF PROT	1CC3: BUS VOLTAGE indications 1RP6: Supervisory lights	
J-2 1B 4KV VTL BUS DIFF PROT	1CC3: BUS VOLTAGE indications 1RP6: Supervisory lights	
J-3 1C 4KV VTL BUS DIFF PROT	1CC3: BUS VOLTAGE indications 1RP6: Supervisory lights	
J-4 1A DG URGENT TRBL	1CC3: DIESEL GENERATOR bezel 1A TROUBLE	MONITOR alarms on 1A DG Annunciator Panel
J-5 1H 4KV GRP BUS DIFF/OVRLD	1CC3: BUS VOLTAGE indications 1RP6: Supervisory lights	
J-6 1E 4KV GRP BUS DIFF/OVRLD	1CC3: BUS VOLTAGE indications 1RP6: Supervisory lights	
J-7 1F 4KV GRP BUS DIFF/OVRLD	1CC3: BUS VOLTAGE indications 1RP6: Supervisory lights	
J-8 1G 4KV GRP BUS DIFF/OVRLD	1CC3: BUS VOLTAGE indications 1RP6: Supervisory lights	

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WINDOW BOX J

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
J-9 1A 4KV VTL BUS OVRD	1CC3: BUS VOLTAGE indications 1RP6: Supervisory lights	
J-10 1B 4KV VTL BUS OVRD	1CC3: BUS VOLTAGE indications 1RP6: Supervisory lights	
J-11 1C 4KV VTL BUS OVRD	1CC3: BUS VOLTAGE indications 1RP6: Supervisory lights	
J-12 1B DG URGENT TRBL	1CC3: DIESEL GENERATOR bezel 1B TROUBLE	MONITOR alarms on 1B DG Annunciator Panel
J-13 11HSD BKR FAIL	1CC3: Breaker indications 1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
J-14 11ESD BKR FAIL	1CC3: Breaker indications 1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
J-15 12FSD BKR FAIL	1CC3: Breaker indications 1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room

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WINDOW BOX J

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
J-16 12GSD BKR FAIL	1CC3: Breaker indications 1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
J-17 1A 4KV VTL BUS UNDRVOLT	1CC3: BUS VOLTAGE indications	
J-18 1B 4KV VTL BUS UNDRVOLT	1CC3: BUS VOLTAGE indications	
J-19 1C 4KV VTL BUS UNDRVOLT	1CC3: BUS VOLTAGE indications	
J-20 1C DG URGENT TRBL	1CC3: DIESEL GENERATOR bezel 1C TROUBLE	MONITOR alarms on 1C DG Annunciator Panel
J-21 1AHGD BKR FAIL	1CC3: Breaker indications	MONITOR relay status at 100' Relay Room
J-22 1AEGD BKR FAIL	1CC3: Breaker indications 1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
J-23 1BFGD BKR FAIL	1CC3: Breaker indications 1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room

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WINDOW BOX J

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
J-24 1BGGD BKR FAIL	1CC3: Breaker indications 1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
J-25 13ASD BKR FAIL	1CC3: Breaker indications 1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
J-26 13BSD BKR FAIL	1CC3: Breaker indications 1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
J-27 13CSD BKR FAIL	1CC3: Breaker indications 1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
J-28 FO DAY TK LVL TRBL	1CC3: DIESEL GENERATOR bezel TROUBLE	Determine Day Tank Levels (any one <18" = Alarm)
J-33 14ASD BKR FAIL	1CC3: Breaker indications 1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
J-34 14BSD BKR FAIL	1CC3: Breaker indications 1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
J-35 14CSD BKR FAIL	1CC3: Breaker indications 1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room

ATTACHMENT 8
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WINDOW BOX J

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
J-37 4KV GRP BUS UNDRFREQ	Aux. Annunciator: Point Nos. 660, 665, 670, and 675	
J-38 4KV GRP BUS UNDRVOLT	Aux. Annunciator: Point Nos. 663, 664, 673, and 674	
J-41 1ADD BKR FAIL	1CC3: Breaker indications 1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
J-42 1BDD BKR FAIL	1CC3: Breaker indications 1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
J-43 1CDD BKR FAIL	1CC3: Breaker indications 1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
J-45 TURB BLDG 460-230V BUS HOT SPOT	None	MONITOR locally
J-46 AUX BLDG 460-230V BUS HOT SPOT	None	MONITOR locally

ATTACHMENT 9
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WINDOW BOX K

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
K-1 11-13 A CW SCRNWSH TRBL	1CC3: Screen Well d/p meter 1RP5: Screen speed and differential	MONITOR Traveling Screens
K-2 4KV CW BUS DIFF OVRLD	1RP6: Supervisory lights 1CC3: CW Pmp Status	MONITOR CW System status on SCADA operator console at CW Switchgear Bldg
K-3 13/4KV STA XFMR L/O RELAY TRIP	1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
K-4 13KV L/O RELAY TRIP	1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
K-5 500/13KV STA XFMR L/O RELAY TRIP	1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
K-6 500KV RNG L/O RELAY TRIP	1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
K-7 500KV LN 11X REG/BU POT FAIL	1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
K-8 CIRC WTR SWGR BLDG 125VDC TRBL	None	MONITOR system status at CW Switchgear Bldg

ATTACHMENT 9
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WINDOW BOX K

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
K-9 11-13 B CW SCRNWSH TRBL	1CC3: Screen Well d/p meter 1RP5: Screen speed and differential	MONITOR Traveling Screens
K-10 13CW1AD BKR FAIL	1CC3: Breaker indications	MONITOR breaker status at CW Switchgear Bldg
K-11 11 STA XFMR TRBL	1RP6: Supervisory lights	MONITOR 11 Sta Xfmr parameters MONITOR relay status at 100' Relay Room
K-12 13KV GND FAULT	1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
K-13 1 STA XFMR TRBL	1RP6: Supervisory lights	MONITOR 1 Sta Xfmr parameters MONITOR relay status at 100' Relay Room
K-14 500KV BKR FAIL	1CC3: Breaker indications	MONITOR relay status at 100' Relay Room
K-15 500KV LN 21X REG/BU POT FAIL	1RP6: PWT T Regular and Backup circuit lights	
K-16 SCADA SYSTEM TRBL	None	MONITOR system status on SCADA Operator Console in CW Switchgear Bldg Battery Room
K-18 14CW9AD BKR FAIL	1CC3: Breaker indications	MONITOR breaker status at CW Switchgear Bldg

ATTACHMENT 9
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WINDOW BOX K

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
K-19 12 STA XFMR TRBL	Unit 2 OHA K-36 1RP6: Supervisory lights	MONITOR 12 Sta Xfmr parameters MONITOR relay status at 100' Relay Room
K-20 13KV BKR FAIL	1CC3: Breaker indications	MONITOR relay status at 100' Relay Room
K-21 2 STA XFMR TRBL	1RP6: Supervisory lights	MONITOR 2 Sta Xfmr parameters MONITOR relay status at 100' Relay Room
K-22 500KV BKR TRBL	1RP6: Supervisory lights	MONITOR the alarm panels at the following 500KV Breakers: 1-5 (12X) 1-8 (20X) 2-8 (21X) 5-6 (10X) 2-6 (11X)
K-23 500KV LN 11X RCVR REM TRIP	1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
K-24 OSCIL TRBL	None	MONITOR oscillograph status at 100' Relay Room
K-25 CW SCRNSH PRESS LO	None	Local operator to MONITOR pressure
K-26 1CW8AD BKR FAIL	1CC3: Breaker indications	MONITOR breaker status at CW Switchgear Bldg

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WINDOW BOX K

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
K-27 13 STA XFMR TRBL	1RP6: Supervisory lights	MONITOR 13 Sta Xfmr status on SCADA operator console at CW Switchgear Bldg MONITOR 13 Sta Xfmr parameters
K-28 13 KV BKR TRBL	1RP6: Supervisory lights	MONITOR the alarm panels at the following 13KV Breakers: BS A-F, BS C-D MONITOR Bkr status on SCADA operator console at CW Switchgear Bldg
K-29 3 STA XFMR TRBL	1RP6: Supervisory lights	MONITOR 3 Sta Xfmr status on SCADA operator console at CW Switchgear Bldg MONITOR 3 Sta Xfmr parameters
K-31 500KV LN 21X RCVR REM TRIP	1RP6: Supervisory lights	MONITOR relay status at 100' Relay Room
K-32 OIL/WATER SEPARATOR TROUBLE	Oil/Water Separator local panels (Yard).	MONITOR Oil/Water Separator system alarm status on SCADA Operator Panel in CW Switchgear Bldg Battery Room.
K-33 CW BRG LUBE PUMP 1 OR 3 TRBL	None	MONITOR Brg Hdr Pressure
K-34 4KV CW BUS UNDRVOLT	1CC3: Breaker indications	MONITOR CW System status on SCADA Operator Console in CW Switchgear Bldg Battery Room

ATTACHMENT 9
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WINDOW BOX K

WINDOW	ALTERNATE INDICATION(S)	COMPENSATORY ACTIONS
K-35 14 STA XFMR TRBL	1RP6: Supervisory lights	MONITOR 14 Sta Xfmr status on SCADA operator console at CW Switchgear Bldg MONITOR 14 Sta Xfmr parameters
K-36 22 STA XFMR L/O RELAY TRIP	Unit 2 OHA K-3 1RP6: Supervisory lights	MONITOR 22 Sta Xfmr parameters MONITOR relay status at 100' Relay Room
K-37 4 STA XFMR TRBL	None	MONITOR 4 Sta Xfmr status on SCADA operator console at CW Switchgear Bldg MONITOR 4 Sta Xfmr parameters
K-39 500KV LN 11X TRBL	1CC3: Supervisory lights	MONITOR relay status at 100' Relay Room
K-41 NaClO TRBL	None	Chemistry to MONITOR Chlorination System
K-42 CW SWITCHGEAR TRBL	1RP6: Supervisory lights 1CC3: CW Pmp Status	MONITOR CW System status on SCADA operator console at CW Switchgear Bldg
K-43 GAS TURB TRBL	1RP6: Indication and controls	MONITOR gas turbine status
K-47 500KV LN 21X TRBL	1CC3: Supervisory lights	MONITOR relay status at 100' Relay Room

ATTACHMENT 10
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ANNUNCIATOR GROUND DETECTION

1.0 PRIMARY SER:

NOTE

Only 1 unacknowledged OHA OR corresponding CRT point is required to prove Scanner is functional.

- ___ 1.1 **CIRCLE** at least one Flashing OHA Window for each Scanner.
- ___ 1.2 **IF** the OHA System is NOT responding,
THEN CIRCLE at least one unacknowledged CRT/Local Printer Point for each Scanner.

NOTE

A minimum of 3 functional Scanners is required for table to be considered complete.

Scanner	Ground Detection Switch	Flashing OHA Windows (minimum of one per box required for functional scanner)	CRT/Local Printer Points (minimum of one per box required for functional scanner)	Results (1)
1	1 (222575)	A: 25, 31, 46 B: 3, 47 E: 42	2, 12, 7 5, 20 4	
2	5 (222577)	C: 5, 6 D: 14, 20 E: 9 G: 32	98, 99 101, 122 106 124	
3	6 (222577)	B: 48 C: 8, 37 D: 5, 39 E: 25	151 129, 137 143, 144 135	
4	9 (222579)	D: 2 E: 20, 44 G: 1 K: 1	196 207, 215 201 203	

(table continued on next page)

ATTACHMENT 10
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ANNUNCIATOR GROUND DETECTION

1.0 PRIMARY SER: (continued)

Scanner	Ground Detection Switch	Flashing OHA Windows (minimum of one per box required for functional scanner)	CRT/Local Printer Points (minimum of one per box required for functional scanner)	Results (1)
5	13 (222581)	A: 4 G: 6, 14 K: 3	304 293, 299 307	
8	20 (222759)	A: 6 H: 41, 42 K: 4, 8, 19	487 477, 484 454, 465, 485	
9	21 (222761)	A: 6 E: 40 K: 27, 35	534 531 532, 533	
10	25 (222763)	A: 6 J: 17, 18, 45 K: 12, 20	631 625, 626, 629 616, 622	
11	28 (222764)	A: 6 C: 24 E: 11, 19 G: 38, 46	687 684 696, 704 695, 703	
12	29 (222579)	H: 5, 13, 21, 38	705, 708, 719, 727	

- (1) Results are SAT when 1 or more OHA AND/OR CRT point went into alarm OR cleared with the operation of the Ground Detector Switch.

___ 1.3 Are there at least 3 Scanners functional? Yes: ___ No: ___

___ 1.4 Return to Step 3.14D.

ATTACHMENT 10
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ANNUNCIATOR GROUND DETECTION

2.0 BACKUP SER:

NOTE

Only 1 unacknowledged OHA OR corresponding CRT point is required to prove Scanner is functional.

- ___ 2.1 **CIRCLE** at least one Flashing OHA Window for each Scanner.
- ___ 2.2 **IF** the OHA System is **NOT** responding,
THEN CIRCLE at least one unacknowledged CRT/Local Printer Point for each Scanner.

NOTE

A minimum of 3 functional Scanners is required for table to be considered complete.

Scanner	Ground Detection Switch	Flashing OHA Windows (minimum of one per box required for functional scanner)	CRT/Local Printer Points (minimum of one per box required for functional scanner)	Results (1)
1	1 (222575)	A: 25, 31, 46 B: 3, 47 E: 42	2, 12, 7 5, 20 4	
2	5 (222577)	C: 5, 6 D: 14, 20 E: 9 G: 32	98, 99 101, 122 106 124	
3	6 (222577)	B: 48 C: 8, 37 D: 5, 39 E: 25	151 129, 137 143, 144 135	
4	9 (222579)	D: 2 E: 20, 44 G: 1 K: 1	196 207, 215 201 203	

(table continued on next page)

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ANNUNCIATOR GROUND DETECTION

2.0 PRIMARY SER: (continued)

Scanner	Ground Detection Switch	Flashing OHA Windows (minimum of one per box required for functional scanner)	CRT/Local Printer Points (minimum of one per box required for functional scanner)	Results (1)
5	13 (222581)	A: 4 G: 6, 14 K: 3	304 293, 299 307	
8	20 (222759)	A: 6 H: 41, 42 K: 4, 8, 19	487 477, 484 454, 465, 485	
9	21 (222761)	A: 6 E: 40 K: 27, 35	534 531 532, 533	
10	25 (222763)	A: 6 J: 17, 18, 45 K: 12, 20	631 625, 626, 629 616, 622	
11	28 (222764)	A: 6 C: 24 E: 11, 19 G: 38, 46	687 684 696, 704 695, 703	
12	29 (222579)	H: 5, 13, 21, 38	705, 708, 719, 727	

- (1) Results are SAT when 1 or more OHA AND /OR CRT point went into alarm OR cleared with the operation of the Ground Detector Switch.

___ 2.3 Are there at least 3 Scanners functional? Yes: ___ No: ___

___ 2.4 Return to Step 3.22D.

ATTACHMENT 10
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ANNUNCIATOR GROUND DETECTION

3.0 INDEPENDENT VERIFICATION:

Ground Detection Isolation Panel (front of OHA Cabinet 118-1)		
Ground Isolation Switch	Required Position	IV
SW1	NORM (UP)	
SW5		
SW6		
SW9		
SW13		
SW20		
SW21		
SW25		
SW28		
SW29		

**ATTACHMENT 11
(Page 1 of 1)**

AVS PLC INDICATIONS

1.0 **CIRCLE** all indication that are illuminated:

140 CPS 211 00 PS 24 VDC		140 DDI 353 00 24 VDC IN				140 DDO 353 00 24 VDC OUT				140 CPU 113 02 CONTROLLER	
Active		M	Active		N	R	Active		P	Active	
Ready	Fault	1	9	17	25	1	9	17 (1)	25 (2)	Ready	Fault
Run	Bal Live	2	10	18	26	2	10	18	26	Run	Bal Live
Pwr OK		3	11	19	27	3	11	19	27	Pwr OK	
Modbus	Com Err	4	12	20	28	4	12	20	28	Modbus	Com Err
Modbus	Error A	5	13	21	29	5	13	21	29	Modbus	Error A
Com Act	Error B	6	14	22	30	6	14	22	30	Com Act	Error B
Primary		7	15	23	31	7	15	23	31	Primary	
Mem Prt	Standby	8	16	24	32	8	16	24	32	Mem Prt	Standby

- (1) Output LED's 17, 18, 19, 20, 21 are associated with EVEN DAC Board Train AND AVS DAC Board 22.
- (2) Output LED's 25, 26, 27, 28, 29 are associated with ODD DAC Board Train AND AVS DAC Board 23.

ATTACHMENT 12
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COMPLETION SIGN-OFF SHEET

1.0 **COMMENTS:** (Include Entry Conditions, procedure deficiencies, and corrective actions. Attach additional pages as necessary.)

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

ATTACHMENT 12
(Page 2 of 2)

COMPLETION SIGN-OFF SHEET

2.0 SIGNATURES:

[illegible]

3.0 SM/CRS FINAL REVIEW AND APPROVAL:

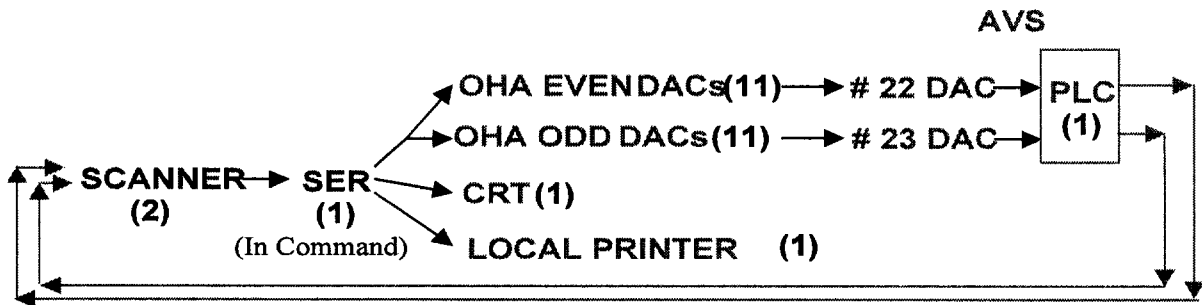
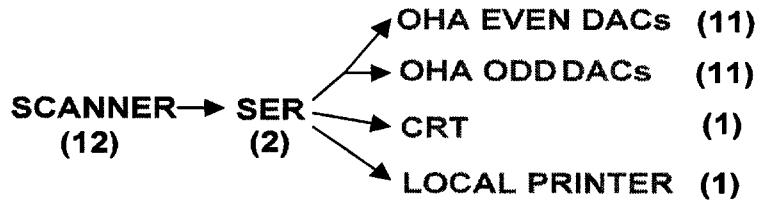
This procedure with Attachment 12 is reviewed for completeness and accuracy. Entry conditions and all deficiencies, including corrective actions, are clearly recorded in the COMMENTS Section above.

Signature: _____ Date: _____
SM/CRS

EXHIBIT 1
(Page 1 of 6)

OVERHEAD ANNUNCIATOR SYSTEM

BASIC SYSTEM



GROUND DETECTOR ISOLATION SWITCH

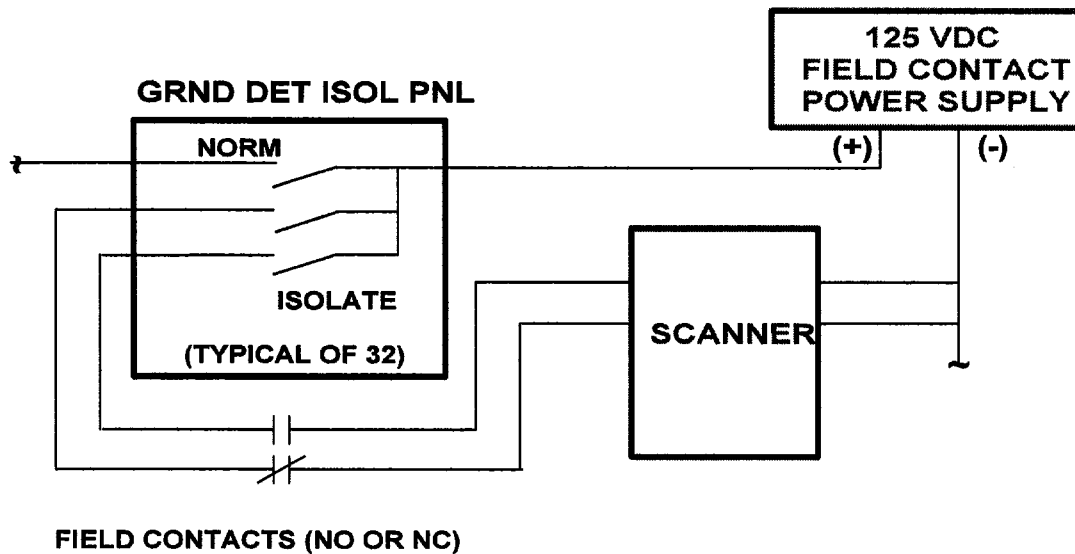


EXHIBIT 1
(Page 2 of 6)**OVERHEAD ANNUNCIATOR SYSTEM****1.0 ANNUN TEST** (previously known as Lamp Test):**WHAT IT DOES:**

- Voltage applied to all OHA Alarm Windows (480 alarm boxes)
- Horn Sound
- **Unlatched (Test) "Logic Errors" (LEs)** sent to all 11 DAC pair LE relays
- All 6 Console Group Alarms actuate
- OHA A-9, ANNUN TRBL actuates
- 1CC1 console OVERHEAD ANNUN TROUBLE actuates

NOTE:

A SAT "ANNUN TEST" does NOT mean that the OHA System is NOT degraded

SAT "ANNUN TEST" VERIFIES:

- Each window box lamp functional
- 3 Scanners (#1, 2, 4) functional
- SER in-command functional (NOT locked up)
- Functionality of the 3 types of peripherals;
OHA via OHA A-9, CRT and Local Printer via printouts
- Minimum of 2 peripherals required to function (allows for single failure)

UNSAT "ANNUN TEST":

- S1.OP-AB.ANN-0001(Q) is entered
- Conduct "Manual Alarm Testing"

EXHIBIT 1
(Page 3 of 6)

OVERHEAD ANNUNCIATOR SYSTEM

2.0 LOGIC ERRORS (LEs):

(VTD 901167 Sht 1, AVS One Line Diagram located in Control Room Area, OWD drawer)

2 TYPES:

◆ **Unlatched (Test) LEs:**

- NOT through DAC board, so NOT latched, returns to NORMAL as soon as ANNUN TEST Switch is released
- Cause: ANNUN TEST Switch in "TEST" position

◆ **Latched (True) LEs:**

- Through DAC board, cannot change state until SER is RESET
- Date, time & alarm state fixed until SER is RESET
- Causes:
 - ▶ Data port communication errors (parity, framing, overrun)
 - ▶ Data port inactive for >53 seconds
 - ▶ Configuration memory check sum error
 - ▶ Power failure (24VDC for lamps or internal electronic power supply)
 - ▶ Shorted lamp driver

MISCELLANEOUS:

- Any DAC board LE cause that results in the board NOT being able to retransmit the signal to the next DAC board in the respective ODD or EVEN string causes all downstream DAC boards on that string to go into **Latched (True)** LE alarm state, e.g., multiple **Latched (True)** LE alarms
- If the communication path is broken (as described above) should also get a 1CC1 AVS ANNUN FAULT alarm
- If the communication path to the next DAC board is NOT affected by the cause of the LE, it is possible to have a single **Latched (True)** LE alarm
- Alarms on the CRT/Local Printer are for DAC board pairs (0/1, 2/3, etc.). Cannot tell from MCR if EVEN or ODD or both DAC trains affected
- Can tell by quick observation of AVS PLC Output Module Trouble Alarm LEDs:
 - ▶ LEDs #17, 18, 19, 20, & 21, associated with DAC 22, EVEN DAC board train
 - ▶ LEDs #25, 26, 27, 28, & 29, associated with DAC 23, ODD DAC board train
- Even if all 11 **Latched (True)** LEs are in alarm, its possible that only 1 DAC train (EVEN or ODD) is affected and the other DAC train may be fully functional
- Even if both (EVEN or ODD) DAC trains are affected and are totally non-functional, it doesn't mean that the OHA System is non-functional from an ECG perspective. It depends on whether or not the SER and the appropriate number of other peripherals are functional. The OHA window boxes are only one peripheral.

EXHIBIT 1
(Page 4 of 6)**OVERHEAD ANNUNCIATOR SYSTEM****3.0 ANNUNCIATOR VERIFICATION SYSTEM (AVS):**

(VTD 901167 Sht 1, AVS One Line Diagram located in Control Room Area, OWD drawer)

PRIME PURPOSE:

- Detect SER in-command lock up
- Will detect all of the following failures:
 - ▶ Stimulus Scanner "a" (#6)
 - ▶ Stimulus Scanner "b" (#11)
 - ▶ SER in-command lock up
 - ▶ Break in EVEN and/or ODD DAC train communication paths
 - ▶ Failure of DAC 22 and/or DAC 23

MISCELLANEOUS:

- Once AVS detects a stimulus fault, it is latched in the PLC.
This alarm can only be cleared with PB-5 next to the PLC or by deenergizing the PLC

STIMULUS CYCLE TIME (Refer to Figure 1 on next page):

- 8 minutes total:
 - ▶ 4 minutes Stimulus Scanner "a" (#6)
 - ▶ 4 minutes Stimulus Scanner "b" (#11)
- Contact CLOSED: 1 minute propagation time followed by 1 minute verification time,
Then contact OPEN: 1 minute propagation time followed by 1 minute verification time.
- Looking for presence of stimulus alarm contact closed and for contact to reopen, monitors for each condition to be present for 1 continuous minute.

EXHIBIT 1
(Page 5 of 6)

OVERHEAD ANNUNCIATOR SYSTEM

4.0 **FIGURE 1:**

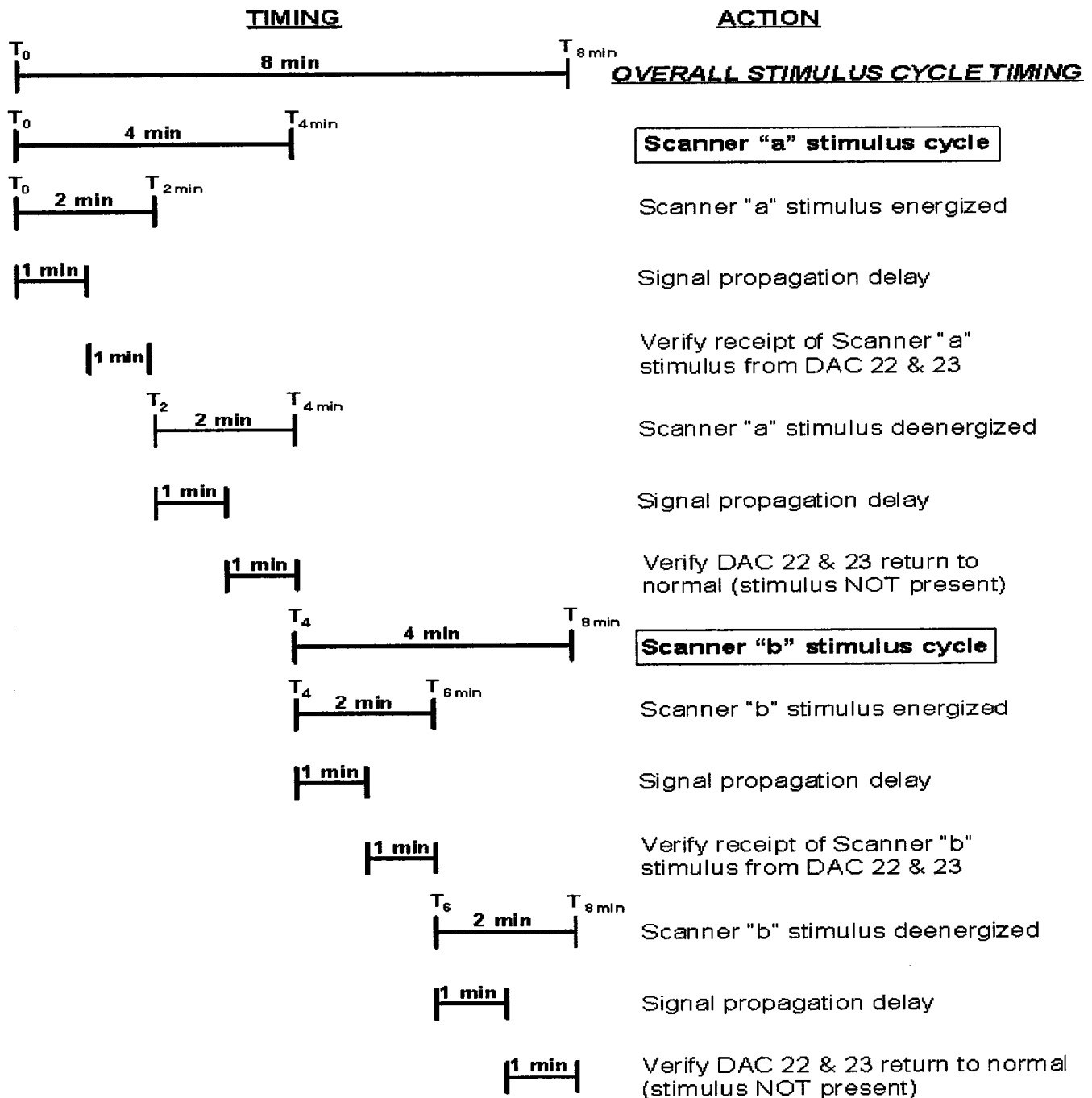


EXHIBIT 1
(Page 6 of 6)

OVERHEAD ANNUNCIATOR SYSTEM

5.0 MANUAL ALARM TESTING:

WHEN USED:

- In S1.OP-AB.ANN-0001(Q) and following an UNSAT "ANNUN TEST"

HOW IT WORKS:

- Utilizes OHA Ground Detector Isolation Switches
- Use 10 of the 32 installed switches (#1, 5, 6, 9, 13, 20, 21, 25, 28, & 29)
- These switches are associated with Scanners 1, 2, 3, 4, 5, 8, 9, 10, 11, & 12
- 2 positions: NORM (up) and ISOLATE (down)
 - ▶ NORM - associated field contacts are connected to the respective Scanner input
 - ▶ ISOLATE - open circuits all of the respective Scanner contacts that interface to the Scanner through that switch
- The 10 switches are toggled from NORM to ISOLATE and back to NORM again
 - ▶ This causes the respective Scanner inputs to momentarily change state, which in turn causes the respective OHA window box to alarm and the CRT/Local Printer to print out the points
 - ▶ When the switch is toggled, all the Windows and CRT/Local Printer points that go through the switch will NOT necessarily cause an alarm condition. It depends on the contacts normal state, e.g., normally open and close to alarm or normally closed and open to alarm.

NOTE:

A SAT "MANUAL ALARM TEST" does NOT mean that the OHA System is NOT degraded

SAT "MANUAL ALARM TEST" VERIFIES:

- Minimum of 3 Scanners (3/12 = 25%) functional
- SER in-command is functional (NOT locked up)
- At least 1 peripheral functional [already in S1.OP-AB.ANN-0001(Q)]

UNSAT "MANUAL ALARM TEST":

- OHA System is NOT functional

LOSS OF OVERHEAD ANNUNCIATOR SYSTEM TECHNICAL BASES DOCUMENT

1.0 REFERENCES

1.1 Technical Documents:

- A. Final Safety Analysis Report, Section 7.7.2.10
- B. Artificial Island Emergency Plan
- C. Event Classification Guide (ECG)

1.2 Procedures:

- A. S1.OP-AR.ZZ-0001(Q), Overhead Annunciator Window A
- B. S1.OP-AR.ZZ-0002(Q), Overhead Annunciator Window B
- C. S1.OP-AR.ZZ-0003(Q), Overhead Annunciator Window C
- D. S1.OP-AR.ZZ-0004(Q), Overhead Annunciator Window D
- E. S1.OP-AR.ZZ-0005(Q), Overhead Annunciator Window E
- F. S1.OP-AR.ZZ-0007(Q), Overhead Annunciator Window G
- G. S1.OP-AR.ZZ-0008(Q), Overhead Annunciator Window H
- H. S1.OP-AR.ZZ-0009(Q), Overhead Annunciator Window J
- I. S1.OP-AR.ZZ-0010(Q), Overhead Annunciator Window K
- J. S1.OP-SO.ANN-0001(Q), Overhead Annunciator Operation
- K. 1-EOP-TRIP-1, Reactor Trip or Safety Injection
- L. SH.OP-AP.ZZ-0110(Q), Use and Development of Operating Logs

1.3 Drawings:

- A. Refer to individual OHA Alarm Response Procedures
- B. 232976, Control Area Annunciator System - Power Distribution
- C. 604567, Overhead Annunciator System Trouble Alarms
- D. VTD 901167, Annunciator Verification System - One Line Diagram

1.4 Others:

- ◆ DCP 1EC-3372, 11-14MS167 Valve Drift Alarm
- ◆ DCP 1EC-3384, Replacement of Main Generator Hydrogen Gas Purity Meter
- ◆ DCP 1EC-3449, Salem Unit 1 Voltage Regulator replacement
- ◆ DCP 1EC-3577, Annunciator Verification System Upgrade
- ◆ DCP 1EC-3648, SSPS Phase A and Containment Ventilation Isolation Modification
- ◆ DCP 1EC-3668 Pkg. 6, SW Accumulator Tank Instrumentation
- ◆ DCP 1EC-3681, Steam Generator Feed Pump Vibration Monitoring Update
- ◆ DCP 1EC-3696, 1PR1 and 1PR2 PORVs Control Modifications
- ◆ DCP 1EC-3733, Auxiliary Annunciator System Replacement Project
- ◆ DCP 1EC-3522, N16 Main Steam Line Radiation Monitoring System (1R53)
- ◆ DCP 80008587, Restore the generator breaker tripping function of the CV-8 relay
- ◆ DCP 80048556, EHC Digital Upgrade
- ◆ DCP 80085908, Replacement of Hydrogen Purity Monitor (2006)
- ◆ CAPR 70045986, Root Cause Evaluation
- ◆ S-C-ANN-ECS-0163, Overhead Annunciator Verification System

1.5 Conformance Documents:

- A. INCI 92-822

1.6 Industry Concerns:

- A. NRC INFO 88-05 Fire in the Annunciator Control Cabinets

2.0 DISCUSSION

2.1 This procedure provides the direction necessary for coping with a partial or total loss of the Overhead Annunciator (OHA) System. This discussion is intended to provide information concerning the basis for directed actions and the logic behind the procedure flow path. It is NOT intended to provide direction in addition to the procedure.

2.2 Entry Conditions:

- A. Any time a partial or total loss of the Overhead Annunciator (OHA) System is suspected or occurs as recognized by one or more the following:
- ◆ OHA(s) versus plant parameters not in alarm when expected
 - ◆ OHA System fault as detected by the Annunciator Verification System (AVS) Programmable Logic Controller (PLC), CRT Point No.92
 - ◆ AVS PLC Failure has occurred as indicated by CRT Point 565, AVS FAULT DETECTED - IMPLEMENT HEIGHTENED AWARENESS
 - ◆ OHA System P1 Port failed indication on CRT
 - ◆ CRT time not updating
 - ◆ Aux. Annunciator alarm received without associated OHA
 - ◆ No OHA occurs during plant activities that normally initiates OHA
 - ◆ Routine functional testing or maintenance identifies abnormality
 - ◆ Primary (SER A) auto transfers to Backup (SER B)
 - ◆ 1CC1 OVERHEAD ANNUN TRBL lamp is illuminated when no testing or maintenance is in progress
 - ◆ 1CC1 AVS ANNUN FAULT alarm pushbutton alarms or reflashes

2.3 Immediate Actions:

None

2.4 Subsequent Actions:

- A. General - throughout this procedure, the term "functional" means some part(s) of the OHA System is working. Functional should NOT be construed to convey the extent that the OHA System is degraded. In fact, the OHA System may be significantly degraded, but still meet the 25% criteria specified in ECG EAL 8.2, Loss of Overhead Annunciator System. On the other hand, "non-functional" means that the OHA System is degraded to the point that it does NOT meet the ECG EAL 8.2 minimum 25% requirement.

ECG EAL 8.2 basis states that 25% is an approximation and it is NOT necessary to count individual windows, etc., to verify the 25%. In this procedure, the ECG 25% requirement is determined by dividing the number of scanners that are functional by the total number of scanners, which is 12. So to meet the 25% requirement of the ECG, a minimum of 3 scanners are required to function, ($3/12 = 25\%$).

Throughout this procedure, an effort has been made to specify the minimum requirement for SAT or UNSAT completion of test steps. This philosophy is further carried into the steps following the test steps so that the procedure user can keep track of where they are in the flow of this procedure.

All of these items are factored into this procedure because of the short time frame in which the ECG declaration has to be made, e.g., 15 minutes. ECG EAL 8.2 basis should be consulted for further guidance about the 15 minute clock.

Exhibit 1 has been included in this procedure to provide more detailed information concerning important system tests and indications.

Exhibit 1 contains information on ANNUN TEST, Logic Errors (LE's), AVS, AVS stimulus timing, OHA local printer printout of **Latched (true) LE's** and **Unlatched (test) LE's**, Manual Alarm Testing and a simplified system diagram.

- B. This procedure is written assuming that the NORMAL/MANUAL TRANSFER TO SER B switch is in the NORMAL position at the beginning of the procedure, e.g., Primary SER (SER A) is in-command and the Backup SER (SER B) is performing its backup function.
- C. Step 3.1 provides direction for placing the plant in a safe condition should a transient occur that requires tripping the Reactor due to unstable conditions. With a degraded OHA System, the Control Room Operators ability to quickly diagnose plant conditions during a transient becomes impeded. The intent of this step is to place the unit in a known condition when it is determined that Operator control of plant conditions is in jeopardy.

2.4 (continued)

- D. Steps 3.2 through 3.7 provide direction to determine whether the SER in-command is locked up. Step 3.2 identifies if the system recognizes the fault and whether or not DAC Board communication has been interrupted. If OHA A-9 or CRT Point No.92 is actuated, the AVS has recognized the malfunction and the system functionality will need to be evaluated (starting with Step 3.9). If neither OHA A-9 or CRT Point No.92 are actuated, the SER in-command has locked up and is NOT functioning. This requires consideration of whether or not ECG EAL 8.2 applies immediately or within 15 minutes. Steps 3.6 and 3.7 down power the annunciator system computer for reboot of the system and to reset the lockup. Down power of the system is a last resort for compensatory actions of a malfunctioning system. Cycling the power supply switches is done because this resets both the SER's and scanners. Whereas, depressing the SER RESET pushbutton only resets the respective SER. After down power and restarting the system, the Operator is directed to Step 3.8.
- E. Step 3.8 has the Operator determine if the SER in-command is still locked up. If it is, the Operator is directed to Step 3.17 to perform a manual transfer to SER B. If the Operator determines that the SER in-command is NOT locked up, he continues with Step 3.9.
- F. Step 3.9 directs evaluation of conditions/evolutions in progress which could result in alarms which would not be received due to failure of the OHA System. Depending on the status of the evolutions, it may be desirable to allow these evolutions to continue rather than create transient conditions which could result in an alarm NOT received. The bases for determining actions in this step is at SM/CRS discretion and is expected to be based on impact to plant stability and available means of alternate indications for alarms that may be affected by these evolutions.
- G. Step 3.10 determines if the OHA System is operating with SER A (PRI) in-command, which is the normal system configuration. Status lights (LEDS) are available to the Operator for this indication. When answered NO, direction is given to determine if SER B is in-command by going to Step 3.15.
- H. Step 3.11 and 3.19 verifies the functional status of the AVS system. This step is performed so that if a satisfactory ANNUN TEST is obtained in Step 3.12, the procedure is NOT exited with the AVS NOT functioning. The AVS is checked before the ANNUN TEST is performed and corrective actions are initiated, if necessary.

2.4 (continued)

- I. Step 3.12 performs an "ANNUN TEST"
(Exhibit 1 contain more detailed information about the "ANNUN TEST"):
1. A satisfactory ANNUN TEST verifies: that the individual window box lamps are NOT blown, 3 Scanners (#1, #2, & #4) are functional, the SER in-command is functional (NOT locked-up) and the functionality of various OHA peripherals; OHA windows via OHA A-9, CRT/Local Printer via printouts.
 2. A minimum of 2 peripherals are required to function in order to have a satisfactory ANNUN TEST. Two peripherals allow for single failure of one or more of the peripherals and accounts for the fact that with a satisfactory ANNUN TEST, as part of the OHA alarm response, one would NOT even be required to enter this procedure.
 3. It must be pointed out that a satisfactory ANNUN TEST does NOT mean that the OHA system is NOT degraded.
 4. It should also be pointed out that **Unlatched (test) LE** alarms are created during the ANNUN TEST. **Unlatched (test) LE** alarms are NOT latched in the SER and should return to normal as soon as the ANNUN TEST switch is released.
 5. On the other hand, **Latched (true) LE** alarms are latched-in, in the SER and cannot change date or time until the SER's are RESET.
(Exhibit 1 contains information on the causes of **Latched (true) LE** alarms and how single or multiple **Latched (true) LE** alarms can occur).
 6. If the ANNUN TEST is SAT, then proceeded to Step 3.25.
 7. If the ANNUN TEST is UNSAT then continue to next step to perform Manual Alarm Testing.
- J. Step 3.13 is used to bypass Steps 3.14 through 3.24 when SER A (PRI) is validated functional via ANNUN TEST.

2.4 (continued)

- K. Step 3.14 performs a manual test to ensure system minimum functionality to meet the ECG requirement of 25% alarm points operating by functionally testing the response of 3 scanners, the SER in-command and one OHA System peripheral. By placing isolation switches in 'ISOLATE', window alarms will alarm, clear, or reflash. The OHA window alarms will be easily viewed as fast flashing prior to acknowledgment. If OHA windows don't respond, CRT/local printer points are used instead.

Moving switches 1, 5, 6, 9, 13, 20, 21, 25, 28, & 29 from NORM to ISOLATE and back to NORM will check system alarm function and functionality as the alarms can momentarily be used as an OHA test. These 10 switches are associated with 1, 2, 3, 4, 5, 8, 9, 10, 11, & 12. The isolation switch removes 125VDC power from the field contact alarm circuit, falsely alarming but functionally testing the OHA alarm capability. (Exhibit 1 contains more information on Manual Alarm Testing) (CAPR 70045986 / 70088954).

If Manual Alarm Testing is SAT, then proceed to Step 3.25.

If Manual Alarm Testing is UNSAT, then proceed to Step 3.17 to perform a Manual Transfer to SER B.

- L. Steps 3.15 and 3.16 determine if the OHA System is operating with SER B (BACK UP) in-command. SER B (BACK UP) should be in-command anytime SER A is failed.

The watchdog timer circuit should initiate the automatic transfer from SER A to B or vice versa when the SER in-command locks up (assuming that the NORMAL/MANUAL TRANSFER TO SER B switch is in the NORMAL position). When SER B is in-command, the Operator is sent to Step 3.19. When SER B is NOT in-command, then neither SER is in-command. If the ECG 15 minute clock has expired, then ECG EAL 8.2 applies and, if applicable, an event is declared. Even if the 15 minuted clock has expired, the Operator will still proceed to Step 3.17 to perform a Manual Transfer to SER B to try and get the system functioning again.

- M. Step 3.17 is performed when SER B is NOT in-command and attempts to force SER B into taking command:

- ◆ Aligning Printer Switch for SER B (BACKUP).
- ◆ Forces a manual transfer to SER "B" (BACK UP) and verifies, by LED lamp indication, that manual transfer is completed.
- ◆ The status of AVS PLC LED's is recorded in Attachment 12.
- ◆ The AVS PLC is reset using PB5 - PLC FAULT DETECT RESET.

2.4 (continued)

- N. Step 3.18 verifies that SER B is in-command. If SER B is in-command, then the Operator is sent to the next step to begin functional testing. If SER B is NOT in-command, then the Operator is sent to Step 3.23.
- O. Steps 3.19 through 3.22 performs the same actions on SER B that were performed in SER A in Steps 3.11 through 3.14.
- P. Step 3.23 is reached when SER A and SER B are NOT functioning. The OHA System is non-functional and ECG EAL 8.2 is applicable at that time (If NOT deemed applicable prior to this step by running out of time).
- Q. Step 3.24 is a transition step to Step 3.31 which provides the contingency action when the OHA System is NOT functioning at all.
- R. Step 3.25 is reached when the minimum OHA System components are functional. It provides guidance on ECG EAL 8.2 applicability and directs corrective actions to be initiated.
- S. Step 3.26 determines the status of the AVS System. When the AVS System is NOT functioning properly, corrective actions are initiated to repair the AVS and 10 minute manual alarm checks are commenced until the system is repaired (Steps 3.27 and 3.28). When the AVS System is functioning properly, Step 3.26 is bypassed and Step 3.29 is performed.
- T. Step 3.29 directs performance of a OHA Functional Test of functioning SER(s) IAW S1.OP-SO.ANN-0001(Q).
- U. Step 3.30 allows the procedure to be exited when the previous functional test of both SERs is satisfactorily completed AND the AVS is functioning properly.
- V. Step 3.31 - resets SER B and the Control Room CRT to try to restore some system functionality. It is prefaced with "if these steps NOT previously performed" to break the procedure do-loop on the second time through the procedure.
- W. Step 3.32 and note preceding Step 3.32 send user back to Step 3.18 to see if SER reset restored SER "B" functionality. The user is returned to SER B because it was already previously aligned to the printers, etc. The Note prior to Step 3.32 about concurrent performance of Steps 3.32 and 3.33 is to initiate compensatory actions in the event the OHA System is still totally NOT functional and at the same time determines if SER B is now functional. It is prefaced with "if this step NOT previously performed" to break the procedure do-loop on the second time through the procedure.

2.4 (continued)

- X. Step 3.33 details the compensatory actions to be taken when the OHA System does NOT meet its minimum functional requirements. The step also initiates corrective actions, as required. It is prefaced with “if this step NOT previously performed” because these actions may have already been performed on first run through the procedure.
- Y. Step 3.34 directs a functional test IAW S1.OP-SO.ANN-0001(Q), Overhead Annunciators Operation, to demonstrate OHA System total functionality after the malfunction is corrected and before discontinuing compensatory actions.

2.5 Attachments:

Attachment 1-9

The approach to the structure of these Attachments was to provide a list of alternate indications readily available to the NCO operator that would indicate that an alarm condition does not exist. For example, for alternate indications of a low flow alarm, a flow meter may simply be listed. It is expected that the operator would determine a low flow alarm condition from a low flow condition. In the case where an alarm condition would be determined by the position of switches or light status, the normal (non-alarming) state of the switch or status lights would be listed. Upon finding that an alarm condition exists, the operator will then use the Overhead Annunciator response procedure for the associated window concurrent with this procedure. Each attachment is laid out by window group to allow for ease of use for only a portion of the windows.

Attachment 10:

Due to the overall time constraint of 15 minutes for the ECG call, this attachment is designed to be completed as quickly as possible. The ultimate intent of this attachment is to validate the minimum functional requirements of 3 scanners AND 1 SER AND 1 OHA peripheral. Attachment 10, Section 1.0, is for the Primary SER (SER A) and Attachment 10, Section 2.0 is for the Backup SER (SER B). These attachments contain tables that list the OHA Annunciator Ground Isolation switches, related OHA window box alarms, CRT/local printer points. Only the ten isolation switches utilized in this procedure are included in the table. Toggling the Ground Isolation switches from NORM to ISOLATE and back to NORM momentarily removes the (-)125VDC return path from the associated field contacts. This causes the programmed "normally closed" contacts that "open to alarm" to go into the alarm state if initially clear. It would also cause the programmed "normally open" contacts to clear/reflash if initially in alarm. In either case, the associated window box, CRT/local printer alarms should flash until RESET. Also, because some inputs are "normally open" and others are "normally closed," this test should work equally well when operating at power or when shutdown. Exhibit 1 contains additional information about Manual Alarm Testing. In general, three normally open and three normally closed contacts are observed for each Ground Isolation Switch that is toggled during Manual Alarm Testing. In addition, as many different window box sections as possible are used so that the failure of a single window box section (A, B, C, etc.) would have minimal impact on overall test results. Also based on power distribution to the scanners themselves, there are enough points / switches listed to get 3 functional scanners from the top row (Scanners 1-8), or the bottom row (Scanners 9-12), or a combination of scanners from both top and bottom rows.

Attachment 10, Section 3.0, provides for Independent Verification of OHA Ground Detector Isolation switches being returned to the NORM position.

2.5 Attachments: (continued)

Attachment 11

Provides a place to quickly capture the AVS PLC indications that are illuminated after Manual Transfer to SER B in Step 3.17.

Attachment 12

Provides for recording comments, deficiencies, user names, and final review and approval by the SM/CRS.

Exhibit 1

This is a copy of the "OHA System Brief" that was used to teach the operator the changes that resulted from the root cause evaluation (RCE) for the Unusual Event declared on 3/24/05. This was developed to enhance the simulator demonstrations that were conducted as part of the (RCE) corrective actions. Revised to reflect the latest Manual Alarm Testing methodology.

END OF DOCUMENT